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Insights in teacher education: 2022

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Wounded healer: The impact of a grant-supported scholarship on an underrepresented science, technology, engineering, and mathematics student's career and life

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This study narratively untangles an African–American student's experiences in the throes of receiving a scholarship to study computer science and enter a future Science, Technology, Engineering, and Mathematics (STEM) career. Using the "wounded healer" metaphor as an interpretative lens, this work explores challenges the young adult experienced relating to his development, culture, contextualized learning, family interactions, religious beliefs, and self-identity. The student's stories of teaching-learning, transforming, and healing instantiate the profound impact the grant-supported scholarship had on the youth's development, life, and career trajectory. Additionally, new connections between narrative and metaphor are forged in ways that strengthen the sense made of teaching-learning, culture, and social interactions in higher education.

KEYWORDS

higher education, scholarships, STEM, learning, teaching, narrative, metaphor, identity

Introduction

Through ongoing interviews/focus groups with undergraduate/graduate students awarded scholarships from six National Science Foundation (NSF)-funded Science, Technology, Engineering, and Mathematics (STEM) grants in the United States, remarkable plotlines illuminating how these scholarships changed students' learning and lives emerged. Among the many elicited stories, one hope narrative stood out. This

particular hope story demanded reflection and retelling, given the obstacles a young African–American overcame on his journey to becoming a STEM professional. In this work, we share the higher education experience of Kadeem Bello, a Nigerian immigrant who became an American citizen and began studying the STEM disciplines at a research-intensive university in a northern state before enrolling in computer science at a research-intensive university in a southern state. Kadeem's personal narrative conveys the profound impact that NSF scholarships can have on students' learning, lives, and career trajectories.

Before we unspool Kadeem's wounded healer story, we present our literature review, theoretical framework, and research method. We next share the raw narrative Kadeem unraveled and reframe his narrative using the wounded healer metaphor as an interpretative lens to "shine a light" (Lamott, 2018, p. 95) on the challenges he experienced. Craig's (2001) "monkey's paw" article provided a model for how we might undertake the complex task of capturing Kadeem's "being" and "becoming" (Greene, 1995) a metaphorical wounded healer in the throes of being awarded a scholarship to study computer science and enter a future STEM career.

Literature review

Scholarship grants

The genesis of NSF's efforts did not grow entirely from altruistic roots. Rather, U.S. initially experienced an unsuccessful "race to space." The country's historical loss to a less technological nation threatened America's global standing. Because of these necessity-driven security problems, "NSF is not interested in benefits; its main concern is with meeting its goals," one of the grants' co-principal investigators with 40 years in higher education informed us. Foundationally, NSF does not intentionally strive to enhance NSF scholarship recipients' careers and lives. Indeed, as the co-principal investigator concluded: "NSF is not in that business." Given that NSF's purpose is to increase the productivity and innovative outcomes of the scientific community, the foundation introduced scholarship grant programs aimed at producing more STEM learners/workers, thus addressing the one-million job shortfall in STEM (Holdren and Lander, 2012). Hence, NSF's funded scholarship grant programs are a targeted means to an anticipated end—with its intended outcome being increased STEM production/advancement and national/international security.

Instrumentalism

Amid this means-ends tension sits another important consideration: instrumentalism. From one point of view, instrumentalism means keeping the means-ends relationship at the forefront of action and not deviating from the plan. At a second level, instrumentalist-driven policies are foundational to technical-economic-educational development. Thus, funded grant programs emphasize the achievement of predetermined outcomes—the future employability of undergraduate/graduate students in STEM positions that will meet projected needs in the country's labor market and secure the homeland from physical/virtual attack. This instrumentalist view forms a contrast with academic/personal growth and/or career development. While NSF's ends are undisputedly important, the "radical possibilities" (Phelan, 2009, p. 105) of education are constrained because attention is not paid to "the distinction between utility and meaningfulness. . ." (Arendt, 1998, p. 157). The "logic of utility risks reducing" human beings "to a means to some end" (Phelan, 2009, p. 110). The pragmatic guiding forces behind NSF's scholarship investments prove the narrative findings of this study to be all the more novel and compelling.

Theoretical framework

Five concepts underpin this narrative inquiry: (1) experience, (2) story, (3) metaphor, (4) identity, and (5) value.

Experience

Education and experience are intimately connected with each dialectically informing the other. In Dewey's (1938) theory of experience, past experience links with present experience, which informs future experience. Unfortunately, not all experiences are instructive. Some may be miseducative. One paradox is that miseducative experiences can become educative if reflected upon. Another paradox is that experience works in both active and passive ways. Kadeem, for instance, accepted an NSF-funded scholarship with the intent of furthering his academic education/entering a STEM career. However, it was impossible to predict that the experience of the scholarship would change not only his career but his life. This is because experience has an all-encompassing effect: it shapes what students like Kadeem know, do, and who they are.

Story

Another of experience's anomalies is that humans have no access to experience in its raw form except through modes like story. Narrative is almost the only way experience can be made known to self/others. Researchers championing narrative approaches maintain that their favoring of storied methods/forms trace to the centrality of educational experience. They claim there would be no need for story in the study of education if it was not for experience. Narratives, though, risk

becoming "stuck" or "frozen." They can become "ruling stories we do not dare step out of" (Conle, 1999, p. 21).

Thankfully, humans are able to make personal choices (Schwab, 1960/1978). As Weill (2013) noted, we can "apprehend stories. . . [and] awaken to new perspective[s] [and] to new possibilities. . ." (p. 152–160). Through rigorous reflection, we may "see that our misery [is] only. . . us looking through the stories with which we had defined the world and our difficult feelings simply are our body's responses to those narratives" (p. 160–164).

Cases in point are those in the teen and young adult phases of life. They necessarily must engage in self-facing (Anzaldua, 1987/1999) to gain self-knowledge and become independent of their parents. Thus, they delve deeply into their family narratives that may or may not have negatively impacted their psyches. In the process, they uncover "damaged parents, poverty, abuse, addiction, disease, and other (un) pleasantries." They eventually realize that "life . . . damages people" (Lamott, 2018, p. 59) and find "way[s] to be part of and apart from [these influences]"; they discover "way[s] of holding on and [ways of] letting go" (Stone, 1988, p. 244).

Metaphor

Metaphor is closely linked to experience and story. Humans come to know experiences through storytelling and metaphor-making (Lakoff and Johnson, 1980). Some consider metaphors condensed narratives (Ritchie, 2010); others call them "two sides of the same coin" (Arkhipenka and Lupasco, 2019, p. 221). Still, others claim "metaphors [i.e., wounded healer] contain narrative life [and] narrative potentiality. . .[and] are sparks of stories" (Penwarden, 2019, p. 256).

Identity

"Stories to live by" denote identity. Humans story/re-story their identities through revisiting/revising their experiences narratively. This process includes one's cultural background. One's identity is both personal and social. Identities are fluidly "formed and reformed by the [multitude of] stories [individuals are told] and which [they] draw upon in [their] communications with others" (Beijaard et al., 2004, p. 123). Identity is always in the making and never made (Greene, 1995).

Value

One's values stem from a natural tendency to gravitate toward the good. In short, "values underpin what we respect and care about, and determine why we aspire to certain modes of life, actions and responses more than others" (Gill, 2014, p. 20). The capacity to lead a happy life is linked to "one's capacity to create value—specifically values of aesthetic or sensory beauty, individual gain, and social good—in and from any circumstances" (Goulah, 2015, p. 254). Taylor (1989) considers values, "hypergoods," that form our frameworks for judgments and decisions. Values/hypergoods allow humans "to equip [them]selves with. . .capacities to make strong evaluations in relation to what [they] do and how [they] are in the world" (Gill, 2014, p. 20).

A self-fulfilling life involves non-instrumentally valuable activities; that is, activities that do not satisfy means-ends purposes in the act of becoming one's best-loved self (Schwab, 1954; Craig, 2013, 2017, 2020). Following Aristotle, values such as the appreciation of others, the ability to reformulate problems, being open to others' views, and having a rich inner life are important because "mind, body, heart and spirit connections" fuel people's being and becoming (Goodson and Gill, 2011, p. 115). Specific to Kadeem is the distinct culture of the African continent and its adherence to Ubuntu—the belief that "I am because we are," a worldview that values caring, sharing, reciprocity, cooperation, compassion, and empathy.

Research method

Narrative inquiry

Narrative inquiry is the "experiential study of experience" (Xu and Connelly, 2010, p. 354) with narrative serving as both phenomenon and method. Story is a "portal through which a person enters the world" (Connelly and Clandinin, 2005, p. 477) and a "portal to experience" (Xu and Connelly, 2010, p. 352). In essence, narrative inquiry provides "a gateway. . .to meaning and significance" (Xu and Connelly, 2010, p. 356). It is ". . .a way of understanding experience. It is a collaboration between researcher[s] and participant, over time, in a place. . . in several social interactions" (Clandinin and Connelly, 2000, p. 20).

Narrative inquirers suspend judgment as participants' experiences unfold. They are careful not to let their knowledge overpower what their research participants are discovering. They take preventative steps to ensure that their voices do not drown out or write over the experiences and voices of those in their studies (Clandinin and Huber, 2010). They leave their participants' experiences and their narrative inquiries open to interpretation rather than forcing closure (Phelan, 2009). They know their work is inherently "unfinished and unfinishable business" (Elbaz-Luwisch, 2006). They are keenly aware that life continues despite research inquiries ending. They do not "collaps[e] disparate perspectives into unanimity" (Phelan, 2009, p. 111), take pattern as meaning, but instead embrace particularity, plurality, and unpredictability of actions, which reveals and "gives expression to what other approaches might

think impossible to explore" (Phelan, 2009, p. 111), such as Kadeem's identification of "hope" in his STEM study and life narrative.

Sources of evidence

This study's evidence was produced through (1) interviews, (2) focus groups, (3) participant observation, (4) creating video clips, and (5) a digital narrative inquiry product. We presented Kadeem's storied data in a digital narrative format first due to the delicate nature of his storyline (Lee et al., 2018). Creating the precautionary digital narrative before initiating this written narrative inquiry fostered a deeper trust between Kadeem and ourselves. We took this not-previously attempted approach because we were acutely aware of Kadeem's vulnerability. We wanted to respect his boundaries while capturing and representing his lived educational experience with "candor [and] proper circumspection" (Nash, 2004, p. 31).

Tools of analysis

Broadening, burrowing, and storying and restorying were the analytical tools we used to interpret and seam together Kadeem's narrative. We used these sense-making devices to transition our field texts into research texts. Broadening allowed us to include a brief history of NSF in the US and to consider the theory of action underlying its scholarship grant programs. Burrowing prompted us to examine Kadeem's stories and how they unfolded over time and across hemispheres. Meanwhile, storying and restorying (re-selfing, Goodson (2013) calls it) animated circumstances that spurred Kadeem to change. Together, broadening, burrowing, and storying/restorying allowed us to explore Kadeem's experiences in a "three-dimensional narrative inquiry space" (Clandinin and Connelly, 2000), which simultaneously accounts for temporality, personal/social interactions, and places.

A fourth tool, fictionalization (Clandinin et al., 2006), provided a way to mask Kadeem's identity. We did this by slightly altering his description without significantly changing his story. Our action-cloaked secrets Kadeem may not want to be divulged.

Trustworthiness

Narrative inquiry research privileges narrative truth (Spence, 1984) and follows where stories lead rather than through prescriptive structures. This does not mean we are not concerned with historical truth. However, we entered into this inquiry and present our research texts narratively. Readers decide whether our research with Kadeem adds to their knowledge and is actionable.

Kadeem Bello's wounded healer story

Kadeem Bello, a competitive scholarship recipient, is enrolled in computer science at a research-intensive university in Greater Houston. Though he currently exudes academic/career promise, Kadeem's path to success has been arduous and circuitous. His self-description starts with his challenging Nigerian "middle-child" upbringing. Interviews revealed school experiences of being bullied because he was "sensitive" and "skinny/wore glasses." Though the antithesis of his current appearance—strong, athletic—his past "nerdishness" was perceived as a weakness by peers and even his parents in his local cultural context.

While faith was integral to Kadeem's childhood, his family's faith culture seemed more structurally litigious than grace-focused. Kadeem recalled an over-emphasis on churching:

> Yeah, it was a Christian family, so we did lots of church activities, and the cool things that. . . religious people do, you know, go to church and go to. . .Bible studies. . .we spent so much time on that. . .

Aligned with their religious beliefs, Kadeem's strict parents meted out physical punishment, supporting the culturally accepted adage of "spare the rod, spoil the child." Kadeem recalls punishment as a regular part of his childhood experience, "I would come home, I would get beat up. It was harsh growing up. . .." Though the physicality of such punishment is at odds with current Western mores, Kadeem affirmed that it was normal "maybe 10 or 20 years ago [when it was] still okay to beat up your child. . ." in Nigeria. It was for these reasons, and others, that Kadeem began to "question everything [he had] come to know" and learned "from watching American movies, which gave insights into other ways of living" cataloged in his own lived experiences.

Understandably, the intense focus on religion juxtaposed with bullying at school and corporal punishment at home, put Kadeem on a sojourn down a dark path "already heading toward depression." Fueled by idealistic western media images, Kadeem independently traveled to America to seek a new life; however, his fresh start in the northern state introduced new challenges:

> And when I came, my parents sponsored it, right? But once I got over here, I wanted to support myself and become independent. But. . . I overworked and I was even getting more depressed and well. . . I was diagnosed with major depression.

Fighting for his life after attempting to end it, Kadeem desperately called his self-proclaimed "angel," a white female

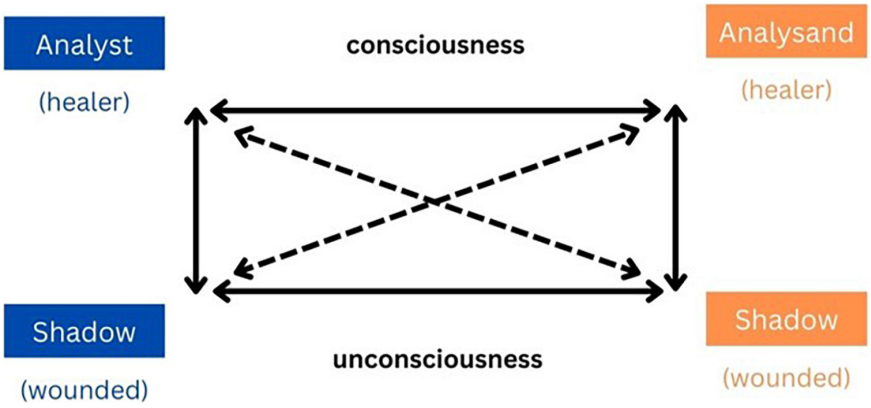

FIGURE 1
The relationship between the healer and the wounded (based on Frith Luton, 2019).

professor he met on his flight from Nigeria, for emergency help. This "angel" brought him into her family where he was invited to live and heal while struggling with mental health issues. He confided,

> She helped me a lot. One time when I was going to hang myself, she was the one I called. . .she even let me stay at her place. She's married with a little kid. She helped—she did so much for me.

When Kadeem Bello became healthier, his uncle brought him to Texas; however, not long after Kadeem settled in, tragedy struck again. This time, a devastating flood destroyed his car, and he was forced to abandon his previously affordable, no longer inhabitable, apartment.

> Kadeem: So last year,—okay, I had a friend. I was staying at his place, and I was paying about $500. So that was after one of my last leases expired, because I didn't have enough ($$$) to get another place. . .So, I stayed at his place. And around May 30, he was flooded out Greater Houston. That was when all this flooding. . . started. I lost my car, so that. . .ruined everything. . . because May 30 is just when summer is really beginning, and that's when you plan to save money. . .. So that messed up everything.

Without financial means to secure a new lease or cultural capital to find more affordable accommodation, Kadeem took to couch surfing which worsened his depression. Without the good sleep essential to mental health, Kadeem lived in a friend's storage space for months, homeless, hot, and frequently without hope. But, due to his lack of work and his inability to achieve future goals without negative financial indebtedness, this situation seemed to be his best option:

> So, my storage unit is quiet and it's dark. I mean, around August it was hot, so it was kind of a struggle. . .But in October, then the weather changes, it was pretty comfortable. October through March, the weather was pretty good. It wasn't a bad place to sleep. But it gets spooky and rats are running around.

Kadeem then shared his most unnerving experience:

> I got scared one time. Someone was trying to break into people's storage units. So I called the cops and that didn't do me good, because it made me expose that I was sleeping in that unit. . .but I just decided to keep on staying there to just save up some money.

Despite being more financially secure, Kadeem continued to stay there to save money to live near a school in a future "safe area." Kadeem also reflected on his future and career/life goals:

> I was soul searching. . . I questioned many things, and felt I needed to change. I felt like the only reasonable way for me to really live in this world was if I did things more realistically, more logically. If I was more rational rather than accepting the belief system that my parents told me. . . I never really had any real reason (why) I'm doing this or that.

Kadeem also began to question his own religious beliefs in relation to his experiences. Though his initial reflective analysis led to a desire to "step away from that" with a view that "religion is really bad for the world," he eventually decided against extreme views, declaring "I'm not an extreme kind of person. . .because my belief in reason won't let me stay in such extremes." He further elucidated his evolving scientific perspective by delving into his current religious preponderances, "If I'm going to be a scientist, I have to think

like a scientist. And scientists. . .consider possibilities. . . You have to know something for certain. . . I had to keep the [God] door open."

Relentless, he Kadeem persevered and continued taking classes toward his eventual goal. Concurrent with Kadeem's homelessness and his identity growth experiences, by purely universal intervention and a great measure of luck, Kadeem was introduced to the NSF-sponsored scholarship program in a class. The scholarship program offered an avenue to greater financial and life stability. The scientifically grounded field of computer science offered him the logical transmutations of meaning he sought and yearned for. After being awarded the scholarship, Kadeem intuited the benefits to his mental health. Once he received the first installment of his scholarship, Kadeem reflected on the now positive trajectory of his future, "[The scholarship] has given me hope," he declared, "Over the past year, I was pretty much sleeping in [a] storage unit. . .that is, until last week. The scholarship has allowed me to hang in there; I found hope in knowing that something is coming." Kadeem reflected backward on the tremendous burden the scholarship lifted, citing, "it took so much stress away" and helped greatly to ease his depression. When asked about other benefits, Kadeem recalls site visits (i.e., Hewlett-Packard), but most genuine perhaps was this exchange about the grant program's helpfulness:

> Researcher: So, this has benefited you greatly then?
> Kadeem: Oh, hell, yes.

Kadeem also revealed his "aspiration to open up a lab" so he can do "helpful research." He further acknowledged that "the scholarship heightened [his] sense of compassion" and birthed a desire in him to heal others with his long-term goal of being one who shares learning resources with other African children in need. Kadeem grounds his desire to do research within a human frame, asserting that "we humans will be better off if we value research" more than profit, and that we "all do better when we all are better," a phrase reflecting the Ubuntu belief that "we should care about the improvement of others," and not just be "concerned about improving ourselves." The compassion afforded Kadeem *via* the STEM scholarship seeded and expanded his generosity toward others. No longer living in the clutches of undiagnosed depression, Kadeem claimed he is a "wounded healer and ambassador," an agent of change bringing hope to others in crisis.

Unpacking the wounded healer metaphor

The wound is where the light enters in—Rumi (2004).

The image of the wounded healer that Kadeem Bello called forth in his narrative is a psychological construct of Carl Jung. It is the most well-known of Jung's 12 archetypes, the one most spread in society's mainstream and pop cultures, which we presaged through using spoken word excepts. The driving force behind Jung's wounded healer is that analysts treat patients with wounds because analysts themselves have been wounded (**Figure 1**). It follows that those previously healed can best tend to others' wounds. Psychic healing requires companionship rather than a hierarchical relationship. Jung shared Freud's response to the wounded healer archetype:

> Freud. . .accepted my suggestion that every doctor should submit to. . .analysis before inserting himself [*sic*] in the unconscious of his [*sic*] patients for therapeutic purposes. . .. We could say. . . that a good half of every treatment. . .consists in the doctor's examining himself, for only what he can put right in himself can be right in the patient. This, and nothing else, is the meaning of the Greek myth of the wounded physician (Jung, 1953, Collected Works, Vol. 12, p. 115–116).

Jung traces his well-known construct to Greek mythology, specifically to the Chiron myth about the centaur wounded by an unintentional arrow from Heracles' bow. However, Chiron did not die. Rather, he experienced agonizing pain for life. Because of his wound, Chiron became celebrated as a legendary Greek healer. Later, an orphan was placed in his care. That orphan became the Greek God of Healing because he used harmless Asklepieion snakes in healing rituals. The single serpent wrapped around a cypress branch—the widely recognized Rod of Asklepios—symbolizes medicine today. The wounded healer myth, which Jung attributed to the Greeks, exists in other cultures as well (i.e., African Shamanistic tradition, the Muslim physician Al-Raz, the Jewish Talmud, children's novel, Pollyanna). For example, the quote from Rumi, the Persian Muslim poet, indicates how widespread the wounded healer metaphor was prior to the Greeks, who are credited with forming the roots of western civilization.

Retelling Kadeem Bello's wounded healer story

Kadeem's story is now re-told and reframed through the unpacked wounded healer metaphor, on which subtle nuances of his storied experience are captured. First, based on Jung's archetype, we shine the spotlight on how social, emotional, cultural, and intellectual contexts surrounding the psychologically wounded boy from Nigeria served to activate the inner healer. We then couple this psychoanalytic unraveling of Kadeem's story with the Chiron myth, interpreting his "being" and "becoming" as not only a wounded healer but a "wounded storyteller" (Frank, 1995). It further reflects the reciprocal aspect of Kadeem's wounded healer/storyteller story.

Jung's wounded healer polarity (**Figure 1**) illuminates the paradoxical coexistence of the wound and the inner healer in Kadeem's story to live by. When revisiting his narrative with this in mind, we came to view it from a different angle. As shown in **Figure 2**, Kadeem's "being wounded" and "being the inner healer" is disconnected when they are left unconscious. When it comes to his unconscious woundedness in his childhood story to live by, his wounded being is likened to that of Chiron. Like the arrow causing Chiron's wound was accidentally discharged from Hercules's bow, his parents' use of corporal punishment left Kadeem scarred unintentionally.

The unintended, unconscious woundedness bubbled to the surface of his consciousness when Kadeem's being "one of those sensitive kids" who used to "question everything" was strengthened by exposure to American culture through media.

Put differently, the self-questioning and cultural exposure enkindled the existential acceptance of Kadeem's woundedness and sharpened his awareness of "narrative incoherence" (Carr, 1986) between his ideal story to live by and his lived story. Accordingly, the conscious attention to the ontological discomfort activated Kadeem's thirst to be healed and led him to leave the African continent in seeking "other ways of life." Differently speaking, Kadeem's sense of his own woundedness awakened his hidden inner healer and provoked his story to live by to shift into his story to leave by Clandinin et al. (2009).

Although Kadeem had an increased awareness of the intrapsychic healer, his woundedness became worsened due to the unstable financial situation he experienced with the severe flood in America, the land he had dreamed of settling down in to actualize his ideal story to live by. Fortunately, already uncovered unconscious woundedness enabled Kadeem to seek an external healer, a campus therapist who could strengthen his inner healer. For Kadeem, the relationship between his external and inner healers was not restricted to the therapeutic realm. In addition to the prescription the doctors issued him, what actually facilitated his inner healer to be integrated into consciousness were (1) social interactions with others, including his official mentor in the scholarship program, the advisor for international students, and the "angel," (2) emotional supports from them, and (3) intellectual experiences he had as an NSF scholarship student. Significantly, the knowledge he gained from the scholarship program experience brought greater awareness and integration of Kadeem's own wound and inner healer; he began to see his woundedness "more realistically, more logically" through the interdisciplinary lens of computer science and neuroscience.

Growing as an integrated and conscious wounded healer, Kadeem now dreams of becoming a computer scientist who heals the other wounded with more scientific knowledge helping to see his wound through neuroscientific investigations and "helpful research." Kadeem's spirit of Ubuntu parallels the paradox of the mythological wounded healer, Chiron; though Chiron has to carry his incurable wound with him, he can cure others using "the knowledge of a wound in which the healer forever partakes" (Kerenyi, 1959, p. 98–99). Further, Kadeem's becoming a wounded healer revealed his identity as a "wounded storyteller" (Frank, 1995), an associated dimension of wounded healing. In exchanges of narratives through the interviews and the digital narrative inquiry process, Kadeem's sharing his painful but hopeful story was a wish that the dissemination of his wounded healer story would inspire wounded others to uncover their own unconscious inner healer. Also, the consecutive telling/retelling of Kadeem's experience through traditional and digital narrative inquiry fostered iterative reciprocal healing between the participant and the authors. In the open-ended interview and the digital storytelling situations, the image of Kadeem's wounded healer was narratively projected onto us and activated the wounded healer polarity in ourselves. We each became consciously aware of the woundedness and the hidden healers within ourselves while attending to Kadeem's wounded healer narrative.

Emergent themes

In Kadeem's hope story and in our re-telling of his narrative using Jung's archetypal metaphor, five overarching themes surfaced: (1) continuum of life; (2) role of the stranger; (3) narrative, trauma, and identity; (4) metaphor, narrative and truth; and (5) arrogant perception-loving acceptance of others and their worldviews.

Continuum of life

Kadeem did not arbitrarily decide that he would be a wounded healer and an ambassador of hope to African children in crisis. Rather, events in his unfolding life conspired together to give shape to this plotline that developed amid his past–present–future life continuum. As King (2003) reminded us, "memory of the past is continuously modified by the experiences of the present and of the 'self' that is doing the remembering" (p. 33). Through this rigorous, reflective process requiring Kadeem to think backward, forward, inside, and out (Clandinin and Connelly, 2000), his storied version of the wounded healer found a voice and gradually surfaced as an intimate part of his being. The wounded healer narrative necessarily had antecedent cultural, familial, and personal experiences that laid the foundation for its telling (Sacks, 2017). Kadeem's description of his bookish appearance, his identification of bullying and harsh physical/mental punishment, his positioning as a middle child (angry, wanting to fit in), and his fervent desire to break free from the excesses of his parents' religious practices set the stage for him moving to the U.S. to pursue his higher education. His expressed purpose was to create a brighter future. However, much to his chagrin, shadows from his past

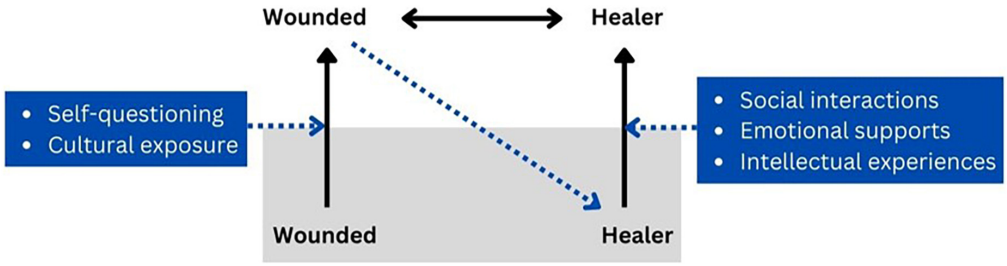

FIGURE 2
Kadeem Bello's being and becoming a wounded healer.

accompanied him on his transnational journey. Not only did he carry suitcases to America but his "complicated" Nigerian life also accompanied him like carry-on luggage filled to the brim with unresolved baggage needing to be sorted out (Penwarden, 2019). In Kadeem's new setting—an ocean away from his family—and working inordinate hours so he would not feel financially indebted to his parents, he fell into a deep depression. The massive shifts he experienced while changing continents unhinged his withered story to live by while stoking his story to leave by, creating narrative wreckage for which psychological attention was required. Kadeem realized he had no other choice but to deal with his psychic upheaval because it curtailed the healthier, more productive life he had in mind for himself.

Role of the stranger

Kadeem's turning point in his narrative paradoxically involved a stranger, a white female professor seated beside him on his flight to the U.S. That professor provided him with food, shelter, and advice. His "angel," as he called her, helped him to come to terms with his depression, encouraged him to have it medically treated, and assisted him in learning the conditions (i.e., proper sleep habits) he needed to manage it. Kadeem's female stranger incidentally was not unlike Schwab's stranger—a man at a train station who strangely enough gave that 15-year-old boy money to escape his parents and his hometown and to travel to Chicago where he would commence his career as one of the U.S.'s most-renowned scholars. Kadeem's stranger—like Schwab's stranger story, which Cheryl Craig laid alongside Kadeem's story in the first interview—served as a harbinger of change, a junctional figure who walked alongside Kadeem as he came to grips with his mental health condition and his ghosts from the past. Interestingly, Kadeem's interactions with this professor, like Schwab's interactions with the stranger at the train station, were only for a fleeting time. When we later questioned whether he would contact the professor, Kadeem indicated that he would follow up after graduation. He wanted his "angel" to know that her assistance had brought him successfully full circle and that he would soon be embarking on a career merging neuroscience and computer science. We also noted that Kadeem's use of computer science to study the nervous system and psychiatric disorders uncannily resonated with his biography and his experiences. His area of emphasis likewise fulfilled the familial and cultural expectations placed on him as a first-generation immigrant hailing from the African continent where being a doctor—or a "double doctor" (Kadeem's dream)—personified the achievement of the American Dream, a plotline with which Kadeem had been long enamored.

In addition to Kadeem's "angel," other strangers played key roles: (1) his uncle and (2) our research team. Identifying a full-blood relative as a stranger initially seemed illogical. However, that was the case. While his uncle accompanied Kadeem from Chicago to Greater Houston, his uncle was not on the scene from that point onward. It is entirely possible that his uncle and his family also suffered hardship during the gulf coast debacle. But it could also be that Kadeem cast his uncle as a third parent in his life story, an individual he intentionally kept at arms-length because he feared his uncle would act as a conduit channeling news to his parents. As researchers, we will never know whether these two options or some other possibility were at work. But we do know from the literature that strangers have played pivotal roles in people's stories since the beginning of time as sacred books from all belief systems attest.

The third manifestation of the stranger was our research team. The germinal seed for this article was planted in the initial interview that Cheryl Craig conducted with Kadeem Bello. Craig used a battery of open-ended interview queries mirroring the questions she asked other participating NSF scholarship students. However, it seems the "narrative environment" (Baboulene et al., 2019, p. 33) she created provided the conditions Kadeem needed to publicly own his experiences leading up to his voicing of his emergent healer/ambassador of hope plotline. In her field notes, Craig wrote that Kadeem's story seemed to "spill out" because it had to. Put differently, both interviewer and interviewee shared "a [sense of a] . . .deep arrival of something unavoidable" (Lamott, 2018, p. 135) in their inaugural interaction. In retrospect, it seems Kadeem had reached a turning point and desired to "make the inchoate

intelligible" (Kerby, 1991, p. 45). He was ready to claim his narrative authority of his life experiences following his recovery from debilitating depression. Critically important to his improved condition was his access to university counseling services, a healthcare plan that paid for medications, an apartment with optimal sleeping conditions, and an academic environment where his professor welcomed and encouraged his questioning, all conditions made possible by his NSF-funded scholarship.

Still, we, as researchers, were understandably cautious. We were deeply aware that people not only "need to be careful of the stories [we] tell" but also "watch for the stories [we] are told" (King, 2003, p. 10). We had no interest in crafting a hot story (Lamott, 2018) that capitalized on Kadeem's fragility by instrumentalizing him in the research process. As a team, we decided to first give Kadeem's narrative back to him in a digital narrative inquiry form. After viewing his narrative devoid of personal photographs and with an anonymous storyteller speaking his words/feelings into being, Kadeem could decide what he wanted told/not told about his life experiences or declare that he did not want his autobiography shared at all. We observed as Kadeem intently viewed the digital narrative footage. To our relief, he found no objection. He added points of clarification, granted his permission a second time around, and authorized the subsequent writing of this article. Kadeem's continuing approval sealed our continuing research relationship. It also determined the degree to which he was ready to meet a world of strangers by presenting his life thus far (Penwarden, 2019). He was eager to show that he had changed his life narrative by personally dealing with depression, its sources, and its triggers, and, in the process, transformed the quality of his life while bettering his life chances (King, 2003). Sharing his journey with others made his life "more livable" (Popova, 2013, p. 336). Time taught both Kadeem and us that his wounded healer narrative instantiated how he had "all that [he] needed to come through. . ." (Lamott, 2018, p. 189). Through Kadeem Bello's telling/re-telling and his drawing on his bred-in-his-bones understanding of Ubuntu, he "claim [ed] the events of [his] life [and] made [his self] [his own]." In possession of all he "[had] been and done," he no longer needed to tell cover stories to family or strangers. The counter-story he had crafted alongside his counselor meant he could unapologetically be "fierce with reality" (Scott-Maxwell cited in Palmer, 2018, p. 173)—even its most painful parts.

Narrative, trauma, and identity

Kadeem's eventual release of his story to the world would not have occurred had he not dealt with the narrative incoherence previously happening in his life. He had been a victim of bullying and physical/psychological punishment. He attributed both phenomena to his culture/generation/time in which his childhood unfolded in Nigeria; he also connected his parents' punishment to their fundamentalist religious beliefs. In Kadeem's view, his country's culture, coupled with his family's religion of choice, had fixed him (Hekman, 2000) in ways contrary to how he would personally story/position himself as a developing youth. These "single stories" of Kadeem were "dangerous and caused harm" (Adichie, 2009) to his sensitive childhood story to live by. The narrative his culture and parents bestowed on him was what he wanted to shake off later in life. He organically knew that some stories he had been given had positively formed him (i.e., his focus on high achievement and his understanding of Ubuntu), while others (i.e., bullying, physical/mental abuse) had unintentionally disformed him (Sacks, 2019). "Others' words," to cite Beckett (1953/1958), had become who he was and what he was made of. Such words had served as "'swords' to attack his diminishing sense of self" (Popova, 2019, p. 356). The continuous echoing of these "stock-plots" (Lindemann Nelson, 2001) drowned out the story he was attempting to live by and left him "unable to maintain. . .. continuity [and] a genuine inner world of self" (Sacks, 1998, p. 111). When he approached the female professor/stranger in desperation, she advised him to seek professional help. At her insistence, he entered therapy because "the [dominant] narratives storying [his] experiences" were out-of-synch with his "lived experiences" (White et al., 1990, p. 80). The time was ripe for Kadeem to self-face alongside a skilled professional. How his life experiences had alienated and worn him down needed to be addressed. It was time for him to narratively trace the sources of his sorrow (the arrow) and how his childhood and teen traumas (later compounded by Greater Houston flood) (the bow) had continued to psychologically injure him. Kadeem's request for help from a stranger created "a crack" in his frozen story to live by. That crack opened up a "possibility [for him] retelling [his] life" (Clandinin et al., 2010, p. 84) in a more psychologically healthy way. Kadeem furthermore needed to expose the stories fixing him for what they were: stereotypes. These stereotypes were not only untrue but also incomplete because the unintended damage invoked years ago was currently given too much play and causing too much pain. Through telling/re-telling his stories to his therapist and having those stories told/re-told to him, he was more confidently able to determine "who [he] was" (Silko, 1997, p. 30) in a more multi-dimensional, self-satisfying way.

Metaphors, narrative, and truth

Not only did Kadeem reclaim his preferred identity through narrative but he also likewise found the truth of his life. This "convincing whole" richly informed his forward-moving story. Further to this, the campus therapist he visited after the flood officially introduced him to the wounded healer archetype, divulging that he also had been wounded and had since helped others nurse their wounds. This spoken metaphor served as "a flash of connection" (Egan, 2017; Edwards, 2018)

for Kadeem. Once uttered, it became a vehicle through which he could "re-author [his] conversations" (White et al., 1990) with his counselor and eventually with us. Because we understand how narrative pedagogies work but do not necessarily know the inner dynamics of therapeutic counseling narratives, we surmise that Kadeem's therapist challenged his client (Kadeem) to reclaim his experiences, while concurrently freeing himself of the victimhood that had weighed him down for decades. In other words, Kadeem learned that he needed to stop accepting the victim plotline. He needed to claim the narrative truth (Spence, 1984) of his life and to recognize that it was more real than the pseudo-narrative truths that others had perpetuated and that he—deleterious to his story to live by—felt forced to live within. Kadeem found that his claiming of "devastating experiences of deep darkness. . .. did not negate the light that also [was] part of who [he] was" (Palmer, 2018, p. 65). With great clarity, he could see that his "suffering [could] be transformed into something that brings life" (Palmer, 2018, pp. 46–47). Rather than being broken apart by depression, Kadeem's narrative was "broken open" (Palmer, 2018, p. 49) to the world. This new understanding enabled him to share his story widely and to assist children to benefit from his wounded healer experience where "failure morphed into fulfillment" (Palmer, 2018, p. 35).

Arrogant perception, loving acceptance, and identity

A fifth prominent narrative thread is intermingled in Kadeem's wounded healer story: his movement from arrogantly perceiving his Nigerian parents and their Christian faith to his loving acceptance of them and the religious views they held and expressed (Lugones, 1990). Readers will recall that Kadeem initially trivialized and then riled against his parents' faith. In fact, he privileged science over religion in his first interview. However, when the research study ended, Kadeem had learned a great deal more about being a scientist and how discarding religious belief without holding religion open to inquiry would not be something a scientist would do. He knew that the final score on the religion–science debate probably would never be reached. He had come to know that "science grows out of its past but never outgrows it, any more than [young adults] can outgrow their childhoods" (Sacks, 2019, p. 39).

Closing statement

Kadeem Bello, a computer science student who received an NSF-sponsored scholarship, ended his story by declaring himself a wounded healer and an ambassador of hope. Kadeem's personal identification with Jung's archetypal metaphor enabled us to sift the events in his experiential narrative "through the conceptual lens proposed by the person utter[ing] it" (Hanne, 2015, p. 24). Our resultant work forged new connections between narrative and metaphor and underscored the importance of opening up stories (Greene, 1995) as a way to strengthen wellbeing. More specifically, Kadeem Bello's hope story demonstrates how "narrative agency can challenge the impact of trauma on. . .identity" (Lucas, 2016, p. 23), which, with time and attention, gives narrative cohesion to a past–present–future that previously was stuck and unable to be dislodged. This allowed Kadeem to subsume new identity threads and to consider new future possibilities. All this was accomplished through unpacking two seemingly contradictory ideas (wounded + healer) and animating how the metaphor "disturb[ed] a whole network of meaning [through] aberrant attribution" (Ricoeur, 2003, p. 23). The wounded healer metaphor further proved to be the "gloved hand that touch[ed] lightly but true" (Lane, 1988, p. 6) on Kadeem's experiential continuum. Our following of his chosen story caused us to revisit his narrative through the metaphoric lens of the wounded healer, which surprisingly managed to "heal and transform" him (Greene, 1995, p. 17) and awaken us to the import of his narrative not only for him, but for us and others globally reading and learning from it. Most importantly, Kadeem's scholarship not only prepared him to be a STEM professional earning an above-average wage, but taught him the inordinately important life lesson that "you are the only custodian of your integrity and the assumptions made by those who misunderstand who you are and what you stand for reveals a great deal more about them and absolutely nothing about you" (Popova, 2013).

Because of his more keenly refined understanding of his Nigerian/American cultural practices and his awareness of social interactions that previously wounded him, Kadeem Bello was able to confidently continue his life with a deep sense of hope, knowing he had laid past insecurities to rest, and that his story of overcoming odds that would have incapacitated others, could now stand as a national and international model that others—particularly other African, African–American, and African immigrant youth—can emulate in the future.

Data availability statement

The data that support the findings of this study are not publicly available due to their containing information that could compromise the privacy of the research participant. The digital narrative inquiry that conveys key themes can be retrieved at https://youtu.be/_ca_LYIwW94.

Ethics statement

This study involving human participants was reviewed and approved by an Institutional Review Board. The participant

consented to participate in this study. The participant was given the option to withdraw participation at any time.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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RV is the founder of Everest Security and Analytics, Inc.

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A comparative research on teachers' knowledge in five Asia-Pacific countries in the COVID-19 pandemic: The case of tourism and hospitality education

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The COVID-19 outbreak at the beginning of 2020 has drastically impacted almost every aspect of our daily life. Empirical evidence is lacking on which sector of knowledge in technology-enhanced teaching needs to be developed further for tourism and hospitality programs conducted online. The present study investigated teachers' technology, learners, pedagogy, academic discipline content knowledge, and context knowledge (TLPACK) in tourism and hospitality online education settings using comparative research methods. A total of 173 participants from five countries (Indonesia, Philippines, Taiwan, Thailand, and Vietnam) were surveyed online. The results revealed that, despite the fact that they were from different countries, all teachers reached a consensus that their knowledge about learners was the lowest during the online teaching period of the pandemic; meanwhile, they all ranked academic knowledge as the highest among these five variables except Vietnamese teachers who considered their knowledge on pedagogy to be the highest. Additionally, their TLPACK revealed significant differences in various countries and differences in academic discipline content knowledge are caused by the interaction of nationality and gender. This study overcomes a major limitation of previous studies on how the pandemic has affected educational praxis as the focus of previous research has been on the situation in a single country. Therefore, the present study's findings can serve as a reference for practitioners of tourism and hospitality online education in Asia-Pacific region when facing unprecedented and urgent changes of educational practices during and post the COVID-19 pandemic.

KEYWORDS

tourism and hospitality online education, TLPACK, COVID-19 pandemic, Asia-Pacific countries, Bayesian statistics

Introduction

The coronavirus disease of 2019 (known as COVID-19) refers to an infection caused by the severe acute respiratory syndrome coronavirus 2, a novel virus that is transmitted primarily through close contact between people (Carlson, 2020). The outbreak of COVID-19 in the beginning of 2020 has drastically impacted almost every aspect of our daily life, including the way the instruction activities are imparted (Aristovnik et al., 2020; Daniel, 2020). Because traditional face-to-face interactions in the educational context are believed to facilitate the spread of COVID-19 (Carlson, 2020; Aboagye et al., 2021), measures taken by governments related to health restriction, social distancing, and lockdowns have affected teaching and learning locally and globally (Matei, 2021). In order to comply with social distancing requirements, alternative work patterns had to be attempted (O'Leary, 2020; Papagiannidis et al., 2020). Efforts have been made by governments around the world to use distance learning through online learning to replace traditional classroom teaching so that education can continue without the risk of the virus being spread (Widodo et al., 2020). The domain of tourism and hospitality education has also been disrupted by COVID-19 in terms of the teaching and learning of the subject matter. Online learning was an alternative that was both feasible and effective for learning (Carlson, 2020; Dwivedi et al., 2020; Widodo et al., 2020). Hence, the adoption of information and communication technology (ICT) in instruction may soon become normalized (Carroll and Conboy, 2020; Dwivedi et al., 2020). Despite several institutions having planned to integrate technology with instruction, the pandemic has forced a sudden transition in instruction to be implemented without sufficient time for planning and preparation (Daniel, 2020; Chen and Hsu, 2021). Thus, empirical evidence is still lacking on which sector of knowledge in technology-enhanced teaching needs to be developed further for tourism and hospitality programs conducted online.

Previous academic research on teachers' knowledge of using technologies in teaching mainly adopted Mishra and Koehler's technological pedagogical content knowledge (TPACK) framework, whose limitations have been reported (i.e., Angeli and Valanides, 2009; Archambault and Barnett, 2010; Adam, 2016; Aydin et al., 2016; Baser et al., 2016; Peng and Daud, 2016), as well as other frameworks based on TPACK (i.e., Angeli and Valanides, 2009; Saad et al., 2012; Hsu and Chen, 2019). The present study adopted Hsu and Chen (2019) technology, learners, pedagogy, academic discipline content, and context knowledge (TLPACK) framework. Compared with TPACK, TLPACK has two additional variables – knowledge on learners and context – that diversify the framework, helping simultaneously detect various factors in teaching. This study investigates the TLPACK of teachers of tourism and hospitality programs at post-secondary levels in five countries – Indonesia, Philippines, Taiwan, Thailand, and Vietnam. It, thus, overcomes a major limitation of previous studies on how the pandemic has affected educational praxis, which have all focused on the situation in a single country (Aristovnik et al., 2020). Moreover, there is scarce pertinent research on how tourism and hospitality education in Asia-pacific countries have been affected by the pandemic. To bridge this gap, two research questions were proposed:

> ***RQ1***: What is the TLPACK of tourism and hospitality teachers from Indonesia, Philippines, Taiwan, Thailand, and Vietnam during the COVID-19 pandemic?
>
> ***RQ2***: Do teachers of tourism and hospitality programs from these five countries have significantly different TLPACK?

The importance of addressing these two research questions for the academia is twofold; firstly, gaining understandings of hospitality and tourism teachers' TLPACK at higher education level from these five countries serves as a bedrock for future curriculum development of these fields. Secondly, exploring the similarities and differences for hospitality and tourism teachers' TLPACK may help program designers of these five countries learn from others' strong points to offset one's weakness. As for the industry, the employers would know how their prospective staff/employees were trained by teachers who had various TLPACK during the pandemic era. As such, those who were trained by teachers who lack proper knowledge in technology might possibly not acquire expected competence in their hospitality and tourism knowledge as well as their technology ability.

Literature review

Measures taken by higher education institutes in five Asian countries during the pandemic

Among the five countries compared in this study, Indonesia, the Philippines, and Thailand have implemented long-distance teaching policies. Indonesia discovered its first confirmed case of COVID-19 on 2 March 2020 and, since then, the number of cases has increased significantly, causing the Indonesian government to take action by reducing interactions between people to prevent the spread of the virus. The Ministry of Education and Culture issued Circular Letter No. 4 of 2020 to trigger full-scale distance learning nationwide (Aristovnik et al., 2020); a similar situation occurred in the Philippines and Thailand. The Philippines placed major cities under lockdown and schools of all levels were closed in mid-March of 2020; in other words, face-to-face education had to be replaced with online learning (Baticulon et al., 2021). Thailand's government announced a closure of all educational institutions on 17 March 2020 and schools at all levels were ordered to suspend classes. COVID-19 also has made educational institutes move instructional activities to virtual environments and online learning has become the norm, although students' and teachers'

limited Internet access remains a challenging issue (Vanpetch and Sattayathamrongthian, 2020).

However, the situation is different in Vietnam and Taiwan. When this survey was conducted, Vietnam's distance education policy was relatively short, while Taiwan's distance education only conducted exercises, i.e., drills for helping teachers to be familiar with online teaching. In Vietnam, the concept of learning can only take place at school (Tran et al., 2020). E-learning or online learning plays a peripheral role in the educational system because of the government's conservative attitude; nevertheless, the status of online learning has changed drastically because of the COVID-19 pandemic (Pham and Ho, 2020). In its early stage, the Ministry of Education and Training imposed the policy of 'suspending school, not stopping learning'; accordingly, traditional face-to-face education needed to be replaced by online education and the government provided immediate training to teachers. However, in Taiwan, due to its past experience of combatting the severe acute respiratory syndrome (SARS) epidemic in 2003, the Taiwanese government had been on very high alert, paying utmost attention to taking specific measures for border control, case identification, and containment. Because of these proactive measures, the pandemic has been effectively controlled in the country. As such, Taiwan is one of the few countries where schools are functioning normally (Cheng et al., 2020). During the pandemic, only one high school and a kindergarten were closed for 14 days because there were confirmed cases among their students. Even so, the Ministry of Education still advised that schools of all levels should be well-prepared for full-scale online education.

The reason these countries were selected was due to the fact that Indonesia, Philippines, Vietnam, and Thailand rank among the top 11 countries in Southeast Asia in terms of total population, constituting more than 86.10% of the population in this region. However, Vietnam, Indonesia and Philippines had the most death caused by the pandemic in this region because of the low vaccine coverage (Duong and Antriyandarti, 2022) which pointed out the gravity of their preparation for online education. Given the fact that some countries in Southeast Asia region may encounter greater challenges caused by the pandemic because of the fact that less resources in technology available to students for online learning (Liu and Gao, 2022), it is critical to have some understandings about how teachers of these countries cope with the pandemic and continued to carry on their teaching tasks. Among the studied countries, full or partial distance online teaching measures in response to COVID-19 were undertaken, except in Taiwan, where schools remained opened and only rehearsals for online education were conducted. Therefore, the findings from analyzing and comparing surveys would make valuable and significant contributions in extending our knowledge on the impact of COVID-19 in relation to teachers of tourism and hospitality programs in the five countries. The solutions adopted by educational institutes in these five countries during the COVID-19 pandemic are summarized as shown in Table 1.

Academic studies on tourism and hospitality teachers' technology, learners, pedagogy, academic discipline content knowledge, and context knowledge

Although the call for integrating technologies in pedagogy was made many years ago, successful implementation remains problematic if other factors such as teachers' readiness are not taken into consideration (Vrasidas, 2015). Teachers' readiness can be ensured with adequate understanding of their knowledge in both ICT and pedagogy and the provision of training and support when they need assistance (Ali, 2020). There is a need to extend our understanding on how instructors' content knowledge can be effectively delivered through technologies and how solutions to students' learning problems can be provided with proper pedagogies (Wang, 2019). TPACK is a theoretical framework developed by Mishra and Koehler (2006) based on Schulman's

TABLE 1 Solutions adopted by educational institutes in five countries during the COVID-19 pandemic.

Country	Implemented solutions	Adopted online learning platforms
Indonesia	The government suspended classes (K-12 and higher education) from mid-March 2020 and cancelled national examinations for grades 6, 9, and 12; distance learning was implemented in areas affected by the pandemic	Rumah Belajar, SPADA
Philippines	Since mid-March 2020, schools at all levels were suspended successively; schools would remain closed until August 24 of the same year and restarted. The subsequent courses adopted a hybrid combination of both physical and online lessons	DepEd Commons
Taiwan	Only two universities, one high school, and one kindergarten in Taiwan temporarily suspended classes for 14 days in accordance with the government's policy. The rest of the schools at all levels continued traditional face-to-face teaching	Microsoft Teams, e-Learning
Thailand	Since March 17, 2020, schools at all levels were ordered to suspend classes; schools were reopened in early July 2020 depending on the situation of the pandemic. If the situation in some areas had not alleviated, online learning continued	Zoom, Google Classroom, Digital Learning Centre, Edmodo
Vietnam	During March and April 2020, online education was adopted by schools at all levels until May	Taphuan, Microsoft Teams, and Google Classroom

MIC AISP database (2020, June). Available at: https://mic.iii.org.tw/aisp/Reports.aspx?id=CDOC20200605005.

(1986) pedagogical content knowledge constructs with an additional important factor of technology in the model, as educational technology has become necessary, particularly during the COVID-19 pandemic (Gao and Zhang, 2020; Mohamad Nasri et al., 2020). In order to apply technology effectively in the educational context, required knowledge will need to extend beyond just an awareness of functionality (Galanti et al., 2020). Despite the importance of TPACK, more empirical research is necessary, as most pertinent studies on teachers' TPACK are not subject-specific (Akyuz, 2018). In the field of tourism and hospitality education, exploration of teachers' TPACK remains limited. Wang's (2019) study shed light on this issue and adopted TPACK, verifying that the framework was suitable to measure the curriculum design of tourism and hospitality programs. The results of his research urged teachers of tourism and hospitality programs to apply TPACK to enhance their teaching of the subject matters. Pahrudin et al. (2021) also suggested that TPACK would be able to predict one's use of information, communication, and technology which confirmed the fact that TPACK can be used as a solid research framework. However, most previous studies of teachers' TPACK were conducted prior to the pandemic and hence lacked a consideration of knowledge about learners and contextual factors during this specific time (Angeli and Valanides, 2009; Saad et al., 2012; Hsu and Chen, 2019).

Since its advent, the limitations of TPACK have been discovered with the expeditious development of technology and other models that have been developed to fit in various contexts (Hsu and Chen, 2019). For example, in the context of mobile-learning, teachers' ICT knowledge is of great importance and the framework of ICT-TPCK was developed by Angeli and Valanides (2009). Similarly, Saad et al. (2012) proposed another framework, TPACK-XL, which extends the elements of ICT-TPACK and includes another vital issue of teacher education courses such as knowledge about learners and context. Since then, a more holistic picture about the competence with which teachers nowadays are supposed to be equipped under various conditions has attracted scholars' attention to address the advice of Hamida et al. (2016). An attempt to cover all the knowledge that teachers are expected to have harnessed led to the development of TPLACK.

TLPACK was developed by Hsu and Chen (2019) on the foundation of TPACK, ICT-TPCK, TPACK-XL, or their connotations. Five major constructs comprise the framework of TLPACK, namely technology knowledge, learner knowledge, pedagogy knowledge, academic discipline content knowledge, and context knowledge. The TLPACK also comprises the respective interactions between any of these five constructs. It differentiates itself from others by emphasizing teachers' knowledge about the learners and learning context. Teachers should have sufficient knowledge about learners, particularly in the digital age, as the majority of today's students tend to be technologically savvy due to the affordances and functionality of ICT (Ali, 2018). This requirement has been exacerbated during the COVID-19 pandemic as not all students in various countries have the same level of digital literacy (Adedoyin and Soykan, 2020). Many have been found to be insufficiently equipped with appropriate digital competence for online education (Dhawan, 2020). Lei and So's (2020) research further highlighted the difference between teachers' and students' perceptions toward online education. Therefore, understanding learners' characteristics and learning styles would be of great help to teachers while designing instructional activities and reconsidering the appropriateness of their pedagogy, which would impact learning effectiveness (Andrews and Tynan, 2015), particularly with the activities occur online (Benedetti, 2015). In addition, it is obvious that complete learning cannot be separated from the context (Bell et al., 2013) because every teaching situation has its own uniqueness. Therefore, teachers must be able to select suitable teaching strategies in accordance with the context to create and provide the best learning environment in order to assist learners to effectively learn the content (Klenner, 2015). The abovementioned problems have been addressed by Tseng et al. (2019). They discovered that, in the online education context, many teachers had problems related to understanding learners' prior knowledge and attracting their attention during online instruction; hence, the variable of context was included in this research framework. Thus, this present study uses the constructs of TLPACK rather than TPACK. Details about the constructs of TLPACK are as follows:

- Technology knowledge (TK): teachers' level of literacy in technology, which includes their ability to acquire information about the applicability of technologies and, more importantly, how to operate and integrate technology into teaching activities.
- Learners' knowledge (knowledge about learners) (LK): teachers' ability to identify and understand different learners' characteristics and make lesson plans (including teaching methods and instructional activities) accordingly.
- Pedagogy knowledge (PK): teachers' ability to plan, design, and administer classroom management skills to not only optimise their teaching practice but also deliver the target contents to learners effectively.
- Academic discipline content knowledge (AK): teachers' mastery of the domain knowledge of the contents they teach.
- Context knowledge (CK): teachers' ability to make any environment ideal for students' learning, including their ability to make necessary adjustments to the teaching environment in compliance with administrative regulations.

The five constructs of TLPACK and how they interact with each other are presented in Figure 1.

According to the above-mentioned literature, it is clear that during the course of the COVID-19 pandemic, the relevant educational strategies adopted by different countries have differed because of the varying levels of their epidemic situations. Education is transformed in terms of not only the use of technology, but also the teaching context, pedagogy, and the

adaptability of teachers and students. All these will lead to new challenges ahead; however, due to the urgency of this situation, pertinent research is still insufficient. In order to understand the performance of teachers in different countries during the COVID-19 pandemic and provide cross-country comparisons and references, this study selected five countries for investigation and formulated the following research hypotheses:

> ***RH1***: Teachers of tourism and hospitality programs have significantly different levels of TLPACK during the COVID-19 pandemic.
>
> ***RH2***: Tourism and hospitality teachers' TLPACK are significantly different across five countries during the COVID-19 pandemic.

Methodology

Research method and participants

This research adopts a comparative research method, which involves describing, identifying, analyzing, and explaining similarities and/or differences of a phenomenon in various domains or disciplines (e.g., socio-cultural and political; von Schnurbein et al., 2018). This method was employed because 'comparative research can show us ways that others have found out of dilemmas similar to our own—and their solutions may be borrowed and adapted to local conditions' (Esser, 2013, p. 113). The benefits of such a comparison might be that a better solution in delivering subject matters online can be generated through learning and understanding on their own TLPACK and their counterparts in other countries.

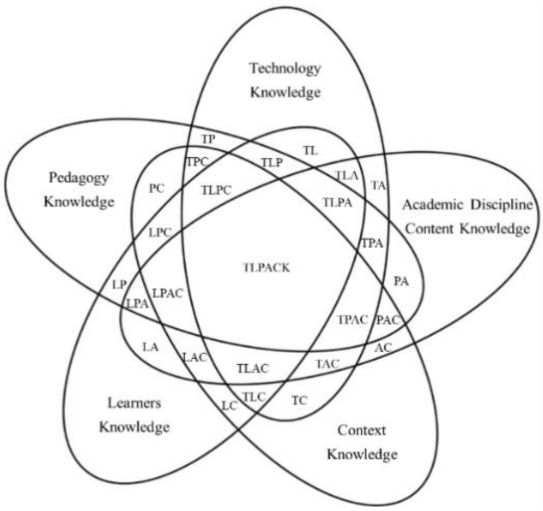

FIGURE 1
The TLPACK model (Hsu and Chen, 2019).

The research was designed and compiled in Taiwan; the questionnaire was then distributed with the help of doctoral students from Indonesia, Philippines, Taiwan, Thailand, and Vietnam who had come to study in Taiwan. Due to the difficulty of collecting cross-national data and the limited number of teachers in the University of Hospitality and Tourism, the sampling method adopted in this study was purposive sampling. In order to keep sampling technique of this present study scientifically rigorous, participants had to meet the following three conditions for inclusion in the study: (1) be engaged in full-time teaching in the hospitality and tourism department of colleges or universities in his or her countries; (2) cooperate with local government policies to actually carry out remote teaching implementation or drills during the COVID-19 pandemic; and (3) participate in this survey voluntarily and with informed consent. After doing online searching on the number of current teachers of hospitality and tourism programs in these five countries, a total of 223 invitation emails were sent out to in-service teachers before the onset of formal survey and 193 replied with their consents. Among these respondents, 9 of them were partial out because of they did not fit in the abovementioned three conditions. In the end, 184 teachers were the target samples of formal online survey.

The survey was conducted over 3 weeks, from September 28, 2020 to October 19, 2020 and Google Forms were used to distribute online questionnaires. Respondents had to fill in each question completely and submit it independently before it could be used as the preliminary sample of this research. After collecting the questionnaires from various countries, the data were cleaned up and the invalid questionnaires that were over-repetitively answered were deleted. The validity rate was 96.1%. In the final sample, the total number of all valid responses was 173, comprising responses from teachers of hospitality and tourism programs in Indonesia ($n = 24$), Philippines ($n = 41$), Taiwan ($n = 37$), Thailand ($n = 35$), and Vietnam ($n = 36$).

Measurements and data analysis

The TLPACK scale compiled by Hsu and Chen (2019) was adapted and used as the survey tool after its reliability and validity were examined. In preparing the scale, the researchers first compiled the questionnaire in English and then invited native speakers to translate it to the national languages of the participating countries. The translated questionnaires were retranslated and confirmed by students studying abroad in the target countries to ensure that the scales were semantically accurate and uniform. In terms of text, participants in Indonesia, Philippines, Taiwan, Thailand, and Vietnam used Bahasa Indonesia, English, Traditional Chinese, Thai, and Vietnamese, respectively, to fill in the questionnaires.

Measurements of teachers' TLPACK were conducted through self-report surveys. Participants provided responses to

all the question items on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree, see Appendix for details). The theoretical dimension indicators of TLPACK were revised according to the results of the Bartlett's test of sphericity, the Kayser-Meyer-Olkin test, and exploratory factor analysis, covering a total of five dimensions and 35 indicators. The factor load of each indicator was above 0.35, and the total explained variation of the whole scale reached 60.43%. The reliability and validity of the TLPACK indicators were examined and the results are shown in Table 2.

After the reliability and validity were assured, the research hypotheses had to be examined. Frequentist statistics such as one-way and two-way analysis of variance (ANOVA) were performed to answer the research questions. The results were cross-examined with Bayesian statistics and the level of significance was set at 0.05. Both the frequentist and Bayesian statistics were performed using SPSS 25.

Results

The first research question – 'What is the TLPACK of tourism and hospitality teachers from Indonesia, Philippines, Taiwan, Thailand, and Vietnam during the COVID-19 pandemic?' – was answered using the mean scores and standard deviations of two variables – knowledge of learners and context – of TLPACK teachers from these countries. Detailed information is presented in Table 3.

The information conveyed in Table 3 indicates that RH 1 is partially supported, revealing that among these five countries, data from Philippines, Taiwan, and Thailand were significant. All these countries shared some similarities in the ranking of TLPACK; namely, the lowest was learners' knowledge. Despite the fact that each country has various systems of teacher training/support programs or curriculum designs for teachers of tourism and hospitality programs, similar situations were discovered by these findings. One thing common among the tourism and hospitality teachers of these five countries is that they all ranked academic knowledge as the highest among these five variables except Vietnamese teachers who considered their knowledge on pedagogy to be the highest. As for what teachers considered they lacked the most, all of them agreed on learners' knowledge. Context knowledge was ranked second lowest by all except Indonesian teachers who deemed that their pedagogical knowledge was the second lowest.

TABLE 2 The test results of the reliability and validity of the TLPACK indicators.

	TK	LK	PK	AK	CK
Number of indicators	9	7	4	10	5
Cronbach's alpha	0.91	0.93	0.85	0.92	0.87
Composite reliability	0.91	0.93	0.85	0.92	0.87
Average variance extracted	0.54	0.64	0.60	0.57	0.57
Maximum shared variance	0.40	0.54	0.54	0.44	0.40

Such a finding indicates that teachers of tourism and hospitality programs in these countries face a similar challenge when required to impart online education, which is their limited understanding of their students. Present-day college students are considered digital natives (Prensky, 2001) as they have been raised with technology and have better digital competence than do those of previous generations (Thompson, 2013). There are some remarkable features of digital natives that differentiate them from other generations (Akçayır et al., 2016) including the way they learn things (Bennett et al., 2008). Therefore, teachers should acquire pertinent knowledge on these learners to successfully implement their lesson plans. Additionally, the pandemic has negatively impacted students' psychological stress, causing anxiety, loneliness, burnout, and helplessness, which have hindered their focus on studies (Baticulon et al., 2021); therefore, teachers' knowledge about learners is now more important than ever before.

The second research question – 'Do teachers of tourism and hospitality programs from these five countries have significantly different TLPACK?' – was answered using ANOVA. The results revealed that participants of different nationalities showed significant differences in their TLPACK ($F_{TK} = 2.49$, $p < 0.05$, $F_{LK} = 3.29$, $p < 0.05$, $F_{PK} = 3.10$, $p < 0.05$, $F_{AK} = 6.24$, $p < 0.01$, $F_{CK} = 4.47$, $p < 0.01$) and hence RH2 was accepted. Post-hoc Tukey's honest significance test found that Indonesian teachers' learners' knowledge was significantly higher than that of teachers in Taiwan, and Filipino teachers' pedagogical knowledge was significantly higher than that of Taiwanese teachers. Furthermore, teachers in Indonesia and Philippines had higher scores in academic discipline content knowledge than did their Vietnamese counterparts. As for context knowledge, teachers in Indonesia and Philippines had significantly higher scores than those of teachers in Taiwan. Detailed information is presented in Table 4.

We further cross-examined the results of frequentist statistics with Bayesian statistics; the results of Bayesian analysis on teachers' technological ($BF_T = 0.01$), learners' ($BF_L = 0.05$), pedagogical ($BF_P = 0.04$), and context ($BF_C = 0.45$) knowledge were in line with the results of ANOVA. Specifically, the probability of occurrence of the null and the alternate hypothesis is similar. However, in terms of academic discipline content knowledge, the results of Bayesian and frequentist analyses are contradictory. ANOVA reported significant differences among teachers' content knowledge in these five countries but Bayes factor indicated that the probability of the null hypothesis is about 10 times higher than that of the alternate hypothesis ($BF_A = 10.22$), which implied that no significant difference should be revealed. In order to solve this issue, a two-way ANOVA was administered to reveal whether the underlying reason for

TABLE 3 Mean scores and standard deviations of TLPACK teachers from different countries.

	Indonesia $n = 24$		Philippines $n = 41$		Taiwan $n = 37$		Thailand $n = 35$		Vietnam $n = 36$	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Technology knowledge	4.30	0.62	4.20	0.59	4.11	0.63	3.89	0.53	3.89	0.86
Learners' knowledge	4.16	0.65	3.89	0.88	3.44	1.06	3.85	0.57	3.71	0.68
Pedagogy knowledge	4.27	0.70	4.29	0.57	3.80	0.79	4.11	0.60	4.04	0.72
Academic discipline content knowledge	4.43	0.62	4.50	0.46	4.15	0.48	4.17	0.50	3.91	0.75
Context knowledge	4.33	0.58	4.13	0.82	3.64	0.70	3.86	0.67	3.83	0.68
F	0.57		4.38***		5.87***		2.43*		0.95	

*$p < 0.05$, *** $p < 0.001$.

TABLE 4 Results of ANOVA and Bayesian statistics of TLPACK teachers from different countries.

TLPACK	*F*	*Post hoc*	Bayesian factor
Technology knowledge	2.49*	No significant difference found	0.01 (H1 > H0)
Learners' knowledge	3.29*	Indonesia > Philippines	0.05 (H1 > H0)
Pedagogy knowledge	3.10*	Philippines > Taiwan	0.04 (H1 > H0)
Academic discipline content knowledge	6.24***	Indonesia, Philippines > Vietnam	10.22 (H0 > H1)
Context knowledge	4.47**	Indonesia, Philippines > Vietnam	0.45 (H1 > H0)

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
A Bayesian factor between 0.01 and 0.03 represents very strong evidence for H1; between 0.03 and 0.10 represents strong evidence for H1; between 0.33 and 1.00 represents anecdotal evidence for H1; between 10 and 30 represents strong evidence for H0 (Jeffreys, 1961; Lee and Wagenmakers, 2013). H1 stands for the alternative hypothesis whereas H0 stands for the null hypothesis.

differences in academic discipline content knowledge were caused by the interaction of country and gender. The two-way ANOVA ($F_A = 3.11$, $p < 0.05$, $\eta^2 = 0.07$) indicated that differences in academic discipline content knowledge are caused by the interaction of nationality and gender. Detailed information is presented in Table 5.

In terms of the critical situation of online tourism and hospitality education in these five Asian countries, teachers' TLPACK was found to be significantly different across borders, as revealed by the results of the ANOVA. Before the pandemic, conventional education was imparted at schools in Indonesia (Yulianti, 2015), which the COVID-19 pandemic changed in no time. Teachers in Indonesia worried about their competence in technology and their classroom management skills in virtual environments (Aristovnik et al., 2020). Nevertheless, the results of this study reported that tourism and hospitality teachers in Indonesia had greater technology knowledge than did their counterparts from the other four countries. This result was supported by Bayesian statistics. Similar outcomes were also observed with regard to learners' and pedagogy knowledge, wherein significant results of frequentist statistics corresponded with Bayesian statistics. However, the results of academic discipline content knowledge differed, as frequentist ANOVA reported a significant difference while Bayesian statistics indicated no such significant difference. ANOVA reported that teachers in Indonesia and Philippines scored higher than did their Vietnamese peers. A two-way ANOVA was performed to identify a sound explanation. Results revealed that the interaction of nationality and gender may be the reason, as these are two salient social categories that often interact to influence human behaviors (Kumar et al., 2021). In the current research context, online teaching in Vietnamese universities during the COVID-19 period was found to be affected by the interaction of gender, which was significantly lower in comparison to the teachers' self-assessment in Indonesia and Philippines with regard to academic discipline content knowledge. Future research should, thus, take gender into account to extend our current understanding on this perspective.

Discussions, implications, and limitations

COVID-19 has changed our lifestyles drastically, which has forced tourism stakeholders to reconsider several aspects of their existence and functioning (Sigala, 2020), including tourism and hospitality education. As the 'new normal' becomes the norm (Davison, 2020), technology-driven practices have begun to play a leading role in not only work (Carroll and Conboy, 2020) but also educational praxis. In the post-pandemic context, online learning arrangements will likely leave a lasting trace and accelerate the online learning undertaken by higher education institutes (Daniel, 2020). COVID-19 has elucidated the vulnerability of the current educational practices and, hence, a more flexible and resilient system should be developed in the future (Ali, 2020). The post-COVID landscape of higher education (tourism and hospitality education included) will rely greatly on online and distance learning. However, many issues still need to be resolved regarding the implementation of online education; for example,

TABLE 5 Results of the two-way ANOVA of academic discipline content knowledge with variables of country and gender.

	df	SS	MS	*F*
Intercept	1	2782.99	2782.99	9093.98***
Country	4	9.57	2.39	7.82***
Gender	1	0.04	0.04	0.14
Country* Gender	4	3.80	0.95	3.11*
Error	163	49.88	0.31	
Corrected Total	172	61.68		

*$p < 0.05$, ***$p < 0.001$.

because the evaluation and assessment of online education are not always adequate, developing an appropriate mechanism to monitor the quality of online education seems critical (Vlachopoulos, 2020). With respect to teachers' readiness, their knowledge on how to successfully impart online education has attracted extensive attention in the academic community. Jin and Harp (2020) argued that when educational technology training programs are implemented, it would be wise to understand teachers' prior knowledge on technology and their TPACK confidence to nurture their TPACK knowledge because course design alone will not foster the development of teachers' TPACK. Moreover, TPACK, ICT-TPCK, and TPACK-XL all shed light on the various competencies that present-day teachers should possess. TLPACK is the holistic framework acknowledged to cover another two important dimensions, learners' knowledge and context knowledge, given the fact that these two have drastically different influences during the COVID-19 pandemic.

As TLPACK is a newly developed concept, only one empirical study (Chen and Hsu, 2021) has been conducted based on it. This particular study indicated that teachers' TLPACK were significantly different before and amid the COVID. Furthermore, this study unveiled the relationship between Teachers' learner knowledge (i.e., knowledge about the learners) and pedagogy knowledge was the strongest, which were not in line with the findings of this research. Possible reason may be the cultural issue as reported in the aforementioned section on two-way ANOVA.

The results of this study have the following implications. Regarding its practical implications, this study reveals that teachers of tourism and hospitality programs in these countries all believed that they lack learners' knowledge the most; in other words, online hospitality and tourism education during the COVID-19 pandemic highlighted the fact that it is necessary to provide teachers of tourism and hospitality programs with training on understanding digital-native learners. Unlike teachers at k-12 levels, most teachers in higher education institute did not receive pertinent trainings on understanding learners in their post-graduate or doctoral studies; hence, it is natural that they did not feel they equipped with sufficient knowledge about their students, particularly these college students were Tech-savvy Generation Z (Persada et al., 2021) or even younger who are different from their teachers in many aspects such as they ways they rely on technology in and out of the classroom (Hicks, 2011). A call to gain understandings on these students because of their special nature has been made to educational institutions (Giray, 2022) and the new normal of post-pandemic education will possibly orient toward 'a personalized (virtually), open, continuous, and flexible education model' (Sigala, 2021, p. 921–922) which fits learners with more diverse learning styles better.

As all the courses were moved to the virtual environment because of the pandemic, the teachers also believed that their knowledge about this unprecedented learning context was foreign to them; therefore, information about how to effectively deliver the target content through online avenues will be necessary for these teachers. Higher education institutes around the world are combating COVID-19 by means of online education; however, teachers in different countries have various levels of TLPACK. Thus, educators and educational administrators should collaborate globally and develop a standard pedagogical practice for online education. Scholars from technologically advanced countries can take the responsibility of offering online training programs through Coursera or other massive open online course platforms for teachers in need, based on the most updated and recently researched TLPACK results. By doing this, it will be easier to help teachers in different countries to effectively impart online education. As for academic implications, this study is the first empirical study to explore teachers' TLPACK in the online hospitality and tourism education in five most populated South Asian countries, revealing that significant differences do exist in terms of their TLPACK. Furthermore, different results of frequentist statistics and Bayesian statistics led to the findings regarding the interaction of nationality and gender. Further studies may shed light on this issue in greater detail.

The major limitations of this study are three fold: First, because it was conducted in October 2020, approximately 6 months had passed since the start of online teaching in response to COVID-19 across the world. Hence, the results may not be timely in response to the pandemic. Second, Taiwan was one of the few countries where online education was not urgently required when this research was conducted. As such, it is plausible that the learners', pedagogy, and context knowledge of online teaching by tourism and hospitality teachers in Taiwan during the COVID-19 pandemic are significantly lower than that of their peers in other Southeast Asian countries. Third, because of the fact that limited connections to help the research team to acquire data from teachers of other countries, this survey focused on tourism and hospitality teachers at the post-secondary level in five Southeast Asian countries; hence, the number of participants was limited, which may hinder the generalizability of the findings. Future research may include

participants from more diverse cultural backgrounds to cross examine the results of this present research.

Conclusion

COVID-19 has changed our daily life routines in several spheres, including tourism and hospitality education. Online education has replaced traditional face-to-face education in order to prevent the further spread of the virus. Under such an unprecedented circumstance, tourism and hospitality teachers' related knowledge about the implementation of online education became a focus for us. This study adopted TLPACK as the research instrument used to survey teachers of tourism and hospitality programs at the higher education level in five south Asian countries. The results reveal that all the participants considered that their learners' knowledge was the lowest within the online education context. After performing an ANOVA to compare tourism and hospitality teachers in these five countries, teachers from Indonesia were found to have the highest TLPACK among all participants, particularly in learners' knowledge, academic discipline content knowledge, and context knowledge. However, the results of frequentist and Bayesian statistics are contradictory in terms of academic discipline content knowledge. A two-way ANOVA revealed that this may be due to the interaction of nationality and gender.

To sum up, this study highlighted that it takes time and experience to adapt to the emergency online teaching requirements caused by situations like the COVID-19 pandemic, which are difficult to predict. The following are the recommendations: (1) various teaching situations should be included in teacher training programs in order to ensure that teachers know how to effectively respond to different emergencies; (2) for emergencies, adequate support and education training should be provided to incumbent teachers to reduce the adaptation period; (3) because online education will be affected by the social context, it is important to be prepared.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

Y-JC organized the conception of this manuscript and finalized the text. LH supervised the writing and statistical analysis. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

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Giftedness and gifted education: A systematic literature review

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The present study aims to discuss the state of the art inherent in pedagogical-didactic research on the education of gifted students. To this end, a systematic review of scientific texts published between 2011 and 2021 was carried out. The present article is organized as follows: introduction to the topic; definition of the objectives, research questions, and methodological protocol; selection, evaluation, and synthesis of the abstract studies; discussion and evaluation of the results; and conclusions. Multiple tools for identifying the gifted students (for use by psychologists, pedagogists, educators, and teachers) emerge from the findings of the present study. The texts highlight numerous instructional and educational programming models for gifted students in all school grades. The main model is the SEM—(Schoolwide Enrichment Model). The present review shows a conspicuous production on gifted education, with the predominance of recently published articles (indicative of vivid interest in the topic) and of American origin. This geographic predominance, which does not cover the European and eastern parts of the world, may depend on the fact that the databases used [Scopus and Web of Science (WoS)] select results based on the use of English. This review reveals gaps and emerging trends in gifted education research, suggesting possibilities and future perspectives.

KEYWORDS

giftedness, gifted education, special educational needs, educational models, systematic literature review

1. Introduction: Toward a pedagogy of talent: Gifted education and inclusive school

1.1. From a quantitative to a qualitative model of intelligence

The awareness of the role of educational context in the development of potential of gifted children formally emerged in the first national report on gifted education, the Marland (1972), in which the United States of America was recommended to take specific measures to support giftedness, emphasizing the need for customizing educational and didactic programming for these gifted students. Approximately two

decades later, Recommendation 1248 (Parliamentary Assembly Council of Europe, 1994) was published in Europe, which reiterated the need for education, as a fundamental right of every individual, to be appropriate for all, emphasizing the importance of adopting special measures to support gifted individuals.

The first studies on giftedness were conducted in the field of psychometry and currently, the measurement of Intellectual Quotient (IQ) remains the main and the only method often used to identify gifted people (Carman, 2013). In 1921, Lewis Terman expressed interest in formulating the developmental process of children with high intellectual abilities. He initiated a longitudinal study involving 1,528 children between the ages of 8 and 12 years with IQs of at least 135. His goal was to show that IQ measured at school age remained unchanged in adulthood and inevitably translated into professional success. The research continued until his final years, and subsequent follow-ups were carried on by other researchers. However, contrary to the biological determinism hypothesized by Terman, the investigation made it clear that intelligence measured at school age was not a sufficiently relevant factor to ensure success in adulthood in professional life. This study corroborates the multidimensional theories that, beyond the genetic factor, variables such as sociocultural environment and intrapersonal factors are determinants.

In fact, in recent years, the advancement of research on the topic of giftedness has shifted the focus from a view of giftedness as permanent and rigidly linked to the individual (Galton, 1869; Terman, 1925; Witty, 1958) to a dynamic and multidimensional view (Renzulli, 1978; Tannenbaum, 1986; Gagné, 1993; Weisberg, 2006; Davis et al., 2011) of exceptionalism influenced, at multiple levels, by contextual systems (Bronfenbrenner, 1979).

1.2. Giftedness at school: legislation and needs

The turning point in Italian educational policy has recently come with MIUR Note No. 562 of 3 April 2019, which for the first time includes giftedness in an official document, formalizing the presence of gifted pupils among the Special Educational Needs (SEN). This development confirms the educational responsibility of teachers, already sanctioned by the regulation of Ministry No. 8/2013, to implement the personalization of teaching, also assessing the possibility of formalizing it in a personalized teaching plan.

Still today, this educational and didactic support for gifted students is perceived as exclusive and elitist (Fiorucci, 2017) with negative impact on gifted students who, if not adequately accompanied, find it difficult to live their own specificity and experiences of demotivation, frustration, and malaise (Pinnelli, 2017) that can degenerate into marginalization and psychological problems.

This elitist vision collides with the full inclusion model pursued by Italian and international policies. Emerged as early as 1978 in the Warnock Report (England), 15–20% of students at one time in their years of schooling are destined to encounter difficulties and for this reason, will need special support.

For this reason, European and international legislation directs schools to activate resources and prepare the educational context in the best possible way to support every diversity (intrinsic to each student) and develop every type of potential.

This right to full inclusion of gifted students in educational system and this commitment to universal education is enshrined in the Salamanca Statement (UNESCO, 1994) which states that "curricula should be adapted to children's needs, not vice-versa (p. 22)"[1] and, more recently, in the Convention on the Rights of Persons with Disabilities (United Nations [UN], 2006) that emphasizes the need for an inclusive education system at all levels and aimed at the full development of human potential.

Inclusive didactics do not propose equality but guarantee equity, that is, these didactics provide everyone with the educational measures they need, also paying attention to gifted students. As Aristotle already concluded in the Fifth Book of the Nicomachean Ethics "[.] What is fair and what is equal are the same thing, and, even both are good, equal is best" (EN 1137b 10-13).

Schools must be able to respond to the needs expressed by gifted students, which, in the Delaubier Report (Delaubier, 2002, p. 15–16), are summarized as follows:

1. The need for identification and recognition: the gifted child must be identified early in life to avoid the risk of situations of failure and suffering later in life. He/she must be understood in his/her complexity, supported, and encouraged in the knowledge of his/her qualities and fragilities.
2. The need to take charge of the student, with consequent attention to the specific difficulties to which giftedness could lead.
3. The need for motivation resulting from the frequent risk of boredom deriving from flat, repetitive, and not very challenging teaching.
4. The consequent need for complexity in learning that brings out the divergent and analytical thinking typical of gifted students, that is, instead, mortified by traditional teaching (based on single logical and sequential units).

The need for balance: the school must compensate for the tendency to intellectual overinvestment typical in these children with social, physical, affective, and moral education.

The fulfillment of personal and educational needs is a necessary condition to guarantee the gifted pupil's wellbeing.

1 UNESCO (1994). World Conference on Special Needs Education: Access and Quality. Final Report.

This scenario is often hindered by teachers' beliefs about giftedness who as teachers, driven by the need to understand, absorb information readily available in context. However, this information is distorted and reductive and consequently impedes specific educational action toward gifted students. Among the myths, the myth of self-sufficiency (Pinnelli, 2019, p. 24) supposes the complete autonomy of gifted students who do not need help or adaptations to always be successful. This superficial view does not consider all the variables that influence performance (e.g., motivation, self-efficacy, control and learning strategies, and resistance to stressors) that need to be enhanced in tailor-made educational interventions.

Indeed, giftedness can be related to high achievement and positive school adjustment as well as to difficulties and underachievement. To avoid such negative outcomes and accommodate the above-mentioned needs, didactic-educational planning must be personalized and aim at the development of both learning potential and socio-emotional skills.

1.3. Systematic literature review as an orientation tool for gifted education

For these reasons, this systematic review of the literature adopts a specifically didactic and pedagogical slant, aiming to offer an orientation tool among the texts on educational methodologies and gifted education models, escorting toward an appropriate takeover of the gifted student.

The decision to limit inclusion in textbooks is motivated by the need to choose works in which the applied methodological dimension is amply argued in terms of teaching practices and learning outcomes. In particular, the argumentation on the validity of a teaching practice must be accompanied by precise and extensive indications on the aims and objectives of the teaching-learning sequence, the methodologies and tools used, the assessment of initial, mid-term, and final learning, examples of activities, qualitative observations on the performance, analysis of results, and reflection on the development of good practices. Although scientific articles based on empirical studies, through the review process, ensure quality and scientific rigor, such articles have a limited number of usable characters and pages. Therefore, the applied methodology is often summarized in a coherent and concise discourse. For these reasons, a more extensive and elaborate dissertation, full of examples, observations, and details, is more likely to be found in textbooks and not in articles with limited pages and characters.

The present review was initially conducted by operating on the main international bibliographic databases (Web of Science and Scopus). In this first analysis, the emergence of very few Italian papers highlighted the limitation of the "citation subculture,"[2] that is, a disparity between subject areas in the retrieval of bibliographic sources in databases indexed based on the quantitative citation analysis.

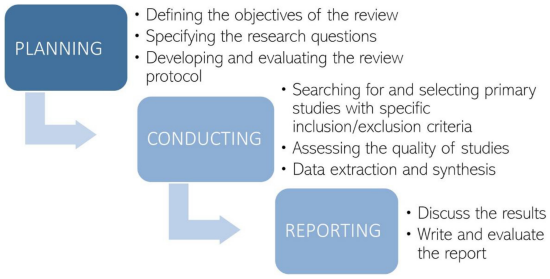

FIGURE 1
Process of systematic literature review (adapted by Kitchenham and Charters, 2007).

The underrepresentation of Italian Social Sciences and Humanities (SSH) scientific literature in the mentioned databases is due to the fact that the field of educational science is characterized by qualitative evaluations and, as Sani (2012, p. 186) states, it is still not very internationalized but this does not mean that it is not a reflection of science characterized by innovation and quality.

To overcome these limitations and include in the systematic literature review on the topic of gifted education books by national authors that may escape academic databases (but are relevant to the review), Google Books was used.[3]

2. Methodology

To understand the development and state of the art on research in the field of education of gifted students, a systematic literature review was conducted, based on the guidelines outlined by Kitchenham and Charters (2007). The process followed three main steps that were divided into several steps (**Figure 1**). Subsequently, Bibliometrix software (Aria and Cuccurullo, 2017) was used to extract and process the datasets.

2.1. Planning

2.1.1. Defining the objectives of the review

Based on the guidelines, the first step in conducting a systematic literature review is to define the objectives. This study reviews the existing Italian and international literature on gifted education with the aim of:

2 For more details, see conclusions.

3 Google Books was used because it offers a greater availability of textbooks (the subject of the review) than the better-known search engine Google Scholar, which focuses, instead, mainly on scientific proceedings and articles.

> *RO1: Identifying the state of the art in pedagogical and didactic research on education and talent development*

> *RO2: Identifying possible gaps and future research perspectives on the subject.*

2.1.2. Specifying research questions

To identify the primary studies and to guide the data extraction and analysis processes, the following research questions were formulated:

> *RQ1: What models are used by schools to identify and take care of gifted students?*

> *RQ2: What teaching methodologies, educational practices, and school programs are dedicated to supporting and developing potential and talent?*

2.1.3. Developing and evaluating the review protocol

The research method used during the systematic review process was based on the review protocol. Specifying the method adopted for the review helps to reduce the risk of unintentional errors. During the planning phase, informal and formal searches were used to identify objectives and research questions underlying the review process. The methodology is based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)[4] model.

2.2. Conducting

2.2.1. Searching for and selecting primary studies with specific inclusion/exclusion criteria

To delimit the selection of studies related to the topic of the review, some keywords were identified. According to Cronin et al. (2008, p. 41), considering alternative terms with corresponding meanings is crucial for maximizing the amount of information in a literature review. For this purpose, the search string also included synonyms used in different combinations through the Boolean operators "and" and "or," which expand or limit the search product.

The final search string was: "giftedness" OR "gifted education" OR "plusdotati" OR ("plusdotazione" AND "Scuola").

The search was conducted on international bibliographic databases (Scopus and Web of Science (WoS)) selected for the following criteria: international spectrum and qualitative evaluation of indexed sources (Impact Factor and h-index). The number of results was subsequently reduced using both the inclusion and exclusion criteria. In Web of Science, the query was performed in the "Topic" field (including title, abstract, and keywords) with the following criteria (**Table 1**):

1. Categories: Education Educational Research, Education Special.
2. Document Types: Books.
3. Publication Years: 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011.
4. Language: English, Italian.

In Scopus, the search was performed in the field "Article Title, Abstract, Keywords" with the following criteria (**Table 2**):

1. Publication Years: 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011.
2. Subject Area: Social Sciences.
3. Document Types: Books.
4. Language: English, Italian.

The initial results of the search across all databases produced a total of 22,854 articles, which when subjected to inclusion and exclusion criteria were reduced to 348.

2.2.2. Assessing the quality of studies

Subsequently, a thematic analysis procedure was performed: the abstracts and the index of the texts (where present) were read and analyzed, and the 271 texts that did not include any empirical evidence or were far removed from the disciplinary context and research questions were also removed. The remaining 77 texts were then considered for systematic review. The PRISMA process followed is illustrated in **Figure 2**.

2.2.3. Data extraction and synthesis

The studies included in the review are reported in **Table 3**.

The search results were acquired in. bib format and processed using Bibliometrix software (Aria and Cuccurullo, 2017), which made it possible to extract basic information, publication details, and specific data from each article based on the initial categorization of the study. The annual output of the articles selected for the systematic review undergoes an exponential increase: in the first year of the decade under review, 2 articles were published, and in the last year considered, 48 (**Figure 3**).

4 Moher et al., 2009. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med. 2009, 6, e1000097.

TABLE 1 Web of Science criteria.

WoS	Inclusion criteria	Exclusion criteria
Categories	Education educational research, education special	Psychology developmental, psychology educational, psychology, psychology multidisciplinary, etc.
Document types	Books	Article, proceedings papers, book reviews, book chapters, review articles, discussions, reprints, editorial materials, meeting abstracts, early access, letters, etc.
Publication years	2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011	2022, 2010, 2009, 2008, 2007, 2006, 2005, etc.
Language	English, Italian	German, Spanish, Portuguese, Slovak, Russian, French, Korean, Polish, etc.

TABLE 2 Scopus criteria.

Scopus	Inclusion criteria	Exclusion criteria
Publication years	2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011	2022, 2010, 2009, 2008, 2007, 2006, 2005, etc.
Subject area	Social sciences	Psychology, arts and humanities, economics, engineering, medicine, etc.
Document types	Books	Article, book chapter, review, conference paper, editorial, note, etc.
Language	English, Italian	German, Spanish, French, etc.

As regards the titles of the works examined, **Figure 4** shows the tree map of the most recurring words with their percentages and **Figure 5** the co-occurrence network map of the most used keywords.

The wordcloud (**Figure 6**) reveals the main keywords related to the abstracts of the analyzed texts.

2.3. Report

As regards the first research question (RQ1), the models for identifying and taking charge of gifted students are numerous. One reason for this is the existence of various conceptualizations of giftedness (Cross, 2021). VanTassel-Baska (2021) explains how the idea of gifted development has always been radicalized into two distinct visions that have to do with the idea of ability. Ability is understood as genetic baggage that we bring into the environment with birth, or, on the other hand, the ability is shaped by the environment during growth. These two perspectives synthesized in the phrase "nature or nurture," underlying two different attitudes of schools in taking charge: (1) the use of standardized tests to identify students with high IQs for whom we need to target advanced programs and (2) designing advanced educational interventions from which all students could benefit (VanTassel-Baska, p. 3).

Today, the paradigms underlying the construct of giftedness that guide its identification are *multidimensional*, that is, they presuppose an interaction between innate variables and environmental stimulation. The theoretical frame of reference can be traced back to psychological studies on the diversity of individual types of intelligence (Gardner, 1983; Sternberg, 2003), which emphasize the variety of learning profiles and domains of excellent performance. The identification of gifted students thus becomes a mediation of case-specific procedures to be chosen because of the person's characteristics and ranging from the professional use of validated instruments to observation protocols by school staff and family, to checklists for self-identification up to peer nomination.

One of the biggest risk factors for not identifying students is underachievement. Possible causes of underachievement at school with corresponding counterstrategies are outlined by Stanley (2021) and Siegle (2021).

The present review includes volumes (Montgomery, 2013, 2015; Baum et al., 2021; Trail, 2021) that guide the identification of students with dual or multi-exceptionality, that is, students who co-occur with giftedness have one or more clinically relevant conditions. These co-occurring factors may not emerge due to a masking effect: it may be that the difficulties mask the giftedness or that the giftedness masks the difficulties, or that the high intellectual abilities lead to finding effective strategies to compensate for the deficit and neutralize both.

In response to the second research question (RQ2), the best educational and teaching practices aimed at talent development which can be divided into two contiguous macro-categories:

- School programs and methodologies based on enrichment (i.e., an expansion of the training offer) that aim to increase competence in specific content-disciplinary areas, for example, related to science (Adams et al., 2021), mathematics (Kennard, 2013; Johnsen and Sheffield, 2021), and STEM (science, technology, engineering, and mathematics) subjects (Taber et al., 2017), earth science (College of William & Mary's Center for Gifted Education, 2021a,b,c), music (Savage, 2012), art (Earle, 2013), physical education and sport (Morley and Bailey, 2013), and in the study of the English language (Reid, 2019).
- Programs to develop soft skills such as leadership skills (Bean, 2021; Boswell et al., 2021), critical reading skills

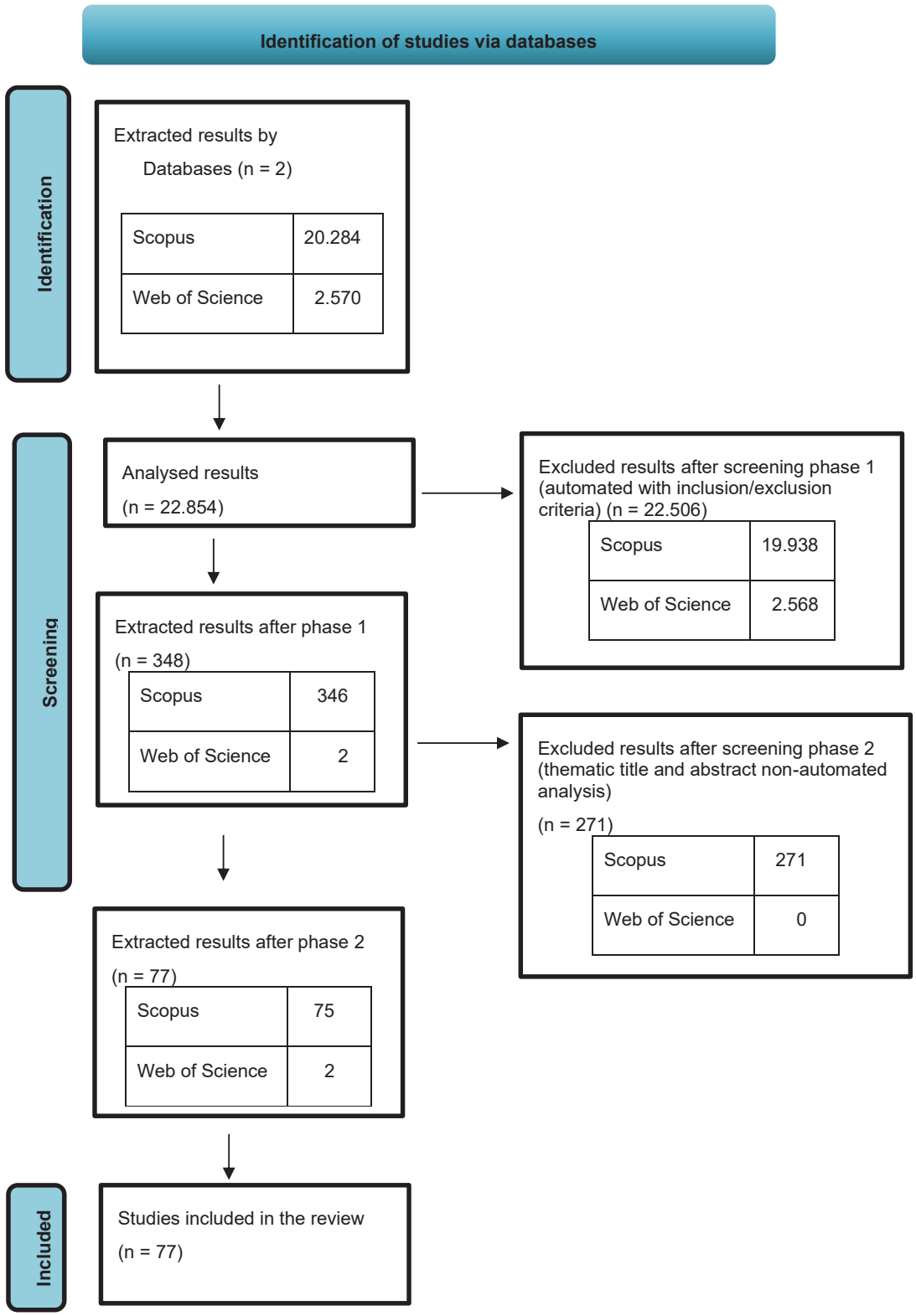

FIGURE 2
Review process PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page et al., 2021).

TABLE 3 Studies (Scopus and Web of Science) included in the review.

References	Title	Year
Lewis et al., 2021	Identifying and serving: Culturally and linguistically diverse gifted students	2021
Boswell et al., 2021	Leadership for kids: Curriculum for building intentional leadership in gifted learners (grades 3–6)	2021
College of William & Mary's Center for Gifted Education, 2021c	Invitation to invent: A physical science unit for high-ability learners (grades 3–4)	2021
VanTassel-Baska, 2021	Talent development in gifted education: Theory, research, and practice	2021
Azano and Callahan, 2021	Gifted education in rural schools: Developing place-based interventions	2021
Javits et al., 2021	How the sun makes our day: An earth and space science unit for high-ability learners in kindergarten and first grade	2021
Hébert, 2021	Understanding the social and emotional lives of gifted students	2021
Callahan et al., 2021	Fiction and non-fiction: Language arts units for gifted students in grade 4	2021
Weber et al., 2021b	A case studies approach: Exploring critical issues in gifted education	2021
Missett et al., 2021	Research and rhetoric: Language arts units for gifted students in grade 5	2021
Olszewski-Kubillus et al., 2021	Talent development as a framework for gifted education: Implications for best practices and applications in schools	2021
Dailey, 2021	Thinking like an engineer: Grade 4: Lessons that develop habits of mind and thinking skills for young engineers	2021
Heilbronner, 2021	The schoolwide enrichment model in science: A hands-on approach for engaging young scientists	2021
Brigham et al., 2021	Units of instruction for gifted learners: Grades 2–8	2021
Renzulli and Reis, 2021	Reflections on gifted education: Critical works by Joseph S. Renzulli and colleagues	2021
Cross, 2021	On the social and emotional lives of gifted children	2021
Plucker and Callahan, 2021	Critical issues and practices in gifted education: A survey of current research on giftedness and talent development, third edition	2021
Johnsen et al., 2021	Implementing evidence-based practices in gifted education: Professional learning modules on universal screening, grouping, acceleration, and equity in gifted programs	2021
Trail, 2021	Twice-exceptional gifted children: Understanding, teaching, and counseling gifted students	2021
Weber et al., 2021a	Differentiating instruction for gifted learners: A case studies approach	2021
College of William & Mary's Center for Gifted Education, 2021b	Survive and thrive: A life science unit for high-ability learners in grades K-1	2021
Kaplan, 2021	Differentiated curriculum and instruction for advanced and gifted learners	2021
Stanley, 2021	When smart kids underachieve in school: Practical solutions for teachers	2021
Fad and Ryser, 2021	Proven strategies that work for teaching gifted and advanced learners	2021
Cross and Cross, 2021	Handbook for counselors serving students with gifts and talents: Development, relationships, school issues, and counseling needs/interventions	2021
Felder et al., 2021	Increasing diversity in gifted education: Research-based strategies for identification and program services	2021
Siegle, 2021	The underachieving gifted child: Recognizing, understanding, and reversing underachievement	2021
Adams et al., 2021	Using the next generation science standards: With gifted and advanced learners	2021
College of William & Mary's Center for Gifted Education, 2021a	Water works: A physical science unit for high-ability learners in grades K-1	2021
Baum et al., 2021	To be gifted and learning disabled: Strength-based strategies for helping twice-exceptional students with LD, ADHD, ASD, and more	2021
Baska and VanTassel-Baska, 2021	Interventions that work with special populations in gifted education	2021
Mofield and Phelps, 2021	Collaboration, coteaching, and coaching in gifted education: Sharing strategies to support gifted learners	2021
Coleman and Johnsen, 2021	RTI for gifted students: A CEC-TAG educational resource	2021
VanTassel-Baska and Little, 2021	Content-based curriculum for high-ability learners	2021
Cross and Olszewski-Kubilius, 2021	Conceptual frameworks for giftedness and talent development: Enduring theories and comprehensive models in gifted education	2021

(Continued)

TABLE 3 (Continued)

References	Title	Year
Makel et al., 2021	From giftedness to gifted education: Reflecting theory in practice	2021
Robins et al., 2021	Methods and materials for teaching the gifted	2021
Ford, 2021	Multicultural gifted education	2021
Stephens and Karnes, 2021	Introduction to curriculum design in gifted education	2021
Peters et al., 2021	Beyond gifted education: Designing and implementing advanced academic programs	2021
Johnsen and Sheffield, 2021	Using the common core state standards for mathematics with gifted and advanced learners	2021
Stambaugh et al., 2021	Effective curriculum for underserved gifted students: A CEC-tag educational resource	2021
Weinfeld et al., 2021	Smart kids with learning difficulties: Overcoming obstacles and realizing potential, second edition	2021
Bean, 2021	Developing leadership potential in gifted students: The practical strategies series in gifted education	2021
Fishman-Weaver, 2021	Brain-based learning with gifted students: Lessons from neuroscience on cultivating curiosity, metacognition, empathy, and brain plasticity: Grades 3–6	2021
Smith, 2021	Challenging units for gifted learners: Teaching the way gifted students think	2021
Sanguras, 2021	Grit in the classroom: Building perseverance for excellence in today's students	2021
DuBois and Greene, 2021	Supporting gifted ells in the Latinx community: Practical strategies, K-12	2021
Reid, 2019	English language education to pupils with general intellectual giftedness	2019
Pfeiffer, 2018	Handbook of giftedness in children: Psychoeducational theory, research, and best practices	2018
Cannaday, 2018	Curriculum development for gifted education programs	2018
Pardeck and Murphy, 1990	Young gifted children: Identification, programming and socio-psychological issues	2018
Ballam and Moltzen, 2017	Giftedness and talent: Australasian perspectives	2017
Taber et al., 2017	Teaching gifted learners in stem subjects: Developing talent in science, technology, engineering and mathematics	2017
Montgomery, 2015	Teaching gifted children with special educational needs: Supporting dual and multiple exceptionality	2015
Vidergor and Harris, 2015	Applied practice for educators of gifted and able learners	2015
Marca Wolfensberger, 2015	Talent development in European higher education: Honors programs in the Benelux, Nordic and German-speaking countries	2015
Buttriss and Callander, 2014	Gifted and talented education from A-Z	2014
Bakken et al., 2014	Gifted education: Current perspectives and issues	2014
Phillipson et al., 2013	Exceptionality in east Asia: Explorations in the actiotope model of giftedness	2013
Morley and Bailey (2013)	Meeting the needs of your most able pupils: Physical education and sport	2013
Ambrose et al., 2013b	Confronting dogmatism in gifted education	2013
Earle, 2013	Meeting the needs of your most able pupils in art	2013
Kennard, 2013	Teaching mathematically able children: Second edition	2013
Kim et al., 2013	Creatively gifted students are not like other gifted students: Research, theory, and practice	2013
Ambrose et al., 2013a	The Roeper school: A model for holistic development of high ability	2013
Eyre, 2013	Able children in ordinary schools	2013
Montgomery, 2013	Gifted and talented children with special educational needs: Double exceptionality	2013
Robinson and Jolly, 2014	A century of contributions to gifted education: Illuminating lives	2013
Romey, 2013	Finding John Galt: People, politics, and practice in gifted education	2013
Savage, 2012	Meeting the needs of your most able pupils in music	2012
George, 2012	The challenge of the able child	2012
Gray-Fow, 2012	Discovering and developing talent in schools: An inclusive approach	2012

(Continued)

TABLE 3 (Continued)

References	Title	Year
Hymer et al., 2008	Gifts, talents and education a living theory approach	2012
Sutherland, 2012	Gifted and talented in the early years: Practical activities for children aged 3 to 6	2012
Smutny and Von Fremd, 2011	Teaching advanced learners in the general education classroom: Doing more with less!	2011
Hong and Milgram, 2011	Preventing talent loss	2011

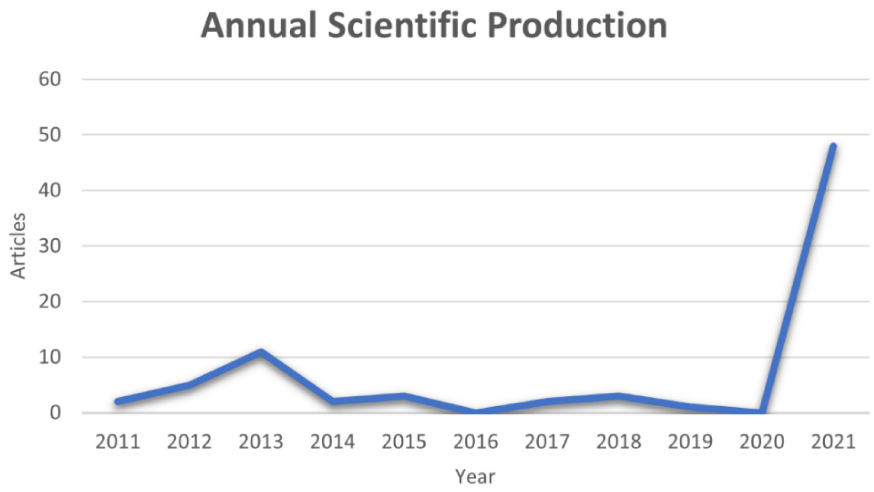

FIGURE 3
Annual scientific production in the decade 2011–2021.

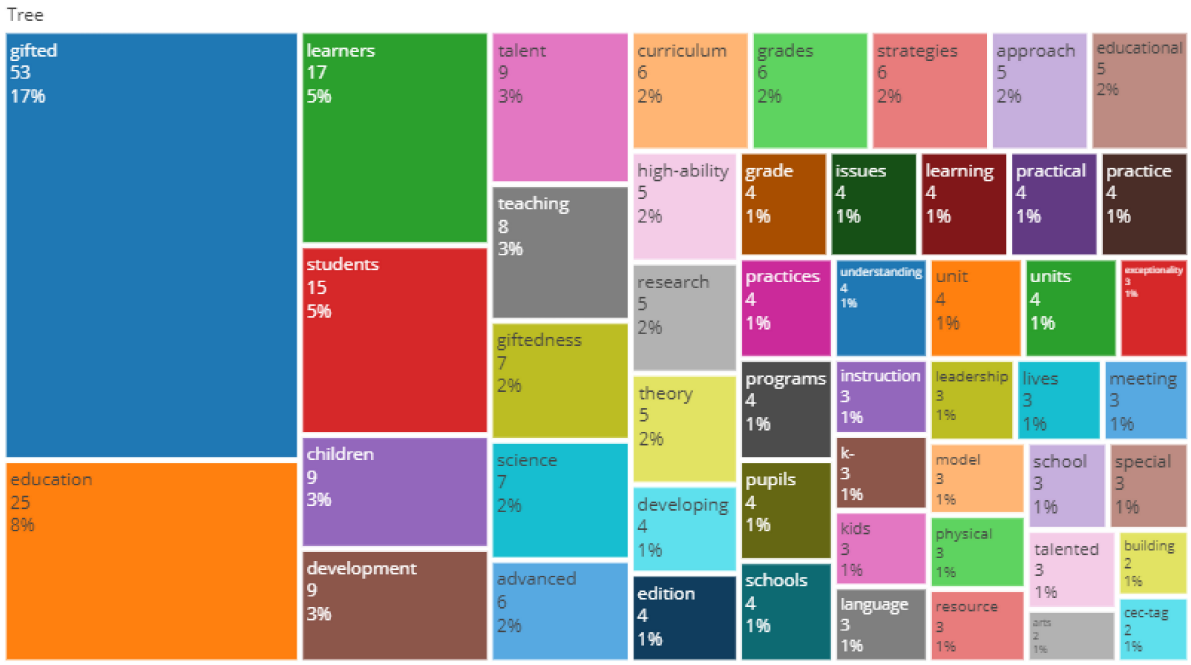

FIGURE 4
Treemap of word frequency in titles.

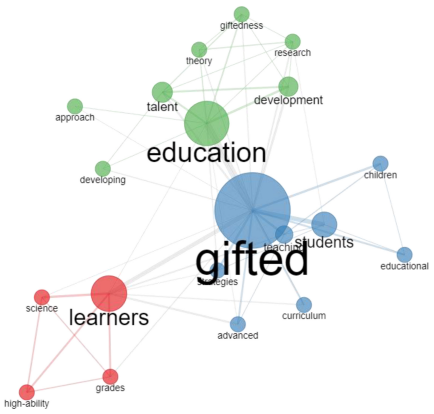

FIGURE 5
Co-occurrence map of words in titles.

FIGURE 6
Wordcloud of abstracts.

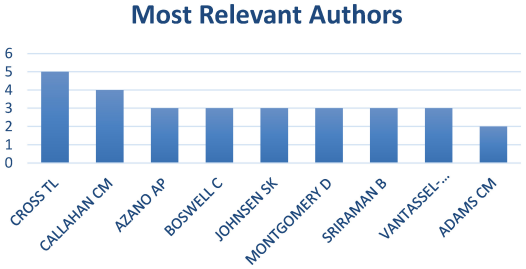

FIGURE 7
Most relevant authors in the review.

(Callahan et al., 2021; Missett et al., 2021), engineering design (Dailey, 2021), creativity (Kim et al., 2013), grit and perseverance (Sanguras, 2021); curiosity, neuroplasticity, metacognition, empathy, and wellbeing (Fishman-Weaver, 2021), social and emotional development (Cross, 2021; Hébert, 2021).

The above-mentioned volumes provide principles, teaching techniques, examples of activities, and materials for use by tutors, teachers, and educational staff. The model behind the suggested interventions is easily available in Renzulli and Reis' Schoolwide Enrichment Model Renzulli and Reis, 1985, 1994, 1997, 2014, 2021, which aims to develop the strengths and talents of all students because, as the authors write, "*A rising tide lifts all ships*" (Renzulli and Reis, 2014, p. 5), proposing enriched learning experiences and higher standards of knowledge that can benefit all children. An example of the application of SEM to the science curriculum is presented in Heilbronner (2021). Another inclusive and effective educational model for talent development is educational differentiation that aims to vary methods, strategies, and educational objectives in response to the variability of the class group. A clear framework is presented in Kaplan's (2021) text, and various case studies of differentiated teaching for gifted children are presented in Weber et al.'s (2021a) text.

Some volumes propose guidelines for underrepresented gifted students: Azano and Callahan (2021) present educational programming for gifted students living in high-poverty rural areas of the United States of America; Baska and VanTassel-Baska (2021), Felder et al. (2021), and Stambaugh et al. (2021) provide effective guidelines for meeting the educational needs of gifted students with different linguistic and cultural backgrounds or those who are in poverty or for the twice exceptional; good practices in the case of twice and multi-exceptional are also illustrated by Weinfeld et al. (2021).

Figure 7 shows the most relevant authors in the review.

The author with the most productions is Tracy L. Cross, Ph.D., an educational psychologist, Professor of Psychology and Gifted Education, President Emeritus of the NAGC (National Association for Gifted Children), and founder of the Center for Gifted Education, a research and program development center for gifted people, located at the College of William & Mary in Virginia. In second place is Carolyn M. Callahan (Ph.D. in Educational Psychology and Professor at the University of Virginia), while in third place, tied, are Amy P. Azano (Ph.D., Professor in the School of Education at Virginia Polytechnic Institute); Cecelia Boswell (Ed.D., educator, gifted education consultant in Texas); Susan K. Johnsen (Ph.D. in Special Education and Educational Psychology, Professor in the Department of Educational Psychology at Baylor University, Waco); Diane Montgomery (Ph.D., Psychologist, and Professor of Education at Middlesex University, London); Bharath Sriraman (Ph.D., Professor of Mathematics at the University of Montana, Missoula); Joyce VanTassel-Baska (Ed.D., Professor Emeritus of Education in the College of William & Mary, Virginia).

As previously mentioned, a second selection step was carried out on Google Books to include scientific products that, due to the "citation subculture," had eluded the bibliometric database search.

TABLE 4 Quality assessment checklist.

Item	Assessment criteria	Description
QA1	Does the text clearly describe its objective?	No, the objective is not described
		Partially, the objective is not clearly described.
		Yes, the objective is well described and clear.
QA2	Does the book clearly present a model (aimed at teachers and/or educators) of identification, taking charge and/or gifted education?	No, a gifted education model is not clearly presented.
		Partially, the model is not clearly presented or/and is not aimed at teachers/educators.
		Yes, it is.
QA3	Does the book describe clear and detailed outcomes of research or experiences of gifted education?	No, the details are not fully described.
		Partially, the details are not clear.
		Yes, the strategies can be used in detail as described.
QA4	Do the examples clarify the sample, method, and objectives?	No, general examples are given.
		Partially, only some items are present and/or are not well clarified.
		Yes, they are clarified.
QA5	Was the study cited by other authors?	No.
		Partly, 1–5 other articles cite this study.
		Yes, more than 5 articles cite this study.

Adapted by Papamitsiou and Economides (2014).

The previously identified query was launched in Google Books. The initial results of the search in the search engine produced a total of 2,010 articles which, when subjected to the inclusion and exclusion criteria, were reduced to 321. Subsequently, a thematic analysis procedure was carried out: the abstracts and the index of the texts were read and analyzed, and those results far from the disciplinary context and research questions were removed, as well as texts with a non-scientific-academic slant. The remaining nine volumes were then selected for review and assessed for quality. The checklist chosen and adapted for the assessment of the quality of the studies is that of Papamitsiou and Economides (2014; **Table 4**), which involves descriptive questions with answers on a 3-point Likert scale.

In the first criterion (QA1) *"Does the text clearly describe its objective?"* the description of the objective of the text was assessed, which was made explicit in seven of the papers. In the second criterion (QA2) *"Does the book clearly present a model (aimed at teachers and/or educators) of identification, taking charge, and/or gifted education?"* examined whether the studies clearly presented a model for teachers/educators to identify, plan, and take charge of gifted students. This criterion was met by all the texts. As far as the third criterion (QA3) *"Does the book describe clear and detailed outcomes of research or experiences of gifted education?"* is concerned, this study confirmed that six works clearly and in detail describe the results of research and experience on the subject. The fourth criterion (QA4) *"Do the examples clarify the sample, method, and objectives?"* assessed whether the studies clearly presented the sample, method, and objectives, which were analytically clarified by five texts. The fifth criterion QA5 *"Was the study cited by other authors?"* concerned citations of the study in other documents. Google Scholar[5] was used to check the number of citations. Of the nine texts included, three were cited more than five times in another research.

Figure 8 shows the results of the quality assessment.

According to the quality assessment checklist, QA5 was the only item that was not sufficiently satisfied. However, given the limitations of the citation system mentioned above,[6] all nine books (**Table 5**) were included in the review.

2.3.1. Discussion

All the texts turn out to be a valuable orientation tool for teachers and educators in their knowledge of models and instruments aimed at identifying the gifted student and accompanying him or her with a personalized educational program that embraces his or her educational needs and counteracts possible risk factors (misdiagnosis, socio-emotional difficulties, underachievement, and/or dropping out of school).

In the magnum sea of models and definitions of the construct of giftedness, Cornoldi (2019) tells the stories of Roberto, Magda, Giovanni, and Maria Luisa: four children with four different types of exceptionalities, making intelligible the

5 Citation checks on 14 August 2022.

6 See pp. 12–13.

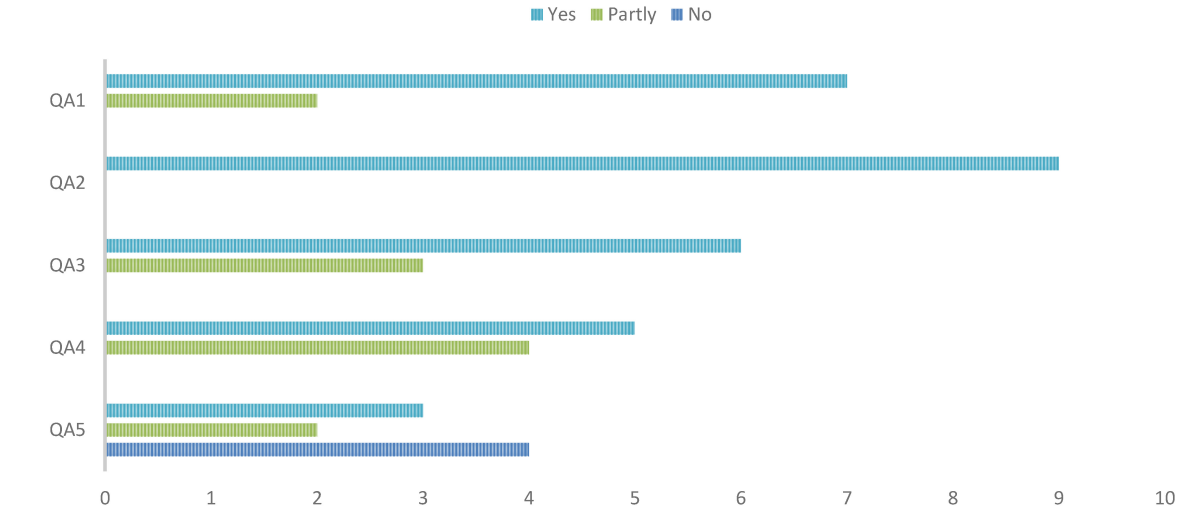

FIGURE 8
Quality assessment results.

TABLE 5 Books (Google Books) included in the review.

References	Title	Year
Zanetti, 2017	Bambini e ragazzi ad alto potenziale. una guida per educatori e famiglie	2017
Pinnelli, 2019	Plusdotazione e scuola inclusiva. modelli, percorsi e strategie di intervento	2019
Sartori and Cinque, 2019	Gifted. conoscere e valorizzare i giovani plusdotati e di talento dentro e fuori la scuola.	2019
Lucangeli, 2019	Gifted. la mente geniale. riconoscere ed educare bambini plusdotati	2019
Cornoldi, 2019	Bambini eccezionali. superdotati, talentosi, creativi o geni.	2019
Mormando, 2019	Altissimo potenziale intellettivo. strategie didattico-educative e percorsi di sviluppo dall'infanzia all'età adulta	2019
Sorrentino, 2021	Inclusive gifted education: from evidence based research to practice	2021
Renzulli and Reis, 2021 (translation and edited by Milan Lara)	Il modello di arricchimento scolastico. guida pratica per lo sviluppo del talento	2021
Sorrentino and Pinnelli (2021) (translation and edited by Sorrentino Clarissa and Pinnelli Stefania)	Scale renzulli. scale per l'identificazione delle caratteristiche comportamentali degli studenti plusdotati	2021

variety within the construct of giftedness. These include the "unmeasurable" ones to which [7] devotes a chapter: imagination; creativity; intuitive thinking; and empathy. The relationship between talent and creativity is also addressed by Lucangeli (2019).

Zanetti (2017) clarifies the fundamental question that it is not "What is giftedness and how is it measured?" but rather is "What does the social, school, and family environment do to promote opportunities for growth [.]?"[8] Indeed, there is no gifted prototype because both the profiles and talents of people with giftedness are extremely complex, heterogeneous, and unique. Precisely in order not to dissipate this valuable uniqueness, the school context must equip itself to be able to recognize each type and expression of potential and know how to develop it, supporting students in their growth process with individualized paths that counteract situations of discomfort and suffering.

Zanetti[9] informs us of the main problems reported by teachers of gifted children: difficulties in peer relations and behavioral problems in the classroom. Social-relational difficulties are attributable to being "*out-of-sync*" (Silverman, 2002) with advanced cognitive development compared to emotional and social development. "When advanced cognition leads to awareness of information for which the child or

7 Mormando (2019). Altissimo potenziale intellettivo. Strategie didattico-educative e percorsi di sviluppo dall'infanzia all'età adulta. Trento: Erickson. p. 55.

8 Zanetti (2017). Bambini e ragazzi ad alto potenziale. Roma, Carocci Faber, pp. 22–23.

9 Zanetti (2017). *Bambini e ragazzi ad alto potenziale*. Roma, Carocci Faber, pp. 99.

adult is emotionally unprepared, vulnerability is the natural result."[10] Behavioral problems, on the other hand, may result from the boredom children experience in front of already acquired knowledge. Possible solutions, as recommended by the author, are engaging students in peer tutoring activities, freely choosing the learning activity, supplementary or enrichment activities, and working in groups. The volume edited by Pinnelli (2019) consists of three parts (research and reflection; family and educational contexts area; and teaching area) that offer a comprehensive view of the state of the art about giftedness and offer a multilateral perspective of the contexts experienced by gifted people. To complement this volume on giftedness, the text offers case studies and specific scenarios, suggesting intervention strategies with an entire chapter dedicated to didactics for gifted pupils and a focus on didactic differentiation and related working strategies (Tic Tac Toe Strategy, Menu Strategy, and Cubing Strategy). The study stimulates a reflection on how to operationalize inclusiveness in different environments and informs us of the risk of categorizing giftedness in standards and labels, that is, of thinking about it in terms of clichés. The author analyzes the most common misconceptions of teachers on the subject, which are complicit in non-intervention: the myth of guaranteed scholastic success, that is, the belief that gifted people do not need specific interventions to excel; the myth of the ineluctable expression of talent, that is, the opinion that talent emerges spontaneously even in the most hostile environment; the myth of happiness, that is, the minimization of the sentimental complexity of gifted people, who are instead seen as always happy.[11]

As proof of the fallacy of the myth of happiness, Sartori and Cinque (2019) focus on the "complex and articulated constellation of emotional and relational characteristics of gifted people"[12] that could condition the expression of potential: low self-esteem, perfectionism, a tendency to isolation, high sensitivity, rigidity in dealing with situations, and arborescent and dispersive thinking.[13]

The book, edited by Sorrentino and Pinnelli (2021), is an orientation tool for identifying gifted students. In a circularity between the theory and educational practice, the construct of giftedness is presented to teachers, guiding them toward a focused observation of the student's potential and the design of targeted and personalized teaching interventions based on

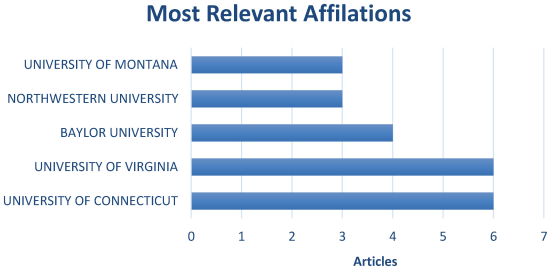

FIGURE 9
Most relevant affiliations in the review.

the interests and peculiarities of the individual. The theoretical framework is identified in the SEM, the Schoolwide Enrichment Model (SEM) developed by the American professor Renzulli (1977), a pioneer in gifted education studies. Renzulli defines gifted behavior as an intersection of the above-average ability in any field, motivation, and creativity interacting with each other to create a diversity of gifted profiles. This "talent pool" is affected by contextual stimulation and, for this reason, schools must offer a vast spectrum of educational and teaching opportunities appropriate to their development. To be nurtured, the potential must first be identified. To address this need for identification, the authors validate the tool for teachers' use. The validation was conducted on an Italian sample. The tool allows to investigate the presence of gifted students from 8 years of age or above, assessing their behavior and abilities compared to peers in various areas, according to a 6-point Likert scale.

There are 14 areas to be observed and they can be divided into basic scales (learning, creativity, motivation, and leadership); science area scales (artistic aptitude, precision, and communicative expressiveness, planning), and transversal scales (science, technology, reading, mathematics, music, and drama). The scale scores are to be interpreted based on local percentiles that can be determined by accessing the online resource provided by the book. As an addition to the original text, the Italian edition of the Renzulli Scales guides the reader in a comparison between the Italian school model and the US model in taking care of gifted pupils. Furthermore, the volume edited by Pinnelli and Sorrentino accompanies a formation in the use of the Renzulli Scales: teacher training. In a harmonious balance between testing and observation, between the subjective and the objective, the school is equipped with a decisive tool to assume a practical definition of giftedness, facilitating the identification, inclusion, and promotion of differences.

At the same time, emphasizing the Renzulli model, a necessary book for programming interventions aimed at the valorization of exceptionalities is the practical guide to the SEM—School Enrichment Model, edited by Milan (2021). The SEM "provides enrichment opportunities for all students and, at the same time, ensures advanced activities for those pupils who are highly motivated and have high skills and performance"

10 Silverman (2005). INTENSITIVE! *Intensities and sensitivities of the gifted. Social and emotional needs of gifted children. Hobart, Tasmania, Australia: Tasmanian Association for the Gifted*, p. 11.

11 Pinnelli (2019). *Plusdotazione e scuola inclusiva. Modelli, percorsi e strategie di intervento.* Lecce-Brescia: Pensa MultiMedia, pp. 21–22.

12 Sartori and Cinque (2019). Gifted. Conoscere e valorizzare i giovani plusdotati e di talento dentro e fuori la scuola. Roma: Magi. p. 159.

13 Sartori and Cinque (2019). *Gifted. Conoscere e valorizzare i giovani plusdotati e di talento dentro e fuori la scuola*. Roma: Magi, 160–161.

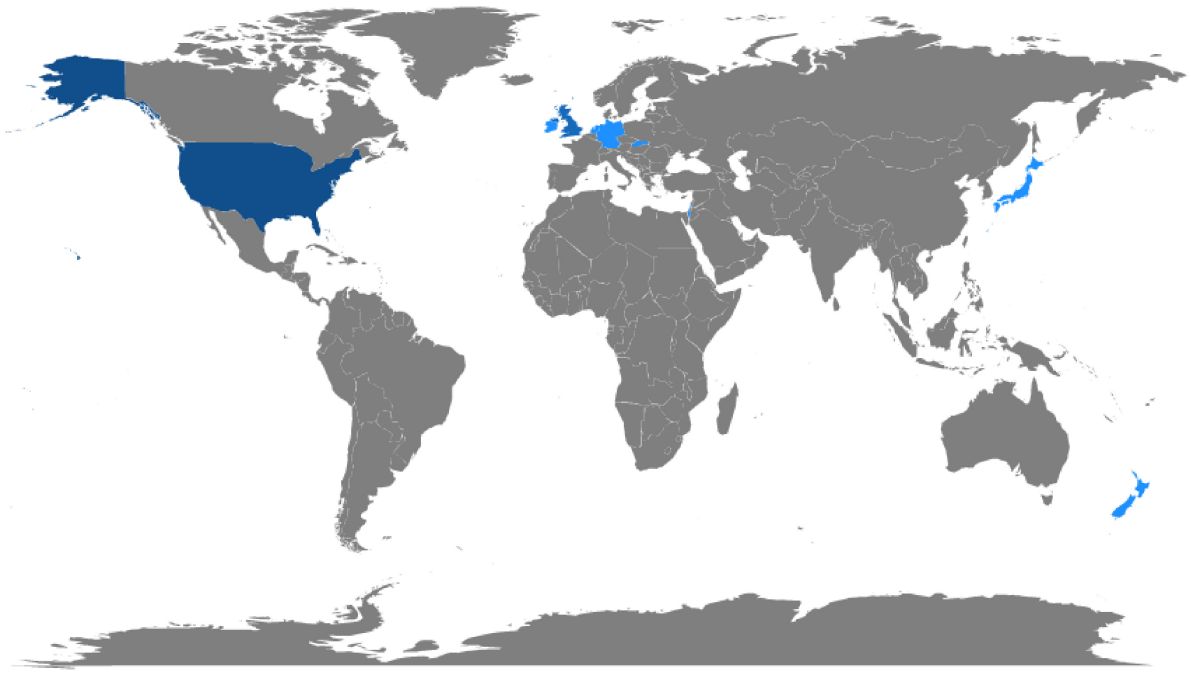

FIGURE 10
Most relevant states in the review.

(Milan, p. 5) by including them within the regular school curriculum. In fact, Renzulli and Reis do not say of giftedness but of "gifted behaviors" to emphasize the idea of the dynamism of gifted behaviors that occurs "in certain people, at certain times and in certain circumstances" (Milan, 2021). The SEM starts from the assumption that schools should be the place for the development of giftedness (Renzulli, 1994) and therefore places the student and his/her wellbeing at the center of educational action, adopting teaching strategies to enhance the student in all his/her complex identity. Teachers help learners understand their strengths (abilities, interests, and learning styles) and enter the information into a management model called the Total Talent Portfolio, which is then used to decide on the educational services to be offered to develop potential. The personalization of the pupil's learning program is enabled by the compacting of curriculum, which makes it possible to eliminate the part of the program that has already been learned and the repetition of previously acquired tasks, thus ensuring that time is found for more challenging activities aimed at advanced and motivating objectives to enable the development of personal abilities and talents (Renzulli and Reis, 1998). This development takes place from an enrichment perspective that increases creative productivity by exposing students to a variety of topics, ideas, and areas of study and then subsequently teaching them to apply advanced content in those areas.

In the last part of Sorrentino's (2021) book, which offers a precise comparison of international educational policies and models of educational identification and intervention, there is experimentation of Renzulli's Total Talent Portfolio with a 13-year-old student who was not considered gifted by his teachers and in a situation of school underachievement with consequent experiences of demotivation. The compilation of the Total Talent Portfolio prompted the student to reflect on his abilities and the importance of commitment to transform these abilities into talent.[14]

3. Conclusion

3.1. The limit of "citation culture"

In **Figures 9**, **10**, we note how almost all the universities involved in the review are American, in spite of the significant and important research contribution of the European Academy and the eastern part of the world (especially Australia). Although the present review is deliberately restricted to the pedagogical-didactic area, it is evident that most of the authors come from the psychological disciplinary field and not from the pedagogical one. Although an interactive network between the professional figures like the psychologist, the pedagogue, and the educator is indispensable and fruitful for improving the field of education of gifted students, this fact has pointed out to avoid

14 Sorrentino (2021). *Inclusive gifted education: From evidence-based research to practice*. Armando Editore. p. 116.

the risk of persevering in a psychometric model of interpreting the educational process and as an appeal for more systematic educational research.

This geographic and scientific-sectoral predominance could depend on two reasons: the well-known criticality of the databases used (Scopus and WoS) for the humanities and social sciences relating to the "strong predominance of Western English-language journals" (Turbanti, 2014) and the "citation culture" (Wouters, 1999, p. 2): a subculture that, over the last two decades, has gradually evolved to the point where work is evaluated according to the number of citations obtained. Wouters (pp. 210–212) points out the presence of multiple "citation cultures," that is, multiple habits and logics regarding citations that are different in the various disciplinary areas of interest. For example, as the University of Palermo Library Portal explains, the use of bibliometric indicators (based on the quantitative citation analysis) is not sufficient as a measure of performance in the social sciences and humanities disciplines, in contrast to the subject areas belonging to the STM disciplines. Indeed, in the SSH disciplines, evaluation is purely qualitative (e.g., peer review). This scarce presence of SSH texts in non-English language.[15]

3.2. Future research perspectives

To conclude, this review of systematic literature on gifted education has shown a conspicuous production in both the Italian and international contexts, with the prevalence of recently published works, an indication of a lively interest in the subject, above all toward the didactic and educational support of the gifted student.

This rising attention can be attributed to the growth of special pedagogy and didactics that are expanding the "inclusive vision" by giving attention and value to all kinds of uniqueness (Pinnelli, 2019; Baccassino and Pinnelli, 2022). However, the review highlighted a limitation in searching for scientific products related to the humanities-social sciences (SSH) in the main international reference databases (Scopus and Web of Science). In fact, these databases select results based on bibliometric indices (quantitative analysis of bibliographic citations) and based on the language used (English): two criteria that are little used in the SSH literature.

Multiple models and instruments for identifying the gifted student emerge from the results: assessment tools for psychologists and professionals; potential identification tools for use by teachers and educators; nomination and identification by a peer; and self-nomination. The main model of educational planning for the gifted population, but extendable to all, is the SEM—(Schoolwide Enrichment Model) that provides for the identification of talents in the classroom, the enrichment of the educational offer in three directions, the compaction of learning already acquired, and the orientation of choices using continuous verification of the interests, learning modes, and styles and strengths of the students.

The texts highlight numerous instructional and educational programming models for gifted students in all school grades. The review also reveals a plurality of misrepresentations and inaccurate beliefs about giftedness, such as teachers' false conviction that gifted students are self-sufficient in learning and therefore do not need help. Instead, as Vygotskij (1973) teaches, there is always a potential for learning development and its enhancement is the responsibility and prerogative of the school community. These misrepresentations are the very reason for inadequate or absence interventions by schools. It is therefore necessary to implement specific training interventions for educators to remove these misconceptions? In this way, teachers would become conscious of the risk and protective factors of gifted pupils and the wide range of possible actions to promote the wellbeing of gifted students and enhance their talents.

Such formation, from a future research perspective, could be aimed not only at teachers but also at the peer group. In fact, gaps in research are both analysis on the motivations behind fragile peer attachment and the development of prosocial educational intervention models aimed at the entire class group. This is because one of the basic needs of the gifted population that emerges in the review is peer recognition and a better socialization experience. It would be important to analyze the representation and belief system that the peer group has about the gifted student to focus educational intervention not only on the individual but on the whole class community. This would help gifted students not only on the level of learning but also on the level of emotional needs, triggering prosocial behaviors and countering the frequent risks of isolation and alienation.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

SP conceived and designed the study, contributing to the choice of objectives, and research questions and methodological protocol. FB selected, extracted, and processed the dataset. Both authors wrote all sections of the manuscript,

15 Source: https://www.unipa.it/biblioteche/fare-ricerca/bibliometria/indicatori-bibliometrici/indicatori-aree-non-bibliometriche/[accessed on 11 August 2022].

contributed to its revision, discussed the data, and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Relationship between structural and social dimensions of school culture

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The culture of an educational institution is defined as a set of common beliefs and values that closely connect the members of a community. Structural dimensions (space, time, teaching materials, and teaching strategies), social dimensions (relationships among school staff, between teachers and children, and among children), common rituals, and customs and traditions of the school are manifestations of school culture in which it is recognized and becomes visible. The aim of this research is to determine the connection between structural dimensions and social relations in the institution. The research was conducted in 2022 on a sample of 174 primary teachers employed in various schools in the Republic of Croatia. *The Questionnaire for the Assessment of the Culture of the Educational Institution* was used for data collection. An exploratory factor analysis on the *Scale of the State of School Culture*, which measured the state of structural dimensions, extracted two factors, based on which two subscales of good metric characteristics were created: *organization of educational work* and *spatial and temporal dimensions*. The *Scale of the State of Relations in the Institution* consists of 13 items and has high reliability. In order to determine the existence of a connection between the structural and social dimensions of school culture, Pearson's correlation coefficients were calculated. Moderate to relatively high positive correlations between the examined variables were found, which confirms the intertwining and interdependence of different dimensions of school culture, which significantly determines the quality of life and education of children in the institutional context.

KEYWORDS

institutional context, primary teacher, relationships, school culture, structural dimension of school culture

1. Introduction

School culture is probably one of the most complex and important concepts in education (Prosser, 1999; Stoll, 1999; Bruner, 2000). The term culture of an educational institution usually refers to the accumulation of many individual values and norms, attitudes and beliefs, rituals, history, traditions, etc., which form unwritten rules about how one should think, feel, behave, and act in a certain educational institution (Veziroglu-Celik and Yildiz, 2018). In addition to the curriculum and structural elements such as spatial-material and temporal dimensions, expectations, ways of solving problems, and decision-making, the concept of institutional culture, in particular,

encompasses the social interactions of people, which are, at the same time, largely determined by the culture itself. This is where the culture of an individual ends and grows into the culture of a group of people who work and live together. In every human organization, such as an educational institution, there is an unwritten consensus about what is important to the members of the institution; how they should behave in the institution; how to work; and what, when, how, and where to do something. It is for these reasons that some authors define the culture of an institution as "the way we get things done around here" (Deal and Kennedy, 1983, p. 4, as cited in Hopkins, 2001, p. 155) or as "a lens through which the world is viewed" (Hargreaves, 1999, p. 33) because culture permeates everything that happens in the institution.

Although each institution has a certain set of externally prescribed rules and procedures on a conscious level, the culture of the institution is something completely different and something covert; it is that hard-to-know, unconscious part of the daily life in it. Therefore, the culture of an institution is not made up of explicit norms, so it is not accessible to direct observation, research, and comprehension but is subtly created from unspoken expectations, common beliefs, behavior, unwritten rules, established habits and patterns of behavior, and the social interactions of the members of the institution (Chung et al., 2019). Thus, each educational institution has its own, unique culture that makes it special, and by which it differs from all the others. Therefore, for the purposes of this article, the culture of an educational institution is defined as a set of common beliefs and values that closely connect the members of a community and is recognizable through the social relations between people, their mutual work, institutional management, the organizational and physical environment, and the degree of focus on continuous learning and research in the educational practice for the purpose of its improvement (Vujičić, 2011).

In order to understand the process of cultural change, it is important to take into consideration the distinction between structure and culture. It is impossible to explore school culture separately from the structure because they are inextricably linked and interdependent, and the relationship between them is dialectical. Structures influence culture, just as culture influences structures. Structures are often regarded as the most basic and profound because they generate cultures that not only allow the structures to work but also justify or legitimize the structures. On the other hand, changes in culture, i.e., value systems and beliefs, can change underlying structures. The two go hand-in-hand and are mutually reinforcing. But culture can only be influenced indirectly, while structures can be changed (Stoll and Fink, 2000). That is the reason why, on a practical level, it is often easier to change structures than cultures. In this sense, Hargreaves (1994) stated that it is not possible to establish productive school cultures without prior changes in school structures that increase the opportunities for meaningful relationships and collegial support between the school staff. Therefore, structural changes should be less focused on the direct impact on curriculum and assessment and more on improving opportunities for teachers to work together. Also, it is difficult to sustain changes in culture without a concomitant change in structure. However, if structures are changed too radically without paying attention to the underlying culture, then one may get the appearance of change (change in structure) but not the reality of change (change in culture) (Hopkins, 2001). Hence, the challenge is that structural changes without concomitant changes in school culture are likely to be superficial, which is a risk associated with all externally driven educational reforms. Therefore, culture change is at least partly achieved through structural change.

Structural dimensions (organization of space and time, teaching materials, and teaching strategies), social dimensions (relationships in the institution between school personnel, between teachers and children, and among children), common rituals, customs, and traditions of the school are manifestations of school culture in which it is recognized and becomes visible (Deal and Kennedy, 1983, as cited in Hopkins, 2001; Schoen and Teddlie, 2008). "Structures are relatively easy to manipulate because they are visible from the outside, but in order to achieve change, one must change the culture that lies behind the existing structures" (Prosser, 1999, p. 40). However, there is a difference between culture and structure: culture refers to the values, attitudes, and beliefs mentioned earlier, while structure refers to the material, physical environment, and the temporal structuring of the activities of children, educators, etc. (Vujičić, 2008). According to author Hargreaves (1999), there is a physical, organizational and social type of structure, while Stoll and Fink (2000) mentioned space, time, roles, and relationships of people in the institution as structural elements. The same authors believe that the culture of an institution cannot be researched separately because it is highly related to the structure and both are interdependent in many ways. A change in the structure without a change in the culture is nothing more than a superficial change. If two educational institutions have a similar structure, they may have different cultures, but cultures can also be formed within certain structures, so that a change in culture is partly achieved by a change in structure (Stoll and Fink, 2000).

When it comes to social relations, Ogbu (1989 according to Vujičić, 2011, p. 21) defined culture as "… the totality of the way of life of a particular human group, as a network and system of accumulated knowledge, customs, values, and patterns of behavior." Fullan (1999) used the term "living thing" when describing the culture of an educational institution precisely because it is most strongly shaped by the relationships between educators and children within the institution, as well as the relationships between educators and children within the community (Weckström et al., 2020). Prosser (1999) also agrees, stating that culture is a set of reciprocal relationships between all those involved in the educational process and a way of constructing reality. The importance of the reciprocal

relationships between all subjects that create the institutional culture is emphasized by many authors (Čamber Tambolaš and Vujičić, 2019; Hewett and La Paro, 2019; Čamber Tambolaš et al., 2020), including Hargreaves (1999), by using the term "lens" through which participants see themselves and also the world around them.

Research studies (Hewett and La Paro, 2019; Hatton-Bowers et al., 2020; Jeon and Ardeleanu, 2020; Ji and Yue, 2020) showed that reciprocal relationships within and outside the institution, sharing attitudes and beliefs, working on curriculum, and collaborative learning are key to change to improve the quality of institutional culture. If the relationships are positive and efforts are made to improve them outside and inside the institution, the culture itself will be positive, as the results of the above research have shown. To change the culture of the institution, its members need to understand it very well, which is supported by the research of authors Veziroglu-Celik and Yildiz (2018), in which educators actively reflected on their own culture of the institution and expressed their opinions and attitudes. They consider group reflections and collaborative learning in the institution to be an even better form of expressing opinions and attitudes that not only bring about personal change and growth for educators but also largely transform the entire culture into a culture of participation in which the kindergarten becomes a learning community. This is evidenced in the research studies of authors Toran and Yagan Güder (2020), Weckström et al. (2020), and Avidov-Ungar et al. (2021), whose research reflects the culture of participation created by creating a context in which collaborative learning and reflective practice were encouraged. The research studies by authors Yang and Li (2019) also demonstrated that the culture of the institution can change in accordance with changes in the curriculum and that several different cultures interacting with each other create an authentic new culture.

2. Materials and methods

The results presented in this article are part of a wider research conducted as part of the scientific research project *Hidden Curriculum and the Culture of Educational Institutions* of the Faculty of Teacher Education, University of Rijeka. The aim of this article was to determine the correlation between structural dimensions and social relations in the institution as dimensions of school culture, as well as their correlation with the sociodemographic variables under consideration. In accordance with the stated goal, the following research tasks were developed:

1. To determine the correlation between the structural dimensions of school culture and social relations in the institution;
2. To determine the differences in teachers' assessments of the current state of structural dimensions in the institution (organization of space, time, teaching materials, and teaching strategies) regarding their level of education and length of service; and
3. To determine the differences in teachers' assessments of the current social relations in the institution regarding their level of education and length of service.

The following research hypotheses were formulated based on the set research tasks:

H1: There is a positive correlation between structural dimensions and social relations in the institution.
H2: Teachers with a higher level of education (master's degree) evaluate the current state of the structural and social dimensions of school culture more positively than teachers with a lower level of education (bachelor's degree).
H3: Teachers with longer lengths of service evaluate the current state of the structural and social dimensions of school culture more positively than teachers with shorter lengths of service.

It is assumed that teachers' assessments of the current state of the structural dimensions of school culture are positively correlated with their assessments of social relations in the institution, in such a way that in those schools where teachers assess interpersonal relations in the collective as being of higher quality and more focused on cooperation, the organization of the structural dimensions of school culture (space, time, teaching materials, and teaching strategies) is to a greater extent in accordance with the contemporary (co)constructivist understanding of education, according to which structures promote communication, discussion, and collaborative learning between all school members involved in the educational process.

The research was conducted at the beginning of 2022 on a convenient sample of 174 primary teachers employed in various schools in the Republic of Croatia. In Croatia at the time, due to the implementation of epidemiological measures in schools and kindergartens with the aim of suppressing the spread of COVID-19 infection in accordance with the requirements of the Croatian Institute of Public Health, access to external actors to schools and kindergartens was restricted. Therefore, the research was conducted online *via* Google Forms. In order to include in the research as many primary teachers as possible, the researchers contacted school principals by e-mail with information on the implementation of the research and a request to inform all employed teachers in their institution and send them a link to the online survey. The list of all elementary schools in the Republic of Croatia, to which we sent an invitation to participate in the research, was prepared on the basis of data from the Ministry of Science and Education. This suggests that the survey sample cannot be considered representative but rather convenient, thus, it is important to take this limitation into account when interpreting the results obtained.

The Questionnaire for the Assessment of the Culture of the Educational Institution was used for data collection, which was designed in 2015 for the needs of the research project *Culture of the Educational Institution as a Factor of Co-construction of Knowledge* at the University of Rijeka (grant number: 13.10.2.2.01). Numerous authors, such as Rosenholtz (1989, according to Stoll and Fink, 2000), Hopkins et al. (1994), Hargreaves (1995), Bruner (2000), and Stoll and Fink (2000) are concerned with the study and typology of school culture and offer a considerable number of different, well-developed typologies of school culture based on different initial criteria. For example, the model of school cultures by Stoll and Fink (2000) based on the dimensions of school effectiveness and school improvement represents a finely developed typology, as does the model by Hargreaves (1995) based on completely different dimensions explained in the areas of social cohesion and social control. Hopkins et al. (1994) built their model of school culture on the dimensions of school effectiveness and the degree of dynamism of the quality improvement process. In their model of school culture, Schoen and Teddlie (2008) listed the following dimensions: professional orientation, organizational structure, quality of the learning environment, and student-centered focus. Schein (1992) pointed out that organizational culture manifests itself at three different levels: artifacts, espoused values and beliefs, and basic assumptions. From the above, it is clear that there are a variety of typologies for the culture of an educational institution, with some similarities and differences among them, which is a consequence of the different initial criteria or dimensions on which these typologies were built. In addition, there is considerable overlap in definitions of school culture and school climate by different researchers, even within the same research tradition (Schoen and Teddlie, 2008). From the above, it is clear what challenges researchers face when attempting to operationalize the concept of the culture of an educational institution, and the questionnaire used in the research presented in this article is one of the possible ways to do so.

Structural dimensions of school culture were operationalized in this study through four aspects: organization of space, time, teaching materials, and teaching strategies. Items examining the current state of aforementioned aspects in the institution are grouped in the *Scale of the State of School Culture*. The respondents' greater adherence to all items in the mentioned *Scale* indicates that the shaping and organization of the structural dimensions of school culture in a certain institution are approached from the position of socio-constructivist theory, whereby attention is directed to the organization of a flexible time schedule and school environment that will encourage collaborative and active learning of all involved, and where it will strive for the greatest possible integration of teaching subjects and teaching contents.

Furthermore, social relations as a dimension of school culture were operationalized in this study through three aspects: relations among teachers, relations between teachers and professional associates, and relations between teachers and the principal. Items examining teachers' assessments of current relations in the institution are grouped in the *Scale of the State of Relations in the Institution*. The respondents' greater adherence to all items in the mentioned *Scale*, except for one (*There is a lack of communication between teachers in the collective.*), points to the practice of establishing and maintaining quality, respectful, and reciprocal relations in the institution, which is inherent to the positive school culture (Peterson, 2002).

In both scales, the respondents provided answers using a 5-point Likert-type scale (ranging from *1—Does not apply at all* to *5—Completely applies*). The collected data were analyzed in the statistical program SPSS. There were no missing data in the database because the research was conducted through an online survey, which did not give participants the opportunity to skip/not answer the question (except for questions related to sociodemographic characteristics), i.e., they could not continue with completing the survey if they did not answer the previous question.

Possible biases in participants' responses due to IER (insufficient effort responding) or CR (careless responding) were attempted to be prevented in several ways. The introductory invitation to participate in the survey at the beginning of the online questionnaire was written in a personal rather than formal style to convey a sense of the researchers' appreciation for the respondents and their genuine interest in what the respondents had to say. In this invitation, the importance of research to the field of school culture was explained in detail to the respondents and the importance of their involvement in completing the questionnaire was emphasized. They were also given the opportunity to contact the researchers if they wanted additional clarification. They were promised that they would be informed about the obtained research results by forwarding the results to schools that express their interest.

3. Results

A descriptive analysis of the sociodemographic variables of the sample showed that 174 teachers participated in the research, 166 of whom are women, 6 men, and 2 respondents did not specify their gender. The average age of the respondents is 48 years ($M = 48.2$, $SD = 9.8$), ranging from 24 to 64 years, and the average length of service is 24 years ($M = 23.92$, $SD = 10.98$), ranging from a minimum of 1 to a maximum of 44 years of service. The largest number of the respondents completed graduate studies and obtained a university degree ($N = 99$, i.e., 56.9%), followed by 37.4% of respondents ($N = 65$) with completed college, professional, or undergraduate studies (bachelor's degree), and 2.9% of the respondents completed doctoral studies (Ph.D.). Nevertheless, 2.9% of them did not answer about their completed level of education. Due to the reform of initial teacher education in the Republic of Croatia,

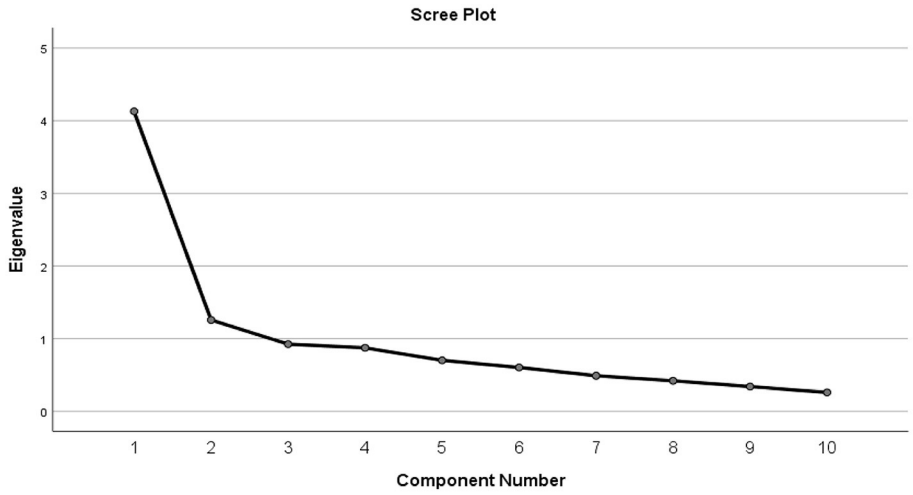

FIGURE 1
Scree plot for the principal component analysis of the *Scale of the State of School Culture*.

the diversity of primary teachers' educational levels is present in the sample. From the late 1970s until the introduction of the Bologna process into the higher education system in the academic year 2005/2006, there were regular changes in the level and type of teacher study programs in Croatia. The biggest change in initial teacher education in Croatia took place in 1992 with the transition from a 2-year post-secondary associate degree to a 4-year college (bachelor) degree (Uzelac et al., 2003). With the start of the implementation of the Bologna process, primary teacher study programs changed to *Integrated undergraduate and graduate study of primary school education* lasting 5 years.

Factor structure and metric characteristics of the used scales

An exploratory factor analysis using the principal component (PC) method with direct oblimin rotation was performed to explore the latent structure of the *Scale of the State of School Culture* (10 items). The adequacy of the correlation matrix for factorization was verified using the Kaiser-Meyer-Olkin coefficient (KMO = 0.820) and Bartlett's test of sphericity ($\chi^2 = 568.358$, df = 45, $p < 0.001$). Based on the Kaiser-Guttman criterion (eigenvalue >1), and the scree plot criterion (Figure 1), two components were extracted, explaining 53.85% of the variance of scale results, which is consistent with the desired 50% limit of the percentage of the variance explained for the component analysis (Nunnaly and Bernstein, 1994). The results of the performed principal component analysis (component loadings and communalities, eigenvalue, and percentage of the explained variance) are shown in Table 1. The value of 0.3 was taken as the limit of an acceptable component loading value (Pett et al., 2003) so that the items with the same or greater component loading (≥0.3) were included in the component. Table 1 shows that two items (42. and 43.) are saturated on both components. However, these items substantively belong to the first component, and their loadings on the second component are also low (<0.35), thus, they were retained.

The obtained results of the principal component analysis indicate that it is reasonable to calculate the linear composite of subscales, i.e., the total average result on each subscale, which is expressed as the sum of the corresponding item response divided by the number of items. It is observable from Table 1 that the first component is saturated with 6 items, pointing to the way of organizing the entire educational work in the school and applied teaching strategies (e.g., project-based learning), while the second component is saturated with four items, reflecting the way of organizing space and time for learning in school. Based on the components described, two subscales were created: (1) *Organization of educational work* (Cronbach's alpha = 0.82) and (2) *Spatial and temporal dimensions* (Cronbach's alpha = 0.67). The reliability coefficient of internal consistency (Cronbach's alpha) suggests high reliability of the first subscale and acceptable marginal reliability of the second subscale. Although a frequently cited acceptable range of Cronbach's alpha is a value of 0.70, its interpretation is muddled with a lack of agreement regarding the appropriate range of acceptability. Some authors (Cho and Kim, 2015) argued that rather than a universal standard, the appropriate level of reliability is dependent on how a measure is being applied in research. Hair et al. (2010) noted that while a value of 0.70 is generally agreed upon as an acceptable value, values as low as 0.60

TABLE 1 Results of the principal component analysis of the *Scale of the State of School Culture*.

Item	Component loadings		Communalities
	F1	F2	
46. Project activities are regularly implemented at the level of the entire school.	**0.85**		0.71
45. Project activities are regularly implemented at the level of classroom teaching.	**0.73**		0.60
47. Excellence is encouraged in every student.	**0.69**		0.52
44. The equipment of the school (materials and aids, media) enables the use of various sources of knowledge.	**0.67**		0.39
42. Correlation of teaching subjects and integration of teaching contents is achieved in cooperation with other teachers.	**0.63**	0.31	0.64
43. The teaching content is adapted to the students' interests in different fields of activity.	**0.51**	0.33	0.50
40. Flexible organization of time is enabled (time is not limited by 45 min school hour).		**0.83**	0.59
41. The space for learning outside the classroom is adapted and used.		**0.70**	0.59
18. Parents participate in providing assistance in arranging the school space.		**0.60**	0.43
19. The space in the classroom (arrangement of desks) is organized in a way to encourage children's communication, especially socializing in smaller groups.		**0.58**	0.41
Eigenvalue	4.13	1.26	
% of explained variance	41.28	12.57	

Factor saturation of variables that saturate a particular factor (≥0.3) are marked in bold.

TABLE 2 Descriptive data for the subscales of the *Scale of the State of School Culture*.

Subscale	*N*	Min	Max	M	SD	Sk	Ku
Organization of educational work	173	1.50	5.00	3.88	0.75	−0.78	0.63
Spatial and temporal dimensions	172	1.25	5.00	3.20	0.86	−0.18	−0.80

N, number of items; Min, minimum score; Max, maximum score; M, arithmetic mean; SD, standard deviation; Sk, skewness; Ku, kurtosis.

may be acceptable for exploratory research, as is the research presented in this article. Additionally, George and Mallery (2003, p. 231) suggested a tiered approach consisting of the following: "≥0.9—Excellent, ≥0.8—Good, ≥0.7—Acceptable, ≥0.6—Questionable, ≥0.5—Poor, and ≤0.5—Unacceptable." While researchers disagree on the appropriate lower cut-off values of Cronbach's alpha, some researchers (Cortina, 1993; Cho and Kim, 2015) warn against applying any arbitrary or automatic cut-off criteria. Rather, it is suggested that any minimum value should be determined on an individual basis based on the purpose of the research, the importance of the decision involved, and/or the stage of the research. Besides that, it is important to be aware that decisions about scale adequacy should not be made based solely on the level of Cronbach's alpha, and that the adequate level of reliability depends on the specific research purpose and importance of the decision associated with the scale's use. Therefore, in this study, the decision was made to keep the obtained subscale with a marginally acceptable value of Cronbach's alpha, but with a warning about the importance of careful examination and interpretation of the results obtained by the subscale, taking into account the possibility of the existence of some additional factors in the data structure, which should be given a theoretical framework.

The descriptive data for the subscales are shown in Table 2. Correlations of each item with the total result on both subscales are relatively high. Partitioning would not significantly increase the reliability of the subscales, and, for this reason, all items were retained on both subscales.

In order to examine the relations in the educational institution at all levels (among teachers, between teachers and professional associates, and between teachers and the principal), the *Scale of the State of Relations in the Institution* was used, which consists of 13 items. The *Scale* was previously used in several studies (Pejić Papak et al., 2017; Vujičić and Čamber Tambolaš, 2017, 2019a,b; Vujičić et al., 2018; Čamber Tambolaš and Vujičić, 2019), on different samples and in three different countries (Croatia, Slovenia, Serbia), and, in all contexts, it showed high reliability, with Cronbach's alpha value of 0.83 and higher. For this reason, in the statistical data analysis of this research, the reliability coefficient of the internal consistency Cronbach's alpha was calculated and showed high reliability of the *Scale* (0.92). The descriptive data for the *Scale of the State of Relations in the Institution* are shown in Table 3.

TABLE 3 Descriptive data for the *Scale of Relations in the Institution*.

	N	Min	Max	M	SD	Sk	Ku
Social relations	174	1.31	5.00	3.55	0.73	−0.37	−0.10

N, number of items; Min, minimum score; Max, maximum score; M, arithmetic mean; SD, standard deviation; Sk, skewness; Ku, kurtosis.

TABLE 4 Pearson's coefficient of correlation between social and structural dimensions of school culture.

Subscales	Social relations	Organization of educational work	Spatial and temporal dimensions
Social relations	1.00		
Organization of educational work	**0.59****	1.00	
Spatial and temporal dimensions	**0.38****	**0.50****	1.00

**p < 0.01, *p < 0.05.
Bold values highlight that these are statistically significant values of the Pearson's coefficient of correlation.

Correlation between structural and social dimensions of school culture

In order to determine the existence of a connection between the structural and social dimensions of school culture, Pearson's correlation coefficients (r) were calculated between the subscales of *social relations*, *organization of educational work*, and *spatial and temporal dimensions.*

Statistical analysis showed that all three mentioned subscales are positively correlated with each other (moderate to relatively high), ranging from 0.38 to 0.59. Table 4 shows that both subscales of the structural dimensions of school culture (organization of educational work and spatial and temporal dimensions) have a relatively high positive correlation ($r = 0.50$, $p < 0.01$). This means that the more the organization of the entire education of work in the school is directed toward encouraging a socio-constructivist approach to learning in which the importance of the active role of students in the process of creating knowledge is emphasized, the more flexible the organization of space and time for learning and more adaptable to the specific interests of students.

The assessment of the quality of relationships between people in the institution, which represent the operationalization of the social dimension of school culture, has a statistically significant positive correlation with both subscales of the structural dimensions of school culture. The quality of relationships in the institution has a relatively high-positive correlation ($r = 0.59$, $p < 0.01$) with the organization of educational work in the school. This means that the higher the quality of teachers' mutual relationships, the more inclined they are to apply modern teaching methods in the organization of educational work methods and strategies, such as project-based learning, integrated learning, and research-based learning. Also, the quality of relationships in the institution has a moderate positive correlation ($r = 0.38$, $p < 0.01$) with the spatial and temporal dimensions. This indicates that the more teachers assess the relationships in the collective as positive, the more flexible their shaping of the space and time schedule of living in school and more adapted to the interests and needs of students with the aim of stimulating the learning process and active creation of knowledge.

Based on the presented results of Pearson's correlation coefficient, the first research hypothesis about the positive relationship between structural dimensions and social relations as dimensions of school culture is confirmed.

Differences in teachers' assessments of structural and social dimensions of school culture

In order to examine the existence of differences in the assessments of the surveyed teachers about the structural and social dimensions of school culture regarding their level of education, i.e., the differences in assessments between teachers who obtained a college degree ($N = 65$) and teachers who obtained a university degree ($N = 99$), a series of t-tests for independent samples was performed on the obtained subscales: *social relations*, *organization of educational work*, and *spatial and temporal dimensions.*

A statistically significant difference was obtained in the average score on the *spatial and temporal dimensions* scale ($t = 2.28$, df = 160, $p < 0.05$), whereby teachers with a college degree have a higher score (M = 3.41, SD = 0.82) compared with teachers with a university degree (M = 3.10, SD = 0.87). The results point to the conclusion that teachers with a lower level of education (college) consider the organization of the spatial and material environment and time schedule in their school to be more flexible and to a greater extent aligned with the educational interests and needs of students than teachers with a completed higher level of education (university). However, the low effect size index $\eta^2 = 0.031$ (Petz et al., 2012) suggests that educational level can explain only 3.1% of the variance in teachers' assessments of flexibility in organizing the spatial and material environment and time schedule in the schools. This means that there are obviously some other independent variables

besides the stated level of education that have a much stronger influence on teachers' assessment of the organization of space and time for learning in school.

On the other two analyzed subscales (*social relations* and *organization of educational work*), no statistically significant differences were obtained regarding the level of education of the surveyed teachers, which means that there is no difference in the assessments of the quality of interpersonal relations in the institution and in the assessments of the strategies used in the organization of educational work in the school between teachers with obtained college and university degree.

Based on the presented results of *t*-tests for independent samples, the second research hypothesis about the more positive assessments of the current state of structural and social dimensions of school culture by teachers with higher educational levels (master's degree) compared to teachers with lower educational levels is rejected.

In order to examine whether teachers' length of service is significantly correlated with the result on the subscales *social relations*, *organization of educational work*, and *spatial and temporal dimensions*, Pearson's correlation coefficients (r) were calculated. No statistically significant correlation was obtained between the investigated variables, which means that teachers' length of service is not related to their assessments of the quality of relations in the institution, as well as to their assessments of the current state of the structural dimensions of the school culture in terms of the organization of educational work, used learning and teaching strategies, spatial and material environment, and the time schedule of activities at school. Based on the results presented, the third research hypothesis about the more positive assessments of the current state of structural and social dimensions of school culture by teachers with longer service time compared to teachers with shorter service time is rejected.

It is clear that the level of education and length of work service have an almost negligible, if not no, influence on teachers' assessment of the state of the various dimensions of school culture, and that these are determined to a much greater extent by some other factors, such as the frequency and forms of professional development in which teachers are involved, the number of opportunities to think about, reflect on and discuss with colleagues the culture of the institution in which they work, and ways to improve its quality.

4. Discussion

Statistical analysis showed that all three analyzed subscales of structural and social dimensions of school culture are in positive, moderate to relatively high correlations with each other. Two subscales of the structural dimensions of school culture (*organization of educational work* and *spatial and temporal dimensions*) were expected to have a relatively high-positive correlation ($r = 0.50$, $p < 0.01$). Such a finding confirms that the efforts and actions of the school staff aimed at greater flexibility in the shaping of the spatial and temporal institutional context in order to support the individual ways and pace of learning of different students as adequately as possible are accompanied by such an organization of the teaching process that is student-centered in terms of adapting the content learning and teaching methods to their specific needs and interests.

The quality of relationships in the institution, which represent the operationalization of the social dimension of school culture, has a relatively high-positive correlation ($r = 0.59$) with both subscales of the structural dimensions of school culture. This leads to the conclusion that the higher the quality of teachers' mutual relations at school, the more inclined they are to apply modern teaching methods and strategies in the organization of the teaching process, as well as flexibility in shaping the space and time schedule of life in the institution. The implementation and application of the mentioned modern teaching methods and teaching strategies at school, such as project learning, integrated learning, and research-based learning, presuppose a high level of teacher autonomy and cooperation, but also of all other stakeholders in the teaching process (students, professional associates, parents, and local community) in making decisions about the methods, directions, and intensity of the learning process, which implies a high level of engagement, but also the personal responsibility of all involved for the success of the learning process of children and adults. This means that such synergy can come to life only in a social environment where helpful and supportive interpersonal relationships prevail, which is confirmed by the results of the conducted research.

Moderate to relatively high-positive correlations found between structural dimensions of school culture and social relations in the institution confirm the interconnectedness of social and structural dimensions of school culture, which leads to the conclusion that the quality of relations between members of the institution largely determines the structural and organizational aspects of school life, as well as that by working on questioning and changing them, the dynamics and quality of people's relationships in the institution are affected. The above speaks in favor of the intertwining, interdependence, and interaction of different dimensions of school culture.

The research results showed that socio-demographic variables, such as the level of education and length of service, are not closely related to teachers' assessments of school culture dimensions. It is somewhat understandable that some other variables, such as teachers' professional development, have a greater influence on the assessment of the quality of relationships in the collective, as well as on the shaping of the structural dimensions of the school context, especially those modalities that are aimed at encouraging the interpersonal and intrapersonal competences of the teachers themselves, and in which they are active participants in (self)reflection

and (self)change. Therefore, future studies should focus on determining the relationship between teachers' assessments of school culture and some other factors, such as the level of support teachers receive from the institution's leadership or the ways and forms of professional development in which teachers are involved. We advocate for those forms of professional development that have transformational, rather than merely informational potential because positive change is only possible through constant questioning and reflecting on one's educational reality. Professional development of teachers represents a feature of improving the quality of an educational institution, i.e., its culture, as it presupposes a strong connection between the members of the institution and emphasizes the interdependence of their actions and the responsibility for them.

In addition, it would be beneficial in future research to investigate what else influences the culture of an educational institution, especially studies such as those by Jančec et al. (2022), who found that the empathy of the members of the institution has no influence on its culture, while the influence of other important educational forces of the educational process, such as personality traits, attitudes, and other important indirect and direct factors that participate in the process in the institution and the classroom, remains unexplored. Also, using the questionnaire from this study for some future research conducted in other social, cultural, and educational contexts provides an opportunity for additional testing of the validity and reliability of the measuring instrument used to assess the culture of the educational institution.

One of the main limitations of this study, due to which the results obtained should be considered with some caution, is the small sample size and the fact that it is a convenient sample, so it has a low degree of representativeness or possibilities of generalization. In school climate research, the research problem is approached from a psychological perspective with the usual use of quantitative diagnostic instruments, while in school culture research, an anthropological perspective dominates, where the data sources are typical of a qualitative approach (narrative statements, interviews, videos, etc.) (Schoen and Teddlie, 2008). This also means that the concepts of school climate and school culture, although similar, come from different research traditions and research communities. In this sense, despite the obstacles encountered in the research (low respondent response rate) and the lack of generalization possibilities, the significance of the results obtained lies in the empirical confirmation of the relationship between the structural and social dimensions of school culture, which is mainly discussed in theoretical discussions about school culture but has either not been studied at all or minimally studied and identified through quantitative methodological approaches.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee for Scientific Research of the Faculty of Teacher Education University of Rijeka, Croatia. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Role of the integration of the 4C model in the professional training of foreign language teachers

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Introduction: This study explored the opinions and experiences of senior EFL teachers and experts regarding the appropriate training of foreign language teachers to implement the 4C (critical thinking, creativity, communication, and collaboration) model of education in foreign language teaching.

Methods: To achieve its goal, the study employed a mixed-methods approach, using both qualitative and quantitative methods. Purposive sampling was used to select 12 participants who were the most knowledgeable and experienced in the research topic, and in-depth one-on-one interviews were conducted with them. Thematic analysis was used to identify major themes and patterns in the participants' responses. Additionally, a survey was conducted with 60 EFL students to assess the impact of the 4C training on their learning outcomes.

Results: The findings of the study revealed that participants perceived the 4C model of education as an effective approach for teaching foreign languages. They also emphasized the importance of providing appropriate training to foreign language teachers to enable them to effectively implement the 4C model. The survey data showed that the 4C training had a positive impact on the students' learning outcomes.

Discussion: The study contributes to the existing literature on foreign language education by providing insights into the perceptions and experiences of senior EFL teachers and experts regarding the appropriate training of foreign language teachers to implement the 4C model. The study recommends that teacher training programs be revised to include the 4C model of education to improve the quality of foreign language education in Kazakhstan.

KEYWORDS

education, 4C model, future teacher, foreign language, school, Kazakhstan

1. Introduction

The Republic of Kazakhstan is a democratic, secular, and constitutional unitary state. Since its inception, the country has been incorporating various initiatives and introducing various reforms within the political and socio-economic spheres. Given the importance of language policy as an important feature of political interaction and action, various initiatives have been

introduced in the country (Tlepbergen et al., 2022). Generally, it is worth noting that in Kazakhstan, education has always been regarded as one of the major priorities of the development and long-term strategy of the country as declared in the Kazakhstan 2050 vision. One of the major objectives of Kazakhstan's education reform is to adapt its education system to the world-class and interactional standards of education. In this regard, in 2019, the country introduced the adoption of 21st-century skills for developing universal competencies in their education system, ensuring that it is at par with global education standards. As that is practiced worldwide, the 4C (critical thinking, creativity, communication and collaboration) model has become an integral part of the contemporary educational system; the educational sector in Kazakhstan also introduced the 4C model in the curriculum (Official Website of the President of the Republic of Kazakhstan, 2018). Kazakhstan's commitment to democracy and education reform has led to various initiatives aimed at improving language policy and adapting the education system to world-class standards, including the adoption of 21st-century skills and the integration of the 4C model in the curriculum.

Subsequently, it is asserted that it is imperative for the teachers in the country to ensure they have sufficient knowledge and skills necessary for adopting global competencies. Furthermore, in the past few years, Kazakhstan has made great achievements in education. Subsequently, the introduction of new educational content and reforms has remained the center of the educational agenda of the country. The education sector in the country has been focused on the integration of critical thinking, communication, collaboration, and creativity in the education system of the country to position the education sector as internationally competent (Salybekova, 2019). In the same context, it is also worth noting that foreign language learning has been one of the important focus areas of Kazakhstan's educational system owing to the rising globalization, the country's reforms to transform the educational sector, and the country's vision establishment on the political, economic, and social contacts in the global context. Besides, international integration in the context of the education sector, as established, is aimed at aligning the education sector of Kazakhstan with international educational institutes, which ultimately increases the importance of foreign language competence in the country (Gerfanova, 2018). This demonstrates the importance of aligning foreign language learning in Kazakhstan with the contemporary 21st-century skills being adopted in the national curriculum.

1.1. Problem statement

The importance of incorporating the 4C model (critical thinking, creativity, communication, and collaboration) in foreign language teacher training is a topic that has been widely discussed in the literature on language education. Many studies have highlighted the need for language teachers to develop these competencies to enhance the effectiveness of language learning for their students (Erdoğan, 2019). Some recent studies have also explored specific approaches and techniques for integrating the 4C model in foreign language teacher training (Ratminingsih et al., 2021), such as using project-based learning (Budiarti et al., 2021) or online collaborative tools (Medeiros et al., 2017). Additionally, there have been discussions on the challenges and limitations of incorporating the 4C model in teacher training, such as the need for adequate resources and support from institutions and the potential resistance from teachers who may be unfamiliar with these competencies.

As established, Kazakhstan has been incorporating reforms and initiatives for the modernization of the education system to position it at par with international education standards. Subsequently, the shift in the teaching paradigm focused on the core subject knowledge and teacher-led techniques for learning in the 21st century means a profound shift in the techniques, methods, and tools used for teaching and learning (Salybekova, 2019). Thus, traditional teaching techniques may not be sufficient for achieving educational agendas pertinent to the adoption of 21st-century skills. In this context, similar to other educational areas, foreign language teaching and learning are also required to be aligned with contemporary 21st-century skills with the adoption of the 4C model of education. In this regard, it is important to ensure that the teachers in the country are well-equipped to implement 21st-century skills in their curriculum planning (Official Website of the President of the Republic of Kazakhstan, 2018). In the context of foreign language learning and teaching, this implies that it is essential to develop professional training for the future teachers of foreign language in Kazakhstan to demonstrate sufficient capacity to ensure the successful integration of the 4C model in their foreign language teaching.

1.2. Research aim and objectives

In recognition of the aforementioned research problem, this article aims to analyze the adoption of 21st-century skills in the context of foreign language learning in Kazakhstan with a focus on the development of teachers' competence. In particular, the article aims to analyze the importance of the integration of the 4C model in the professional training of foreign language teachers. Besides, the paper aims to propose techniques and methods that can be incorporated into the professional training of future teachers of a foreign language in Kazakhstan to develop their ability to implement the 4C model of education at schools.

This article focuses specifically on the professional training of foreign language teachers in Kazakhstan and provides guidance on how to incorporate the 4C model (critical thinking, creativity, communication, and collaboration) in their training. There are very few training opportunities for foreign language teachers to enhance their skills in teaching English as a foreign language (EFL) and their ability to implement the 4C model in their classrooms. Therefore, this study contributes to the literature by identifying specific techniques and methods that can be incorporated into the professional training of future foreign language teachers in Kazakhstan to enable them to develop their ability to implement the 4C model of education at schools.

1.3. Research significance

The significance of this research is to fill the existing gap in theoretical and conceptual reasoning of the importance of the professional training of future foreign language teachers to implement the 4C model in the educational institutes of Kazakhstan. The study will enhance the existing literature and provide a better understanding

of the implementation of the 4C model in schools. The study also paves the way for future researchers to further study the other aspects of implementing the 4C education model rather than the professional training in education in Kazakhstan.

2. Literature review

This study is guided by several theoretical perspectives that underlie the adoption of 21st-century skills in the context of foreign language learning and teaching. First, the study is situated within the framework of the 4C model of education, which emphasizes the importance of critical thinking, creativity, communication, and collaboration in developing the competencies necessary for success in the 21st century. This framework has been widely adopted in various fields, including education, and has a positive impact on learning outcomes (Fink, 2013; Voogt et al., 2015).

Second, the study draws on the concept of professional development, which refers to the continuous learning and growth of educators to enhance their knowledge, skills, and competencies (Guskey, 2002; Yoon et al., 2007). The development of foreign language teachers' competencies in the 4C model is crucial for improving the quality of language education, and this study contributes to the development of effective professional training programs for future foreign language teachers in Kazakhstan.

Third, the study is based on the concept of mixed-methods research, which involves the use of both quantitative and qualitative data collection methods to provide a more comprehensive understanding of a research problem (Johnson and Onwuegbuzie, 2004; Creswell, 2014). The mixed-method approach used in this study involved in-depth interviews with senior EFL teachers and experts from five Kazakh institutes, an achievement test at the AGI Language and Culture School, and a perception survey by EFL students. The findings of the interview were used to develop a comprehensive professional training for the EFL teachers to implement the 4C model of education.

Finally, the study is based on the concept of an educational change, which refers to the process of improving educational practices to enhance student learning outcomes (Fullan, 2007; Hargreaves and Shirley, 2009). The integration of the 4C model in foreign language teacher training is a form of educational change that requires careful consideration of the challenges and limitations involved in the adoption of new teaching practices. This study identifies specific techniques and methods that can be incorporated into the professional training of future foreign language teachers in Kazakhstan to enable them to implement the 4C model of education at schools while also addressing the challenges and limitations of this process.

2.1. 4C model of education

The 4C model has emerged as one of the most important tools in the context of modern education. As per the Partnership for 21st Century Learning (2011), the 4C model has emerged as crucial in the 21st-century education system that entails communication, collaboration, critical thinking, and creativity (Figure 1).

The teachers must integrate the 4C model in the teaching and ensure that the students master these 4Cs to prepare them for the future and foster their learning and innovation skills (Abdollahi et al., 2022). These are transferable skills that an individual can transfer from one task to another and from one job to another (Galabova, 2022). Additionally, on the basis of several recent findings, the National Education Association (2015) has deduced that the 4C model is required to be fully and comprehensively integrated into learning and teaching to create well-prepared employees for the contemporary world. The 4C model has also been widely integrated within the educational system of China as it blends well with its cultural values while cultivating the teachers with the added value to improve the problem-solving and creative skills of the students in a multidisciplinary context. As per Yang et al. (2020), the 4C model encompasses the Piaget's constructivism theory as it is designed in line with the characteristics pertaining to the knowledge acquisition by the students and their learning capabilities to promote long-term educational practice in China. Similarly, Supena et al. (2021) added that 4C model of education has also influenced the teachers in Indonesia to enhance the students' learning outcomes. The learning process in Indonesia had many weaknesses and lack of critical thinking ability of the students was the foremost concern. However, with the integration of 4Cs, teachers have been able to combine the scientific methods and collaborative critical thinking abilities of the students in the classroom learning. Moreover, similar experiences have been witnessed in the developed nations, where the embedment of 4C model has led to improved creativity and provision of a collaborative learning environment. This model in education involves teachers integrating techniques that have become crucial for the person to integrate for growth and become successful in the 21st century (Fathurrochman et al., 2021). The worldwide educational system emphasizes building these four major competencies within students through their early childhood education to achieve proficiency in them. According to Chahin-Dörflinger (2020), educational institutes should implement such models and teaching practices that highly focus on building the competencies of students, making them successful personalities in the future. Therefore, the educational and work paradigm is noted to be shifting globally, and the skills like these serve as an opportunity to ensure growth in the future.

These four competencies are regarded as "soft skills," "life skills" and "graduate skills" owing to their crucial importance in contemporary education and their role in preparing students for future employability experience. The first two skills proposed by the model, communication and collaboration, are regarded as team-working, particularly in the context of heterogeneous environments. These skills are concerned with effective conflict management, idea and knowledge sharing, open-mindedness, initiative-taking, and innovation (Voogt and Roblin, 2012; Chalkiadaki, 2018). The third competency, critical thinking, is aimed at increasing self-development and autonomy (Basri et al., 2019). The competency is concerned with the ability of introspection, independent thinking, autonomous action, self-organization, objective analysis and evaluation, and enhancing rights and emotional intelligence (Sassin, 2019). Additionally, it facilitates analytical reasoning, problem-solving, and higher-order reasoning (Chalkiadaki, 2018). Finally, creativity is associated with higher imaginativeness, innovativeness, curiosity, and the ability to think out of the box (Chalkiadaki, 2018; Figure 2).

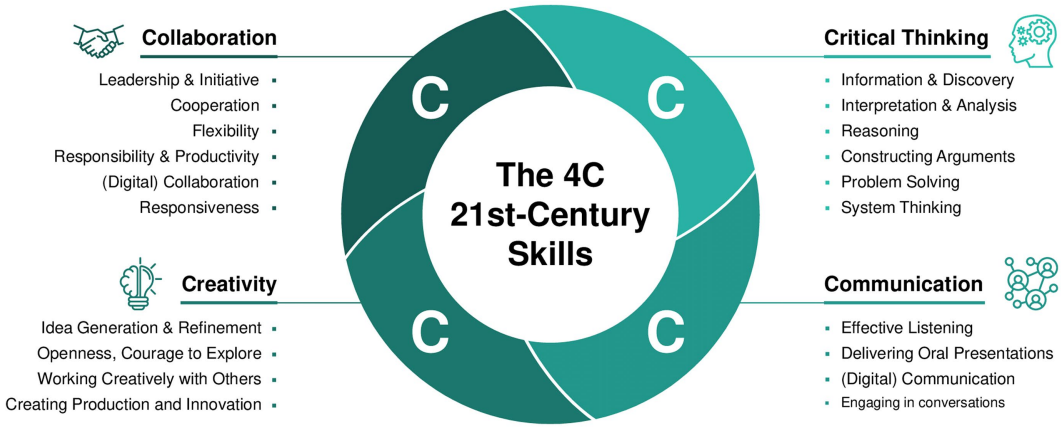

FIGURE 1
Critical thinking, creativity, communication, and collaboration model in education (Partnership for 21st Century Learning, 2011).

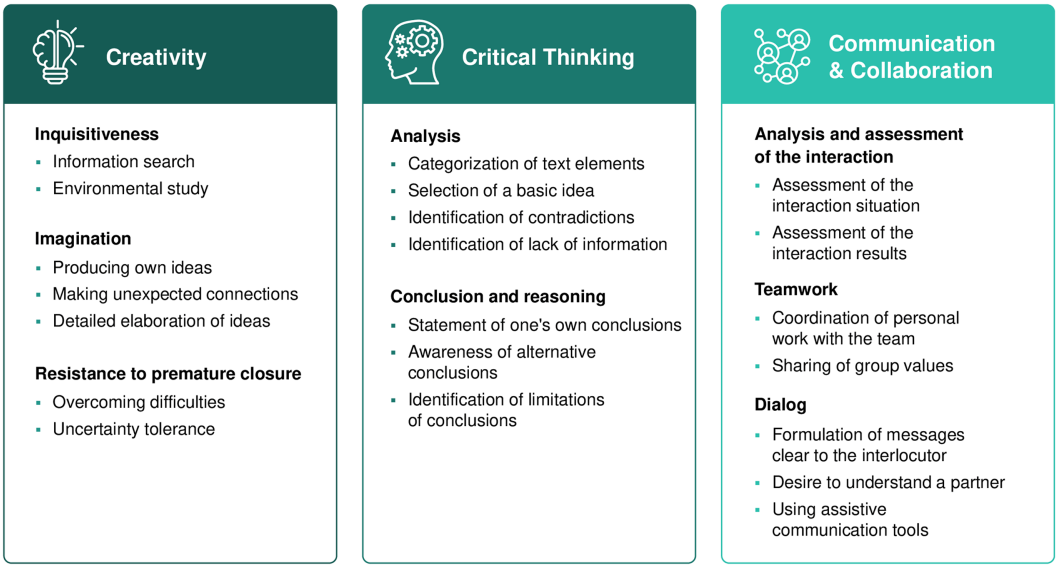

FIGURE 2
Core competencies in the 4Cs' model (Chalkiadaki, 2018).

2.2. 4C model for professional training of the future teacher

It is asserted that teaching quality is the most crucial factor that shapes the learning experience of the students (Rozak et al., 2022). Thus, the teaching quality must be continuously improved with effective training and development (Doringin and Sasmoko, 2017). The concept of creativity in teaching requires teachers to create a more flexible and healthier environment to encourage students to think creatively. The teachers go beyond textbooks to foster creativity in the classrooms. In the context of critical thinking, teachers must possess the ability to improve their analytical skills to find the best solutions and instill this ability in the students by encouraging them to objectively analyze and evaluate (Sunardi and Doringin, 2020). Furthermore, de Villa (2017) has stressed the role of the teachers in the creation of an inquiry-based environment and in the provision of the tools to the students to exercise critical thinking. Thus, an adequately trained and well-informed teacher can greatly assist learners in developing this type of thinking by presenting them with challenging situations and encouraging them to incorporate different perspectives and proffer solutions. Furthermore, fostering collaborative engagement among the students is yet another important aspect of teaching requiring teachers to encourage students to collaborate and develop and create integrated solutions to various problems. Finally, teachers are required to foster open communication among the students in order to foster learning and engagement (Sunardi and Doringin, 2020).

Rusdin and Ali (2019) have articulated how the implementation of the 4C model in teaching and learning can pave the way for increasing teachers' understanding and enhancing their teaching quality. With a deeper understanding, the teacher would be able to improve teaching practices that meet the 21st-century educational

agendas and be more effective in promoting the adoption of the 4C model competencies in learning. In this regard, although there is a great need to re-evaluate and improve teaching practices in line with current changes, many teachers of the past still practice traditional teaching methods using teacher-centered strategies to this day (Azmi and Nurzatulshima, 2017). Thus, the system of imparting knowledge is inherently passive. As a consequent impact of this, students' engagement in learning is delayed, the learning process is constrained, and the student does not optimally acquire subject-related knowledge and skills, as well as the 4C skills. When teachers apply limited strategies, techniques, methods, and approaches, students lose interest in the learning experience (Yunos, 2015). Thus, students fail to integrate 4C skills in their learning experience because teachers do not promote them (Rusdin and Ali, 2019).

Students should be given the opportunity to engage in various activities that encourage them to work together to solve problems or complete tasks as a group to promote participation, achievement, and motivation in learning (Alismail and McGuire, 2015; Nuphanudin et al., 2022). Kristanto and Santoso (2020) found that incorporating appropriate strategies and approaches in teaching plays an important role in arousing students' interest in a subject and changing their perception of subject difficulty. Thus, teachers must be proficiently trained and prepared to ensure the provision of engaging and effective learning students for students. Teachers must be given sufficient training to incorporate the 4C model in teaching.

3. Research methodology

3.1. Research approach

The research approach of the study is the framework that comprises the procedures of broad assumptions to comprehensive methods and approaches used in data collection, evaluation, and interpretation (Mitchell, 2018). For the current study, the research approach opted for is the inductive approach as the researchers aim to reach the research objectives based on existing issues. The inductive approach in this study is used to analyze the importance of professional training for foreign language teachers to successfully integrate the 4C model in the educational institutes of Kazakhstan. As numerous existing types of research have previously highlighted the importance and challenges in the integration of the 4C model integration, the study further investigates the aspect of professional training of foreign teachers to improve and enhance the integration of the 4C model in Kazakhstan. This research approach facilitated the current study in analyzing already existing studies and based on it drawing conclusions for the following research. Besides, the use of the inductive approach facilitated the following study by testing different probabilities and aspects that can lead to the need for the professional training of future foreign language teachers.

3.2. Research methods

The research methodology procedure used in this study is a mixed-methods approach, combining both qualitative and quantitative methods (Brannen, 2017). This approach allows for a more comprehensive understanding of the research problem by examining both the subjective experiences of teachers and the objective impact of training on student learning outcomes (Creswell and Plano Clark, 2018a,b). The study employs an inductive research approach to explore the opinions and experiences of EFL senior teachers and experts regarding the appropriate training of foreign language teachers to implement the 4C model of education in foreign language learning. This approach is based on the theoretical framework of grounded theory, which emphasizes the importance of generating new insights and theories based on empirical data rather than preconceived notions or assumptions (Charmaz, 2014). The study uses a purposive sampling technique to select 12 senior EFL teachers and experts from five Kazakh institutes. Purposive sampling allows for selecting participants who are most knowledgeable and experienced in the research topic (Creswell and Plano Clark, 2018a,b). In-depth one-on-one interviews were conducted with these participants, using semi-structured questions to explore their opinions and experiences regarding the 4C model of education and foreign language teacher training.

Thematic analysis is used to analyze the interview data and identify major themes and patterns in the participants' responses. Thematic analysis is a qualitative data analysis technique that involves identifying, analyzing, and reporting patterns (themes) within data (Braun and Clarke, 2019). In addition to the interviews, a survey was conducted with 60 EFL students at the AGI Language and Culture School to assess the impact of the 4C training on their learning outcomes. The survey is conducted twice, once before and once after the 4C training, using a pre-test/post-test design. The data collected from the survey is analyzed using descriptive statistics to determine the effectiveness of the 4C training on improving the students' language learning outcomes.

3.3. Research design

To analyze the influence of professional training on future foreign language teachers to integrate the 4C model, the following study opted for descriptive research analysis. The descriptive design in the current study enabled the researchers to provide an in-depth analysis of the findings. Descriptive research analysis was selected as it aligned with the chosen mixed-method research and enhanced the data collected through this approach by providing the in-depth analysis, interpretation, and presentation of the research conducted understandably.

3.4. Research philosophy

The current study is based upon the interpretivism philosophy as it will enable the study to further investigate information related to the research while emphasizing the subjective aspects. Interpretivism philosophy facilitated the qualitative research design for the study while enabling the researchers to understand and reflect on different aspects of the findings. Hence, interpretivism was deemed appropriate research philosophy for the professional development of future foreign language teachers.

3.5. Data collection method

The experiment was conducted with students of the Department of Modern Languages and Translation Studies, M. Auezov South

Kazakhstan University, specialty 6B01730 "Foreign Language: Two Foreign Languages." To understand the need for the professional training for future foreign language teachers to integrate the 4C model in schools in Kazakhstan, the data collection method that the current research has opted for is the primary data collection method. This method enabled the following study to gain first-hand knowledge about the current situation and the need for professional training for foreign language teachers in Kazakhstan as well as enabled the researchers to have unbiased opinions and experiences of the foreign language teachers to better identify the potential of the professional training. The use of the primary data collection method also enabled the researcher to maintain a focus on the research issue. Due to these reasons, the primary data collection method was deemed appropriate for the research.

3.6. Research instruments

The research instruments are the tools through which the data for the study is collected. For this study, to obtain an in-depth analysis of the research issue, the research instrument used is the interviews and a survey. The interview enabled the researchers to investigate the underlying research phenomenon based on open-ended questions. A survey with closed-ended questions enabled assessing the perception of EFL learners. For the current research, the study conducted face-to-face interviews and an online survey with the foreign language teachers employed in the primary education sectors of Kazakhstan, which enabled the research to acquire the current challenges while analyzing the areas or improvements based on the professional training. The study uses a purposive sampling technique to select 12 senior EFL teachers and experts from five Kazakh institutes, while the survey was conducted from 60 EFL students at the AGI Language and Culture School. These interviewees were interviewed on the basis of semi-structured questions to analyze the need for professional training for future foreign teachers. The survey was conducted twice before and after the 4C training to assess the impact of training on improving the framework competency.

The study uses a purposive sampling technique to select participants who are most knowledgeable and experienced in the research topic. In-depth one-on-one interviews are conducted with these participants, using semi-structured questions to explore their opinions and experiences regarding the 4C model of education and foreign language teacher training. The survey portion of the study employs a pre-test/post-test design to assess the impact of the 4C training on the students' learning outcomes. It is worth noting that both the interviews and survey were conducted in Kazakh, which is the language used by the participants. The use of Kazakh was intended to facilitate effective communication and understanding between the researcher and the participants, as well as to ensure that the data collected accurately reflects the perspectives and experiences of the participants. This approach is consistent with the methodological principle of using appropriate language and cultural context to facilitate data collection and analysis in studies.

3.7. Data analysis techniques

For the current research to analyze the data collected through semi-structured interviews with foreign language teachers in the primary schools of Kazakhstan, the data analysis technique used was a thematic approach, while the survey findings were analyzed statistically. This approach is the most appropriate for the current study as the research has already identified the pre-determined framework. Hence, the thematic approach facilitated in generating common themes from the information collected directly from the respondents. Although the thematic analytical process is time-consuming, it is the most preferred approach as it helps in understanding the viewpoint of respondents from their personal experiences and helps in categorizing the data based on commonalities found in the answers. Additionally, the statistical analysis helped in understanding the training effectiveness. Thus, to analyze their experience and opinions regarding the appropriate training of the teacher of a foreign language to implement the 4C model of education in foreign language learning, thematic and statistical analyses were deemed appropriate for the study.

3.8. Ethical considerations

Ethical considerations refer to the set of principles complied with while conducting the research (Mishra and Alok, 2022). For the following study, all ethical values and principles have been abided by, including voluntary participation, which indicates that the participants were not forced to share any information they did not want to. Moreover, their confidentiality was maintained, and the analysis was done based on the expertise and skills of the respondents, which correlated with the aims and objectives of the study. Moreover, the participants were well informed of the value that their responses hold in the current research and the purpose of the following research is conducted. Hence, the current study complies with the ethical principles.

4. Results

4.1. Qualitative interviews for developing future training methods

For uniformity and simplicity, in-depth one-on-one interviews with EFL senior teachers and experts in Kazakhstan were conducted to analyze their experience and opinions regarding the appropriate training of the teacher of a foreign language to implement the 4C model of education in foreign language learning. In this regard, interviews with 12 teachers from five Kazakh institutes were conducted including the AGI Language and Culture School, University of Foreign Language and Professional Career, Kazakhstan International School, Kazakh Ablai Khan University of International Relations and World Languages, and Al-Farabi Kazakh National University. Using thematic analysis, the following themes were identified from the interviews:

4.2. The incorporation of the 4C model in foreign language teaching and learning

A major pedagogical aspect highlighted in all the responses was the relevance of the 4Cs in foreign language learning. All four competencies offered by the 4C model have been found to be important for enhancing the effectiveness of foreign language learning for students. One of the respondents asserted,

> Teachers should create an inquiry-based environment for developing the critical thinking of the students. A well-trained teacher can greatly assist learners in developing this type of thinking by presenting them with challenging situations. In particular, foreign language teachers can use debate, group discussions, media analysis, and problem-solving activities to promote critical thinking among foreign language students, which ultimately enhances their ability to comprehend and solve communication problems in the target language.

Another respondent asserted, "Contemporary language learners should be encouraged to become self-adjusted and aspiring language analysts to solve all communication problems."

Similarly, all the respondents agreed on the importance of collaboration in foreign language learning. A respondent asserted,

> Collaboration entails students working together to achieve a common goal. When teachers foster collaborative learning, students work in teams and interact, which enhances their language proficiency and social skills with the use of a foreign language. Thus, they can converse in a foreign language in social settings. In addition to this, teachers can develop a perception of "positive interdependence" by fostering a sense of belonging to the group, which is an important aspect of language learning as a language serves as a means of social interactions and relationships.

In the context of communication, all the respondents in the study presented "communication as the major aspect of language learning." One respondent particularly emphasized, "If the language teachers do not foster communication in the class, this will significantly affect the language fluency and competence of the students."

Finally, the promotion of creativity has also been highlighted as the major requirement for foreign language teachers to enhance the effectiveness of foreign language training. A respondent asserted,

> The promotion of creativity by teachers in foreign language classrooms can also enhance the effectiveness of language learning and learners' competence, developing foreign language teachers' skills for developing knowledge pertinent to how to implement creativity in the classroom by developing creative practices and activities. The creativity of the EFL students can be encouraged by creating assignments about meaningful communication situations in real social settings. In fact, they can include various activities such as storytelling and role plays.

According to these findings, Table 1 shows major themes pertinent to the relevance of each of the four competencies to foreign language learning.

4.3. Implementation of the 4C model in future training of foreign language teachers

All the teachers in the study asserted that at present, very few training opportunities exist for the teachers to enhance their Teaching English as a Foreign Language skills in Kazakhstan. All the teachers agreed on the need for the incorporation of the 4C model to develop adequate training of future foreign language teachers, stating, "If they are trained to incorporate 4C competencies in their teaching, they can enhance the language learning proficiency and competence of the students."

Another respondent asserted, "The 21st century competencies are relatively new to the foreign language curriculum of Kazakhstan, so teachers are not really trained to work with these competencies." Thus, there exists a need for the implementation of the 4C model in the training of future language teachers in Kazakhstan. One of the respondents asserted,

> I believe long-term intensive and integrated training should be provided to the EFL teachers to enhance their ability to incorporate communication, creativity, critical thinking, and collaboration in teaching. In fact, it is important that teachers take professional courses to enhance their language competence with 4Cs. Otherwise, it is unreasonable to expect the teachers to use these skills in their classroom when they are not competent in these skills.

TABLE 1 Interview themes for the relevance of 4Cs.

Competencies	Relevance of 4Cs to foreign language teaching and learning
Critical thinking	• Using debate, group discussions, media analysis, and problem-solving activities • Encouraging the students to incorporate critical thinking skills in their learning of a foreign language. • Leading to the development of self-adjusted and self-sufficient language speakers who can use appropriate words, terms, and phrases in particular contexts
Creativity	• Incorporation of creative activities such as role plays, games, and storytelling • Leading to the development of the ability to use language in various contexts • Fostering better engagement and enjoyable learning process
Collaboration	• Learning language use *via* collaboration among students • Practicing language skills in an interdependent manner • Leading to the establishment of a sense of interdependence in the language use • Enhancing oral language skills • Encouraging the students to depend on each other for learning new language codes and skills
Communication	• Active interaction among students • Enhancing information exchanges • Enhancing conversation skills and competency of the students in the foreign language

Accordingly, all the senior teachers have suggested various strategies to be incorporated for intensive training of the EFL and other language teachers in Kazakhstan. Succinctly, on the basis of the suggestions of the respondents, for comprehensive training of foreign language teachers training, an integrated training course has been suggested to be incorporated by authorities in Kazakhstan. Some respondents in the study suggested regularly organizing professional workshops and seminars for the EFL teachers in Kazakhstan. A respondent asserted, "EFL teachers can be encouraged to regularly attend these workshops and seminars to update their knowledge and comprehension of 4Cs and learn ideas on how they can integrate the four competencies in their language teaching."

Some respondents gave the idea to organize meetings of foreign language teachers and experts, whereby they can discuss the incorporation of 4Cs into foreign language learning and build curricula and professional development based on integrating the 4Cs into educational research to promote the 4Cs in language learning. One of the respondents posited, "Foreign language teachers of the country can have such meetings organized by the higher education commission, whereby the teachers can support each other as they share their experiences in putting together the 4C skills." In a similar vein, another respondent suggested that education institutes can also create a foreign language teachers' group, whereby they allocate an hour or two every 2 weeks for discussing various practices that can be incorporated to maximize the integration of 4Cs in foreign language learning.

For communication particularly, respondents emphasized that to improve communication with the foreign language teachers, it is important to focus on the attitudes, verbal and written as well as digital communication of the foreign language teachers. One of the respondents in the interview asserted,

> In the present times, communication competence entails proficiency in interpersonal and digital communication. The teachers must be proficient in informing, instructing, motivating, and persuading the students and incorporating various media and activities to facilitate communication in language learning.

Another respondent suggested that "along with developing the conventional oral and written communication of the students in the target language, the foreign language teachers must also be able to induce ICT-mediated-conversation abilities, and this calls for the usage of ICT as studying tools. In this regard, ICT-mediated cooperative learning can be used to train the teachers so that teachers can incorporate contemporary ICT tools in their language teaching encouraging students to actively communicate and converse to develop their language proficiency." This implies that information technology should be a major component in the training of the foreign language teachers.

The respondents also suggested various types of instructional approaches to enhance the ability of foreign language teachers to foster active communication in their language teaching. The two major ideas observed across the responses were content-based instruction and task-based language teaching. A respondent suggested,

> As a part of the professional training of the English language teachers, it is useful to incorporate a content-based instruction approach for their professional on-the-job training. The teachers can be asked to perform their day-to-day tasks while ensuring to use the English language as their means of communication with their peers and colleagues.

Similarly, for a task-based language teaching approach, a respondent asserted that "teachers should be trained to be able to engage the students in various tasks to improve their language proficiency. For instance, they can be asked to make reservations or write letters in the target language." This implies that preparing teachers to incorporate such interactive activities should also be incorporated into the professional training of foreign language teachers in Kazakhstan.

It was also found from the analysis of the interview responses that at present, the training of the teachers lacks any kind of critical approach due to which teachers cannot develop their critical thinking and incorporate activities that can foster critical thinking in the context of foreign language learning in Kazakhstan. In this regard, one of the respondents suggested,

> Debates and meetings should be arranged by the institutes and educational sector of Kazakhstan, whereby all the teachers can engage in critical discussion and debates regarding the curriculum and other academic issues while using the target language as their medium of conversation. This way, the teachers will be able to develop their ability to integrate critical thinking with the language teaching and will ultimately be able to foster this in their classrooms.

As teachers are also required to foster creativity in their classrooms to facilitate active language learning by the students, the respondents also offered varying suggestions to work on the development of teachers' creative abilities. One of the respondents in the interview asserted, "At present, most of the teachers use a very rigid approach following a curriculum provided by the education commission in their language teaching. This greatly limits the ability of the students to integrate their creativity into language learning. It is therefore important to train teachers to use more problem-based learning approaches whereby the students can demonstrate their creativity." Similarly, various other respondents also voiced the same ideas stating that teachers' training should entail the demonstration of various activities that they can incorporate into their lesson planning to ensure greater creative autonomy in their classrooms.

Based on the aforementioned findings, Table 2 displays the major themes identified from the interview responses.

4.4. Quantitative findings: Validating the new training methods

The validation of the new training based on the 4C model was assessed in two phases. The first phase entailed training the EFL teachers to implement the 4C model in their lessons and achievement assessment of the EFL students to assess the effectiveness of training. The second phase was comprised of a Perception survey involving the EFL students to assess their awareness of the reflective and the control aspects of their learning experience.

4.5. Experiment for training effectiveness

According to Table 2, training was developed, and a training session was conducted at the AGI Language and Culture School. The EFL faculty were trained to use activities based on the 4C model in their EFL teaching. To validate the use of the 4C model for the professional training of future teachers of foreign languages, a pre-test was conducted before the teachers were trained. In the pre-test, an achievement assessment was conducted involving a class of 60 EFL students at the AGI Language and Culture School. The assessment comprised spelling tasks, problem-solving and critical thinking essays, argumentative essays, vocabulary tests, and story writing. The test was conducted to measure the effectiveness of the conventional teaching methods used by EFL teachers before the provision of any training. The overall score for the assessment was 100.

Right after this pre-test, the training of the EFL faculty of the AGI Language and Culture School started and they were concurrently asked to implement the 4C techniques in their EFL lessons in the classrooms. As a part of this training, the EFL faculty would have a formal meeting to make adjustments to the EFL curriculum and incorporate elements of the 4C model such as debating, task-based language teaching, storytelling, and creative writing. The training went on for 2 weeks, while the EFL teachers were asked to extensively use the new model in their lessons in the classroom for 1 month. At the end of this period, a post-test was scheduled. The learning of the EFL students with the 4C model was closely monitored, and a visible difference was observed in their learning style. At the end of the month, the post-test (achievement test) was conducted, comprising tasks similar to those of the pre-test, howbeit the content was different as the test had to be administered by the same group of students, and the overall score was again 100.

TABLE 2 Major themes from the interview responses.

Themes	Implications/Details
Lack of adequate training (based on the 4C model) for foreign language teachers in Kazakhstan	Lacking the competence and ability of foreign language teachers in Kazakhstan to use the 4C model in their language teaching planning
	Extant need for developing training of future Kazakh teachers to enable them to use the 4C model in their language teaching
	Need for integrated training to enhance future teachers' ability to use communication, creativity, critical thinking, and collaboration in teaching foreign language
The need for an "integrated" training course	Use of various strategies for training foreign language teachers in Kazakhstan.
	Attending workshops, seminars, and workshops
	Organizing meetings with foreign language teachers to share ideas and experiences
	Creation of foreign language teachers' groups
	Initial teacher education program
Use of communication in language teaching	Training for verbal, written, and digital communication Use of ICT in training
	Use of content-based instruction and task-based language teaching
Use of collaboration in language teaching	Use of task-based language teaching
	Use of interactive activities to reinforce cooperative learning and engagement
Use of critical thinking in language teaching	Debates and meetings should be arranged by the institutes and educational sector of Kazakhstan
	Use of group discussions and reciprocal peer questioning sessions
Use of creativity in language teaching	Use of screenwriting and chain games
	Training for problem-based learning approach
	Active practices of brainstorming, story writing, and creative writing
	Use of language play

The results of the pre-test and post-test were compared. Tables 3, 4 present a summary of the arithmetic means and the standard deviation of the pre-test and post-test. It can be seen that students scored a mean score of 87.2300 with a standard deviation value of 3.21213 in the post-test. However, the mean score of the same group of students in the post-test was 68.36323 at a standard deviation of 3.98567. Hence, the mean score of the students in the post-test was greater than their mean score in the pre-test.

To analyze the difference between the scores of the two assessments conducted before and after the provision of 4C training of the teachers and to find the differential impact of the 4C EFL lessons on the students, a t-test was conducted. The result in Table 5 shows that no equal variances were assumed owing to the value of $p = 0.000$, which demonstrated a 100 per cent significance level. Thus, the values in the second column are considered in the results. The results show that the mean value of the difference between the scores of the pre-test and post-test was found to be 18.8668 at a degree of freedom of 37.992.

The scores of the students on the achievement tests showed that the professional training of the EFL teachers using the 4C model was found to be effective for the learning of the EFL students. When the students were taught using the 4C model activities, their learning effectiveness increased, which contributed to increased language skills and comprehension, which is evident by their scores on the post-test.

4.6. Perception survey of EFL learners

The evaluation of the learning of EFL students was conducted using the Perception survey. A self-administered questionnaire was used, comprising 12 items and a four-point Likert scale with "Not at all" and "Very much so" at the two extremes. The students were asked to fill out the questionnaire after their post-test demonstrating the extent to which they agree with the statement in the given questionnaire. Table 6 presents the results of the survey.

The results of the survey show that the standard deviation values for all items are lower than the mean values, indicating that all data points are consistent and free from significant variations. Thus, the students responded consistently to the items provided. All items have a mean higher than 3.5 showing skewness on the skewness. Thus, all the students demonstrated high agreement with the given statements, showing that they agree that the new EFL curriculum based on the 4C model increases the effectiveness of learning.

TABLE 3 The case processing summary.

	Cases					
	Included		Excluded		Total	
	N	Percent	*N*	Percent	*N*	Percent
Pre-test	60	100.0%	0	0.0%	60	100.0%
Post-test	60	100.0%	0	0.0%	60	100.0%

TABLE 4 Mean values of the achievement assessments of EFL students.

Report		
	Pre-test	Post-test
Mean	87.2300	68.3632
Std. deviation	3.21213	3.98567

TABLE 5 Independent *t*-test results of the effectiveness assessment.

Independent sample test					
	Mean difference	Std. error difference	*t*	df	Sig. (two-tailed)
Equal variances assumed	18.8668	1.342	8.348	38.000	0.000
Equal variances not assumed	18.8668	1.342	8.348	37.992	0.000
Hartley test for equal variance: $F = 1.029$, Sig. = 0.4746					

5. Discussion

The relevance of the 4Cs in foreign language learning has been highlighted by all the Kazakh teachers involved in the interviews. The findings were found to be in line with the extant literature. The results showed that each of the four competencies of the 4C model is important for foreign language learning and teaching. For instance, it was found emphasized by the respondents that language teachers should be able to develop self-adjusted and aspiring language analysts. This is well supported by the extant literature. Critical thinking has been regarded as an important skill for improving language pedagogy (Harizaj and Hajrulla, 2017). Critical thinking entails understanding, application, analysis, synthesis, evaluation, interpretation, reasoning, explanation, and self-regulation. All these cognitive actions can enhance the language learning efficiency of linguistic students (Saleh, 2019). However, none of these cognitive actions can be performed by linguistic students with limited or underdeveloped critical thinking skills. This explains the need to integrate critical thinking into education in general and in particular in foreign language learning (Khatib et al., 2012).

Furthermore, it was found that using collaboration in future teachers' training can enable the teachers to develop a perception of "positive interdependence." In line with this response, Johnson et al. (2014) defined collaborative learning as students working in groups and teams to maximize learning for themselves and others. Collaborative learning is a hallmark of progressive education, an integral part of effective teaching and important to better educate foreign language learners and provide effective training to language instructors (Martin-Beltran and Peercy, 2014). Collaborative learning fosters active learning in terms of team learning and peer-assisted learning, which helps develop speaking skills in language students (Espina et al., 2017).

Similarly, communication was emphasized by all the senior teachers in the study as the cornerstone of language teaching. This idea is supported by various linguistic scholars. It is asserted that developing the learner's ability to communicate in the target language is a major goal of language teaching and learning, as language is a means of communication (Shi and Chen, 2015). Another respondent also emphasized the use of the communicative language teaching approach for enhancing communication in a language classroom. As per Rivera (2010), the communicative language teaching approach is used to develop and facilitate communication and interaction among language learners to enhance the effectiveness of language learning and develop speaking proficiency in the target language. Thus, to foster effective interaction and communication within the foreign language classroom, the teachers must use various communication strategies. Mesgarshahr and Abdollahzadeh (2014) highlighted the positive impact of incorporating various communication strategies in language learning. With the communicative language teaching approach, the learners can interact with each other, build better relationships, and learn from one another (Shi and Chen, 2015).

Finally, the promotion of creativity has also been highlighted as a major requirement for foreign language teaching. The extant literature also supports these responses. As per Avila (2015), teachers can integrate creativity in language learning classrooms by incorporating creative writing activities, games, visual aids, and the like that ultimately enhance the speaking and writing fluency of the foreign language students and improve their understanding of the grammar and structure of the target language. Similarly, Cho and Kim (2018) suggested that the application of language play activities in the classroom can enhance the communicative competence of the students. Besides, Fitriah (2017) postulated that fostering creativity in the language classroom is not only imperative for fostering engagement among the students but also for enhancing the creativity of the students in the target language.

All this discussion proves the critical importance of the 4C model for language learning and teaching. However, it was found from the interviews that at present there exists a dearth of training and development opportunities for EFL or foreign language teachers in Kazakhstan. The teachers reported that the introduction of the 21st-century competencies (4Cs) is relatively new to the foreign language curriculum of Kazakhstan due to which teachers are not really equipped with the knowledge and competence to implement this model in their foreign language teaching. This makes this model a good prospect for the training of foreign language teachers in Kazakhstan. This implies that it is important to first educate and train the foreign language teachers about 4Cs to make them competent enough to implement the model in their teaching of a foreign language to the students. This is consistent with Handayani's (2017) position that the competence of the teachers is the most crucial factor for achieving high teaching efficacy. Therefore, to teach effectively in the

TABLE 6 The results of the survey.

Items	Min	Max	Mean	SD
I believe that I was better prepared to take the assessment after the EFL lessons based on the 4C model were used by my teacher	2.00	5.00	3.9753	0.13879
After the 4C lessons and activities, I could comprehensively understand the meaning of the tasks in the assessment	2.00	5.00	3.7586	0.12797
The change in the EFL curriculum and lessons contributed well to my performance in the assessment	2.00	5.00	3.5246	0.74965
I felt satisfied with my level of performance and comprehension during the assessment	2.00	5.00	3.8651	1.19765
Compared to my pre-test, I could understand the questions with greater ease	2.00	5.00	3.8571	0.16483
I was better able to organize my writing in the post-test	1.00	5.00	3.5437	0.28549
I could ensure that there was no language issue in the post-test unlike the pre-test	2.00	5.00	3.6518	0.15769
I used better vocabulary in the post-test than the pre-test	2.00	5.00	3.8631	0.25698
I think that the 4C model shall become a permanent component of the EFL curriculum	2.00	5.00	3.7932	0.46975
I believe that the use of the 4C model in EFL teaching has enabled me to improve my language comprehension	1.00	5.00	3.8623	0.36845
I believe that the use of the 4C model in EFL teaching has helped me improve my vocabulary	1.00	5.00	3.5443	0.19765
I believe that the change in the EFL curriculum is good and improves the effectiveness of the EFL learning	2.00	5.00	3.7752	0.12976

classroom, it is necessary to develop and train qualified teachers. Similarly, Hernawati (2017) points out that EFL teachers' competence holds crucial importance in the language learning process in 21st-century educational programs. They should be adequately trained to guide the learning of their students.

To design the training plans for future teachers, integrated training has been suggested as the most useful approach. The integrated training would be long-term and continuous training of the teachers leveraging various activities and practices. In line with these suggestions, Shabrina and Astuti (2022) have asserted that foreign language teachers can regularly attend conferences, seminars, and workshops to continuously update their language competence and proficiency by learning contemporary language skills to gain deeper insight into the subject matter. Similarly, Ula (2019) asserted that a teacher's competence in terms of team skills, pedagogical competence, and language proficiency, can be considered in an initial teacher education program. Ultimately, foreign language teachers must constantly push their pedagogical competencies and professional qualifications to a higher level to teach effectively in the classroom. In summary, as foreign language teachers must update their skill set by incorporating 4Cs, these teachers must actively participate in conferences, seminars, workshops, and foreign language group meetings sponsored by institutes and the education sector of Kazakhstan.

For developing communicative competence, it was suggested to develop teachers' written and verbal as well as digital communication skills. In line with this suggestion, it is asserted that the technology applications in learning strengthen communication among the learners and reinforce the collaborative and coordination skills and competencies of the learners. Thus, the use of ICT-enhanced communication among learners enables them to further develop their language proficiency (Budiman, 2020). Thus, ICT should be incorporated into the professional training of the teachers to develop their proficiency in technology and enable them to actively make use of ICT in their language teaching, making it more interactive.

Furthermore, content-based instruction and task-based language teaching were suggested as appropriate strategies for enhancing communication as well as collaborative competence among the teachers. This implies that preparing teachers to incorporate such interactive activities should also be incorporated into the professional training of foreign language teachers in Kazakhstan. This will enhance the ability of the teachers to reinforce cooperative learning in the classrooms enable the students to actively communicate with their peers for exchanging ideas and completing a task together that improves their language comprehension and proficiency (Namaziandost et al., 2020). Thus, with the use of such techniques, teachers' ability to foster collaboration and cooperative learning in their classrooms increases.

The findings of the interview also suggest that active debates, meetings, and discussions should be arranged by educational institutes to enhance the critical thinking abilities of foreign language teachers. This idea has been supported by various scholars as Wahyuni et al. (2019) have suggested debates and problem-solving as effective techniques that can be used by EFL teachers to develop and foster critical thinking in language teaching and learning. Tekliuk (2020) supported this idea stating that instructional strategies such as group discussions, reciprocal peer questioning, and debating in English can add to critical thinking and enhance EFL proficiency. Similarly, for developing the linguistic creativity skills of foreign language teachers, all the senior teachers and experts suggest to organize creative and interactive activities for the teachers. In this regard, Wang and Kokotsaki (2018) have suggested the use of screenwriting and chain games for improving proficiency in the target language and their knowledge of grammar and structure. Gursoy and Bag (2018) have also suggested that a problem-based learning approach inspires students to think creatively. Activities such as brainstorming, story writing, creative writing, and listening through the usage of imagination improve creativity in the target language. Cho and Kim (2018) also suggested that various types of language play can be used to improve the communication skills of the learners in the target language and offer them the space that they need to be creative. With the use of such interactive activities, it would be possible for the learners to demonstrate creative and exploratory abilities. Thus,

foreign language teachers should be provided with useful guidelines for incorporating language games into the classroom.

The results of the experiment and survey also showed that the new curriculum based on the 4C model can contribute to enhancing the EFL students' learning effectiveness. The results of the achievement test and the perception survey validated the use of the professional training based on the 4C model for future teachers of foreign language. Reflecting on the aforementioned findings, it is deduced that it is imperative for foreign language teachers in Kazakhstan to enlarge their horizons in order to incorporate the 4C model of education at schools. Thus, it is important for the professional training of foreign language teachers in Kazakhstan to adequately prepare them to integrate the four competencies offered by the 4C model, communication, collaboration, critical thinking, and creativity, in their foreign language teaching. In this regard, it is possible to incorporate the activities suggested in the aforementioned discussion for the professional training of foreign language teachers in Kazakhstan to prepare them to implement the 4C model of education at school. Based on the suggested techniques and methods for developing the professional training of foreign language teachers in Kazakhstan, Figure 3 presents an overview of the professional training content for the teachers to develop their ability to incorporate the 4C model.

Based on the interview responses and analysis of the extant literature, the article suggested developing and incorporating integrated training of future foreign language teachers, comprising workshops, seminars, and group meetings and discussions sponsored by their institutes and the educational sector of Kazakhstan. The professional training of future teachers should be focused on developing the abilities of the teachers in the four competencies: communication, collaboration, critical thinking, and creativity. Succinctly, for communication, it is important to develop ICT-mediated cooperative learning for the teachers to develop their interpersonal as well as digital communication (Fansury et al., 2020; Sassin, 2020). This way, teachers will be well-prepared and well-equipped to incorporate these in their language teaching at schools. For developing collaboration, the paper suggests the use of content-based instruction and task-based language teaching in the professional training of teachers. This will, in turn, develop the ability of the teachers to reinforce cooperative learning in the classrooms that will enable the students to actively communicate with one another for the exchange of ideas. Ultimately, this will improve communication and the language proficiency of the students. For the development and implementation of critical thinking, the article suggests the use of debates, group discussions, and reciprocal peer questioning among the teachers of the foreign language that will enhance their critical thinking ability in the target language and develop their ability to foster the critical thinking in the students' foreign language learning. Finally, for developing creativity, problem-based learning approaches are suggested to be incorporated into the professional training of the students. This way, teachers will be able to learn various activities that they can incorporate for fostering creativity in their classrooms.

5.1. Comparison with previous studies

The findings of the paper are found to be in line with the findings of the extant literature that support the stance of this study, which is to incorporate the 4C model in the professional training of foreign language teachers in Kazakhstan to enable them to implement this model in the classrooms. Generally, the importance of the implementation of the 4C model in teaching and learning has been emphasized by various scholars. As per Rusdin and Ali (2019), this contributes to the increment of the teachers' understanding and enhances their teaching quality. Furthermore, with such a deeper understanding, teachers become more sufficient to improve their teaching practices and ensure that they are in accordance with 21st-century educational agendas. The quality of critical thinking has been suggested as crucial for foreign language learning and teaching as it improves language pedagogy (Khatib et al., 2012; Harizaj and Hajrulla, 2017; Saleh, 2019). Furthermore, collaboration has been

FIGURE 3
Professional training of a future teacher of a foreign language to implement the 4Cs' model of education at a school in Kazakhstan (The authors' own construction based on the findings of the study).

regarded as an important feature for improving the interaction, oral skills, sense of interdependence in language use and engagement which has been greatly emphasized in the extant literature (Johnson et al., 2014; Martin-Beltran and Peercy, 2014; Espina et al., 2017). Similarly, communication is important for enabling teachers to enhance the language fluency and competence of the students (Shi and Chen, 2015). Finally, the article suggested incorporating creativity in the teachers' training to enable them to deliver effective and enjoyable learning courses and encourage students to learn effectively (Avila, 2015; Fitriah, 2017; Cho and Kim, 2018).

6. Conclusion

The article proposed techniques and methods to incorporate into the professional training of the future teachers of a foreign language in Kazakhstan to develop their ability to implement the 4C model of education at schools. The concepts of communication, collaboration, critical thinking, and creativity have been comprehensively discussed in this article in the context of foreign language learning and training and the development of professional training for future teachers. The paper incorporated a qualitative approach and in-depth interviews were conducted with EFL senior teachers and experts in Kazakhstan in order to incorporate their experience and suggestions for developing adequate training for foreign language teachers.

Succinctly, all four competencies offered by the 4C model are found to be applicable in the context of foreign language learning and can be used to enhance the efficiency of foreign language learning in the classrooms of Kazakh foreign language institutes. The effective training to implement the 4C model in their language training was found to be important for the future foreign language teachers in Kazakhstan owing to the lack of training opportunities for foreign language teachers in the country. Besides, it was also found that the concept of 4Cs has been introduced in the language teaching curriculum in Kazakhstan. However, because the concept is relatively new for foreign language teachers in the country, they lack sufficient skills across the four competencies in the context of language teaching. In this regard, there exists a need for the professional training of the future foreign language teachers to enhance their ability to implement the 4C model of education. The EFL senior teachers and experts had a consensus on the fact that well-trained teachers can greatly assist learners in developing their foreign language proficiency by incorporating the 4C model. In this recognition, a schematic model has been proposed for the integrated and continuous training of foreign language teachers to develop their four competencies, critical thinking, creativity, collaboration, and communication, with the incorporation of a wide variety of activities and methods.

All in all, the findings demonstrate the need for the development and implementation of continuous professional training of foreign language teachers in Kazakhstan to enable them to implement the 4C model in the classrooms for effective teaching of foreign languages. This article offers practical implications for the foreign language institutes of Kazakhstan pertinent to the development of their future teachers to enhance their effectiveness in foreign language teaching with the incorporation of 4Cs. In particular, the educational sector of Kazakhstan should develop and organize long-term training opportunities for foreign language teachers, which currently appears to be lacking. Similarly, the educational institutes that are offering foreign language courses such as EFL in Kazakhstan must develop appropriate activities and programs for the foreign language teachers such as foreign language teacher's groups that enhance the ability of their teachers to integrate the 4C model in the language teaching.

The strengths of this study are reflected in its theoretical contribution to the extant literature. Besides, as per the knowledge of the researcher, this is the first study to advise and suggest professional training of foreign language teachers to implement the 4C model in foreign language teaching in the classrooms. Despite such contributions, there are certain limitations of the study that must be acknowledged. The recommendations of the study for developing the professional training of the future teachers of a foreign language in Kazakhstan are majorly based on the suggestions and opinions of the language teachers and experts in Kazakhstan. This may limit the ability of the findings to be generalized in all contexts.

As it is established that the ability of this study to generate generalizable findings is limited by the narrow focus of the data collection (perceptions and experience of the EFL senior teachers and experts in Kazakhstan, future researchers must overcome this limitation of the study to generate more effective results). In this regard, it is suggested that future researchers conduct a more comprehensive study taking into account the perspectives of various stakeholders (teachers, educational leaders, etc.) from various regions to develop more comprehensive training for the teachers that can be applied to varying contexts.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

FS and NA were responsible for conceptualization and in charge of the methodology. AS processed the data. GK performed a formal analysis. GK and GN conducted the investigation. FS supervised the project. AS and MK searched and provided the literature resources. NA carried out the validation. MK prepared the manuscript draft. GN reviewed and edited the manuscript draft. All authors contributed to the manuscript revision, read, and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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How to develop four competencies for teacher educators

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Understanding competencies and the process of acquiring them contributes to a shared set of essential abilities for teacher educators' professional development. Practical experiences of practitioners expose which competencies the work context requires them to possess and situations in which their learning is conducted. The necessity for essential contextual competency is pressing, particularly for teacher educators working in developing countries where teacher education has undergone reforms to respond to national and international demands.

This study explores competencies for teacher educators in Vietnam through in-depth interviews with experienced practitioners and their visual metaphors. Eight participants with working experience ranging from 6 to 26 years were interviewed for 60–180min during January–April 2021.

The results reveal four competency areas of (1) knowledge and skills consisting of (a) teaching skill, (b) subject content, (c) scientific and subject-related information, (d) the reality of education and multidisciplinary knowledge, (e) research procedural knowledge, (f) collaboration with others, and (g) English language; (2) ethical manner; (3) motivation; and (4) self-reflection about personal values. Professional development includes learning from and working with others, learning in organized courses, conducting independent and collaborative research, and other field-related academic activities. An interesting highlight is that even motivational competency is gradually formed by professionals' effort put into work.

The findings suggest these four competency components should be attended to when providing professional development activities for teacher educators. Motivational competency should be prioritized since it fosters job productivity and commitment. The findings also serve as practical guidance for self-preparation and development for those working as teacher educators in demanding contexts.

KEYWORDS

teacher educator, competency model, teacher education, professional development, Vietnam

1. Introduction

As a backdrop of the internationalization of higher education, teacher educators' academic productivity has concerned their academic outputs, such as scientific publications, won research grants, and academic conferences to benefit national and international tertiary rankings (Lao, 2015; Shagrir, 2021). This reality exists not only for Western scholars but also for those in Asia, where developing research capability of teaching staff has been heavily invested in making their higher education competitive on the international ranking billboard (Lao, 2015; Chun, 2016;

Ota, 2018). Teacher education has been significantly reformed in Thailand (Rupavijetra and Rupavijetra 2022) and Vietnam (Nguyen and Hall, 2017). Moreover, teacher education in Japan faces a dilemma of producing a future competitive global human resource and national teachers matching with the local demand (Kusahara and Iwata, 2021). Working in this environment with increasingly performance-based standards in the Asian context possibly increases work pressure. However, teacher educators show some resistances to these assessment standards rather than merely welcoming them (Bourke et al., 2018). The resistance might lie in an underestimation of how complex teacher educators' work is (Vander Klink et al., 2017; Berry, 2021); how flexible they are in balancing responsibility for learners and the organization; how professional concerns change in each career phase (Ben-Peretz et al., 2010); and how their work is affected by personal, institutional, and national factors (Brody and Hadar, 2011).

Prior literature reported that teacher educators experience uncertainties and frustrations about teaching duties; assessment of learners; research; lack of time; heavy workload; and consolidation of multiple identities after job entry, which has been showcased in Czechia, Japan, Australia, and the Netherlands (Vander Klink et al., 2017). Moreover, available professional resources lack a professional knowledge base, a designed induction program, organizational support, and incentives (Swennen et al., 2009; Lunenberg et al., 2017; Wilwohl, 2017; Lunenberg and Dengerink, 2021; Mork et al., 2021). Being positioned as both workers and scholars at their workplace (Murray et al., 2021), their job duty covers diverse aspects of teacher education from teaching, research-related activity, developing teaching materials, and expanding collaboration with domestic and international partners. The professionals need complex competencies to be beneficial to both the learners' learning and the institutions' mission (Tack et al., 2021). Professional competencies are attributable for local contexts which govern specific and focused competencies (Ahmed and Bodner, 2017).

Despite this need, contextual competency in the field of teacher education, especially in Asia, is a deficiency that challenges their preparation for the profession and is the reason for this study. Besides, teacher educators' prior self-preparation correlates positively with job engagement and satisfaction (Richter et al., 2021). Feeling overwhelmed by unfamiliar tasks in a new environment leads to motivational exhaustion and reduces job satisfaction (Richter et al., 2021). Additionally, teacher educators' learning is work-based, active, and life-long so that they gradually sharpen their skills in their professional life (Cochran-Smith, 2003; Berry, 2021). Their competencies are formed through experiences at work and their reflection to figure out what works for them. To understand this practical knowledge, reflection on experiences should be captured through narratives about their professional life. Hence, in-depth interviews with these experts are applied to excavate their personal knowledge and situations when they form that competency (Crick, 2008). Goodwin and Kosnik (2013) also recommended research to explore whether their motives and personal features contribute to a competency profile of these professionals or not.

Therefore, this study explores competencies of teacher educators in Vietnam through their reflection on work experience. This study also articulates the developmental circumstances for each competency which is currently insufficient in the literature of teacher educators. The findings bring experiential lessons that promote professional growth for others (DeCuir, 2017).

This study aims to answer the following research questions:

1. Which competencies do Vietnamese teacher educators draw from their work experience?

2. How do Vietnamese teacher educators construct those competencies in their work?

2. Literature review

2.1. Teacher educators' competencies

Research on developing competency-based education from elementary to higher education has been upheld after professor McClelland claimed that it was a competency that determines the future success of high-school students (McClelland, 1973; McLagan, 1980; Vazirani, 2010; Bergsmann et al., 2015; Ahmed and Bodner, 2017). In this study, competency is defined as follows:

…"a combination of knowledge, skills, attitudes, motivation and personal characteristics" allowing teacher educators to effectively work (Spencer and Spencer, 1993; Koster et al., 2005, p. 159).

According to the iceberg-shaped competency model from Spencer and Spencer (1993), skills and knowledge are on the visible surface, while self-concept, trait, and motif make up the invisible core of one's competency. Superior teachers are reported to possess 14 competencies in descending order, beginning with the competencies of impact and influence on others through presentations, use of teaching methods that meet the needs of learners, interpersonal understanding of human diversity, confidence in one's own abilities, control of one's own emotions and behavior, other self-reflection and personal development, subject matter knowledge, service orientation to clients [learners], teamwork and cooperation, analytical thinking, conceptual thinking, initiative, flexibility, and directness or assertiveness (saying no) (Spencer and Spencer, 1993).

Spencer and Spencer (1993) addressed that this generic model is inclusive of all superior teachers, including those from the primary and tertiary levels. Yet, it is widely stated that being a teacher educator is a particular profession that is distinguished from other teachers at lower schooling level. For instance, the profession contains mid-career transistors from school to higher education institutes (Murray, 2016); adult-teaching duties; multiple roles as a teacher of teachers; researcher; coach; gatekeeper; broker; curriculum developer (Lunenberg et al., 2014); and sub-professional identities, such as being a school teacher, a generic tertiary teacher, teacher of teachers, and researcher (Swennen et al., 2010). Additionally, this profession is heterogeneous since it involves those working in different contexts. Teacher educators are classified into school-based, university-based (Murray et al., 2021), community-based teacher educators (White, 2019), and hybrid teacher educators (Hall-Kenyon et al., 2022). These groups have different occupational tasks, work expectations, and qualifications. Owing to this heterogeneity, this study focuses only on university-based teacher educators. This study also refers to the generic competency framework proposed by Spencer and Spencer (1993) to examine a specific set of competencies that apply to teacher educators at universities (hereinafter, teacher educators).

Blašková et al. (2014) developed a competence model for tertiary teachers in the Slovak Republic. The model includes professional, educational, motivational, communication, personal, scientific,

research, and publishing competencies. Motivational competence, which has a positive or negative impact on the learning of students and their colleagues, determines all educational and professional activities and job satisfaction. Personal competency is also the most important feature of being a university professor in general (Bakhru, 2017; Dervenis et al., 2022; Nushi et al., 2022). Meanwhile, having high morality is a must for ideal teacher educators, according to a study in Malaysia (Singh et al., 2021). Thus, a teacher educator can be either an inspiring model or a demotivating role model for learners, and this is rooted in their inner motive (Blašková et al., 2014).

Celik (2011) classified four qualities of a good Turkish teacher educator: being a good teacher, creating new practical and theoretical knowledge, supporting teachers in training and development, and developing oneself professionally. Celik (2011) acknowledged that a good teacher has some qualities ranging from teaching and assessing to being the best example of human behavior.

Moreover, a study in Spain and Romania by Duţă et al. (2014) concluded eight competencies for good university teachers: scientific, teaching, transversal (teamwork, information-communication technology [ICT], linguistic, etc.), relational (consultation with learners etc.), vocational and dedicated, experience in educational institutions (the reality of teaching), self-assessment and professional development, and research.

Koster et al. (2005) synthesized four categories of teacher educators' competencies in the Netherlands, which are content knowledge, communication, and reflection, and organizational and pedagogical understanding. In this professional profile, they excluded research as a competency—rather, they note it as a task.

Smith (2005) collected Israeli teacher educators' views on the qualities of good teacher educators, which include the following competencies: encouraging learner reflection; self-awareness and ongoing professional development; patience, empathy, assertiveness, and confidence; research and publication; working in teams and supporting colleagues; and adherence to professional ethics.

From the literature of teacher educators' competency, four areas of competencies are categorized as follows.

- Knowledge and skills about (1) subject content (Koster et al., 2005; Celik, 2011; Blašková et al., 2014; Duţă et al., 2014; Long et al., 2014; Tripathi, 2015; Mork et al., 2021; Singh et al., 2021; Dervenis et al., 2022); (2) pedagogical content or teaching skill (Koster et al., 2005; Celik, 2011; Blašková et al., 2014; Duţă et al., 2014; Long et al., 2014; Tripathi, 2015; Dervenis et al., 2022); (3) interpersonal understanding (Smith, 2005; Celik, 2011; Blašková et al., 2014; Duţă et al., 2014; Bakhru, 2017; Dervenis et al., 2022; Nushi et al., 2022); (4) research and publication (Smith, 2005; Celik, 2011; Blašková et al., 2014; Duţă et al., 2014; Tripathi, 2015); and (5) collaboration or communication with others (Koster et al., 2005; Smith, 2005; Celik, 2011; Blašková et al., 2014; Duţă et al., 2014; Long et al., 2014; Tripathi, 2015; Dervenis et al., 2022).

- Ethical manner (Smith, 2005; Celik, 2011; Singh et al., 2021; Dervenis et al., 2022).

- Self-motivation and dedication to the job (Blašková et al., 2014; Duţă et al., 2014; Tripathi, 2015; Dervenis et al., 2022).

- Self-reflection about professional development (Koster et al., 2005; Smith, 2005; Celik, 2011; Duţă et al., 2014).

2.2. Professional development of teacher educators

To gain knowledge and skills including teaching and researching, teacher educators' learning is workplace-based (Ben-Peretz et al., 2010; Shagrir, 2010; Murray, 2016; Lunenberg et al., 2017; Vander Klink et al., 2017; Ping et al., 2018; Loo, 2020; Tack et al., 2021). The most common type of learning is self-study because there is no serious induction for novices (Shagrir, 2010). Teacher educators learn to adapt to the new environment and find ways to navigate and survive there. They learn through trial and error by supervising student teachers and reflecting on their teaching practice (Swennen et al., 2009). Gaining basic disciplines of teaching adults, building a relationship with colleagues, and familiarizing oneself with the tertiary working environment hold their attention (Murray and Male, 2005; Dengerink et al., 2015). Learning from others, such as senior colleagues, supervisors, and other novices adds to their competency building (Shagrir, 2021). Individual learning, such as joining specialized seminars and organized courses, is also utilized to equip their capabilities (Dengerink et al., 2015).

Learning through engagement in research is mainly used by professionals with more work experience. After they get used to the new workplace, they actively engage in research-related activities. Both individual and collaborative research projects help to increase their confidence and standing in the academic world (Ben-Peretz et al., 2010; Ping et al., 2018). Experienced professors are considerably active in working closely with their network of professors in their professional community, not just in their institute.

From the competency and professional development literature, it has not clarified how the above-mentioned eight competencies are formed during teacher educators' work in a study, particularly the development of interpersonal, motivational, and ethical competency. Meanwhile, there is an agreement that competency changes overtime and is embedded in contexts and influenced by person's values (Crick, 2008). This study contributes to this knowledge gap by discovering the developing process of each competency among Vietnamese practitioners from their experience. This study is consonant with the ongoing attempt by field researchers to define teacher educators' professionalism from a practice-based research approach (Vanassche, 2022).

3. Materials and methods

This study applies a qualitative approach by conducting in-depth interviews of 60–180 min with eight teacher educators from January to May 2021. A qualitative design is suited to gather the voices and experiences of professionals through their narratives (Clandinin, 2007; Merriam and Tisdell 2015). Experiences are conveyed through told stories with reflection, which reveal a person's struggles and attempts to address their problems (Craig, 2011). Narrative inquiries make it possible to conceptualize experiences with the growth of an individual (Clandinin, 2007). The process of transformation combines professional learning, adapting, and improvising to change, which is the foundation for insightful lessons from experience (Craig et al., 2018). Hence, by listening to narratives and reflect on what a person has been through, the situations that are important for developing competencies can reveal lessons for growth.

Participants' work experience ranged from 6 to 26 years. Prior to the interviews, participants' profiles including work experience, educational background, and credentials were collected from the workplace's public website. In addition, participants were asked to select a character that symbolized themselves and helped the researcher relate their personalities and shared stories. Five of eight participants engaged in this activity. Five participants—Quang, Nam, Hung, Tai, and Linh—were randomly sampled through the list of university staff, while Thu, Hong, and Tra were purposively sampled. After interviewing randomly sampled participants, the author realized that they have been active in their careers with a good research profile. Hence, the author asked her friends to introduce teacher educators working at that university to triangulate data gained from random samples. Those purposive samples showed fewer achievements in scientific research than those volunteering to join the study.

A protocol for semi-structured interviews including interview questions was designed by the author. The focus themes during the interview were: 1) teacher educators' perceptions about their career phases; 2) teacher educators' perceptions about essential competencies and 3) professional activities to achieve those competencies. Data for the two later themes are reported in this manuscript. Interview questions were discussed with senior researchers in the field of teacher education in a 180-min seminar. Later, the interview was piloted with two teacher educators for their feedback in January 2020. The interviews were conducted virtually *via* Zoom application. They were recorded for later transcription with the permission of the interviewees.

Thematic data analysis was applied to capture explicit and implicit meanings from the in-depth data (Guest et al., 2012). The themes that emerged from the codes with the text sections were then related to eight common competencies that emerged from the literature review. For example, the codes as being "cheerful," "enthusiastic," "caring," and "empathetic" were grouped in a "good manner" sub-category. Being "a role model" formed another subcategory. These two subcategories later formed a theme of "ethical manner" competency, which was used as a heading to present the data.

3.1. Ethical approval and informed consent

This research was applied to and approved by the Graduate School Ethics Committee (no. 3721; January 4, 2021). Research content, data collection methodology, participant's sampling, and data protection were presented and approved before the data collection was conducted.

Informed consent indicated the study purposes, the sampling process, and permission to record and use participants' data. Participants approved the content of the informed consent emailed to them before the interviews. The author asked for their permission before recording the interviews. If the participants did not want to answer any questions during the interviews, the author did not persist with that issue. After transcribing each interview, the content was sent back to the interviewees for their confirmation and validation before the data analysis. Recordings, transcription, and personal documents were stored using a password-protected hardware, which could be accessed only by the author.

3.2. Context of the study

In Vietnam, a four-year degree is required to become a teacher in colleges, secondary schools, and elementary schools. A three-year program at colleges is required to become a kindergarten teacher (MOET, 2006). Teacher educators are recruited by universities based on their workforce needs (The National Assembly, 2019). The basic qualification is Vietnamese nationality, a master's degree, English level, ICT, pedagogical certificate, certificate for university lectures, good morality, and no physical disabilities. Some require their teacher educators to have a good academic research profile whereas others do not. Novice teacher educators experience 12-month probation and are evaluated regarding their specialty, pedagogical skill, scientific research capability, morality, and manner by colleagues, managers, and learners (The National Assembly, 2019). Occupational ranks at universities and colleges are teaching assistant, lecturer, and main and advanced lecturers (The National Assembly, 2019). To get promoted from each level, one has to meet the requirements in six areas: diploma, teaching hours, research publications, specialized books, supervised learners, and duration of working. Teacher educators are evaluated annually by self-reports as well as learners' and faculty manager's opinions regarding their teaching and research quantity and quality. Professional ethics includes political loyalty, lifestyle, and preservation of teachers' morality. A proposal of standards for teacher educators covering their professional virtue, specialization, research capacity, capability to establish a democratic education environment, and capability to develop social relationships has been issued. This shows that the teacher educator profession has been attempted to be standardized by researchers and managers.

The research site is the Hanoi National University of Education (HNUE). Teacher educators are responsible for training future teachers at all levels of education and evaluated and doing in-service training for schoolteachers owing to the reform of school teacher's diplomas. Teacher educators' work is evaluated annually; however, the shared criteria of staff-assessment has not been available for the public.

4. Results

4.1. Participants' demographic information

Eight teacher educators, four females and four males, were selected for this study (Table 1). Pseudonyms are used for participants' to anonymize their identities.

4.2. Competencies of teacher educators and their professional development

Four competency areas of teacher educators are summarized in Table 2. Details about each competency and its professional developmental approach are presented below.

4.2.1. Knowledge and skills

Teaching skills include an attractive teaching style, clear and concise instructions, the use of various teaching techniques, and linking teaching to life conflicts.

TABLE 1 Participants' demographic information.

Pseudonym	Gender	Year started working	Specialty	Prior job	Entering job with senior's recommendation	Metaphor
Quang	Male	2015	Natural science	Part-time researcher	Yes	Turtle
Tra	Female	2010	Social science	Official	No	*Not given*
Nam	Male	2009	Natural science	No	Yes	Starfish
Hung	Male	2005	Natural science	High-school teacher	Yes	*Not given*
Thu	Female	2011	Social science	No	Yes	Ant
Hong	Female	2011	Social science	Journalist	No	Sunflower
Tai	Male	1999	Natural science	No	Yes	*Not given*
Linh	Female	1996	Social science	No	Yes	Rice panicle

> Hong: for difficult units, I use the traditional presentation methods. But there are lectures that require practical engagement from students. I apply project-based and/or game-based teaching methods.
>
> Linh: As for the skill, I think teacher educator must have two important skills. The first is teaching skill. I can convey what I want to explain to students. Consequently, they can understand the conveyed scientific knowledge.
>
> Tai: I remember there is a teacher who is going to retire this year. That teacher later said to me: I am about to retire, and my wife is already retired. My wife is always watching me at home; so, how to resolve that conflict? In the process of teaching, I gave a few examples on conflict resolution. The narrower the scope is, the more intense the conflict is […] The lesson must be related to life.

One commented that the teaching skill is both trained and innate as "born to be teachers" as in case of Tai.

> Tai: the teaching ability must be good, to express clearly, easy to understand. Teaching skill, on the one hand, can be trained; on the other hand, it is an innate talent. I think I have an innate capacity to teach. I feel that I am in love with this profession.

A participant with teaching experience noted a difference between teaching students and student teachers. Teacher educators should be aware that adults are "self-learners" and adjust the level of content difficulty from the standpoint of learners.

> Hung: high-school students need to receive more attention, and university cohort doesn't need too much attention, but rather self-study […] Pure researchers who do not have teaching experience do not care much about learners […] there are things that professors think are easy to understand but actually difficult for learners.

TABLE 2 Themes and subthemes for competencies of teacher educators.

Themes	Sub-themes
Theme 1: Knowledge and Skills	1. Teaching skill
	2. Subject content knowledge
	3. New scientific and subject-related information
	4. Research procedure
	5. Collaboration with others
	6. Reality of education and multidisciplinary knowledge
	7. English language
Theme 2: Ethical Manner	1. Good manner
	2. Being a role model
Them 3: Motivation	1. Love of knowledge, learning, and research
	2. Love of teaching
Theme 4: Self-reflection about personal values	1. Staying active and creative
	2. Working with your best
	3. Aware of the profession's sacredness
	4. Remaining resilient and positive

The distribution of content within the allotted time contributes to learner satisfaction and the scope of the secondary curriculum. Overtime should be avoided, or the delivery of advanced knowledge requires consideration of learner needs.

> Hong: You must be sure about the lesson—be accurate. The amount of knowledge must be just enough for the allocated time. What learners hate the most is our overtime teaching [laughs].
>
> Quang: While teaching specialized content, I try to integrate new information from research and new publications. I update teaching content, but not as much as in foreign countries.
>
> [Interviewer: Why not?]

> Quang: In teaching pedagogy, I have to teach the basics first and then advance. The advanced ones are also limited because of the pre-set program.

To develop teaching skills, teacher educators, who graduated from HNUE, claimed to be prepared with *their formal education* during their bachelor's and master's courses. Some participants specialize in general pedagogy and subject-specific teaching methods. During the course, the college dedicates the entire month of November to student teachers to participate in a teaching competition that includes presentation/teaching, blackboard writing, lesson planning, and teamwork, ranging from class to faculty to college.

> Linh: During my bachelor, I learned how to teach. Later, during my master's, there was a course on teaching adults. I learned basically from them.

> Thu: Each year, the university will have one month for intense teaching-concentration, and students will have a whole week off to organize pedagogical competitions, such as giving presentations, writing blackboards, making learning tools, lesson planning, working in teams. That competition ranges at all levels: class, faculty, and university.

Even so, developing a teaching style matching their preference is a continuous process. The most common form of learning is to *learn from others*. The others can be their supervisor, senior colleagues, and in-service school teachers. Teacher educators observe their supervisors while serving as first-year teaching assistants. This experience was made in five cases with Quang, Nam, Thu, Hong, and Linh. They learn how their supervisors teach and how student teachers interact in their classes by working as teaching assistants for their supervisors or mentors. Quang, Nam, Thu, and Linh came into this profession at the recommendation of their supervisor during their bachelor's or master's degrees. Nam did not study education during his bachelor's degree because he switched from physics to teaching during his master's degree.

> Thu: We were not allowed to teach right away. We had to observe our supervisors as teaching assistants and engaged in several classes each year. Then, we started teaching only half the program. The following year, we continued to teach the rest of that program.

> Nam: During first years, I worked as a teaching assistant. I helped my supervisor correct student teachers' exercises. I attended his entire course and observed how the student teachers learned or discussed among themselves. I spent one year doing this activity.

> Linh: I also learned from colleagues. During my first work year, I worked as a teaching assistant. I learned methods from that lecturer. Then, I also went to this and that course; so, I learned a little bit from each another […] Yet, I think I accumulate more and gradually in the working process.

Those who do not have a supervisor also learn by observing senior or well-known colleagues. Hong came to the profession in search of her first career as a journalist. She did not only observe, she also recorded her well-known colleagues' classes, re-watched them, and noted down good explanations to use in her class.

> Hong: Any teachers are appraised by the students for attractive class, I came to monitor their class, to see how they lecture, what their manner is. I observed from A to Z. I brought my camera and filmed it from the beginning to the end. At night, I watched the recording again, and jotted down what they said, sometimes, I checked whether what they said is true. Good parts with nice lecturing were kept and used in my lecture.

Hung, a former teacher, observed teaching in France, where he was pursuing a doctorate. In the process, he learned a new form of assessment that he later applied with some groups of his students, considering learners' abilities.

> Hung: I observed lectures in France to see how they teach. […] It is difficult to import directly because the way students think is different; but I could learn many things. For example, they assessed learners based on topic and want them to delve into that […] I applied this assessment for learners at third or fourth year, learners at advanced class or classes taught in English.

Searching for teaching materials on the Internet (Nam and Quang) or in the national library (Hong) or asking colleagues to provide teaching materials (Quang) or to confirm information (Hong) are used in planning lessons.

> Nam: While preparing the lesson, I searched the Internet. I use not only the Vietnamese books, but other classic [foreign] ones […] I referred to foreign materials and adjust and prepare exercises to suit my students' abilities.

> Hong: I had to go to the History Academy to collect teaching materials because I didn't use materials from open online sources. The data accuracy may not be ensured. If there is information that needs to be verified, I consult a senior for information verification.

In addition, *surveying learners' opinions* is performed whether it is compulsory or not. Quang created a Google form and asked his students to evaluate his classes during the semester. He did this for years, and whenever he received constructive feedback, he made changes to improve his teaching.

> Quang: My voice is low and steady, and I use slides in both English and Vietnamese or English alone. Some may find it difficult, although I always speak Vietnamese.

> *Interviewer*: Did you change anything when you heard the students' feedback?

> Quang: Yes, of course. For example, it was only English earlier, now I teach in both English and Vietnamese in parallel. I am very comfortable [with making this change].

This evaluation of learners affects the evaluation of staff; thus, a good reputation with students carries with its certain incentives through credit-based learning.

> Hong: The same class but the higher the number of students give the higher salary. There are teachers who teach poorly, students learn once and then it is spread that news, the salary is low.

> Nam: After my probation, I needed to take examination as well as be evaluated by supervisors and leaners so that my work contract would be decided. I am happy that I got positive comments from them.

The next area of competency contains *subject content knowledge*, which is considered a prerequisite of being a teacher educator. "In-depth knowledge" is a must and needs constant "updating," which was mentioned in all cases.

> Thu: A method is actually just a tool, and the prerequisite is still content knowledge […] We still have to deepen our knowledge through research.

> Linh: One must be very in-depth about the scientific knowledge of the field they teach. You know, I studied ten, I can only teach one.

> Tra: Teacher educators need access and update new information, to balance relationships between family, colleagues, students … The skills are formed naturally in the process of working and drawn from our own mistakes.

New scientific and subject-related information in the field supplements what is being taught as well as hooks learners' interest in deeper knowledge. To deepen and expand knowledge, individual and collaborative research is the main channel of learning. Working with student teachers brings knowledge and makes professionals feel fulfilled because a good connection with learners is one of the valued aspects in the work of teacher educators, as the cases of Quang, Linh, Thu, Tai, and Nam show.

> Linh: Without doing research, it is impossible to teach well. I must back what I say with evidence. With research findings, my lectures will be more interesting for the students.

> Thu: In fact, knowledge is infinite. My job is not only teaching but also research, those are the two missions of the university. Research will expand and deepen my knowledge […]

> *Interviewer*: How did you expand the field knowledge?

> Thu: Doing the PhD—fulfilling the pressure of research outputs or encouragement of seniors. Sometimes, I was so tired because, as a woman, I just need job security; yet, my seniors are sources of my motivation. Moreover, the motivation came from a student's request. Sometimes, they said, "I want to research this topic." Then, I brainstormed that research with them — that was my driving force.

Another way to deepen their knowledge is to teach gifted student teachers for regional and international competitions, design test items for national tests, and write secondary school textbooks, as Tai and Nam do.

Research-procedural knowledge includes finding an interesting topic, balancing quantitative and qualitative data (especially in the social sciences), writing papers, and obtaining research funding, which become important once one is confident in one's educational work. In addition, research brings material benefits and affects job evaluation and promotion. Thus, teacher educators are aware of the increasing number of research products as evidenced by research grants received, articles published, or collaborative projects. Experienced teacher educators are working on multiple research projects from the faculty level to the international level, as in the case of Thu, Nam, Linh, Tai, and Quang.

> Thu: I am currently participating in a project with The National Fund. Previously, I was also in ministerial-level research groups and had strong collaborations with a research group at the Vietnam National University.

To become familiar with research, teacher educators acknowledge the importance of *accomplishing the doctoral course*. Then, they conducted individual and collaborative research to develop the research capability gradually.

> Linh: For me to be independent, I must complete a PhD. When people want me to do duties, they seem to trust me more. Second, after the PhD, I became more active and independent in my own research. I also joined different research groups.

> Quang: Working in international research projects, firstly, I appreciate the cooperation between different countries and fields. [International] teammates work professionally and are willing to help and share experience. Second, the way they work is very scientific and timesaving. They push me to work [laughs]. It is also an environment to use English; so, I don't forget it.

One factor that motivates professionals to embark on a research journey is that there are exemplary seniors who have been successful in their academic careers.

> Tai: When I just entered the university, very few people did research. College without research is almost a complete failure. But there are also people who persevered, researched, and achieved great success. Hence, that is an example that affects me. I believe that there is a career pathway with successful people in academia.

To work well with others, *the ability to collaborate* with diverse people, from learners to international teammates, is essential and is developed through reflection on their direct work with these groups. These skills include project management, planning, listening to others, and encouraging teammates.

> Linh: I participate in many different studies […] I learned skills to work with different people; so, that was the biggest change in me […] For example, skills in organizing research, working in groups such as making plans, listening when people share ideas and then promoting everyone's ideas, or even complimenting people […] Even small things like praising others are learned through working with previous groups.

Since applying for research funds seemed to be a challenge for young professionals, they collaborated with their colleagues or asked them for tips on how to secure national research funds, as in the cases of Hong and Quang.

> Hong: I often asked about how one can get research grants successfully. Almost every professor's answer is the same: "I read the documents, and naturally noticed when a new problem arose, that's all!"

> Quang: Currently, I am applying for an interdisciplinary state-level project in collaboration with a group of colleagues. That is a challenge.

The next area of knowledge relates to *the reality of education and multidisciplinary knowledge* of different cultures and fields. They gained an understanding of the reality of education through teacher training in schools, as in the cases of Linh, Tai, and Quang.

> Tai: One must have wide knowledge of different fields. Like it or not, students also take their teacher educators as a mirror. Then, I think that teacher educators must be knowledgeable about different cultures and disciplines.

> Linh: In-service teachers' training is the duty that I must maintain to carry out, despite being busy. I have the opportunity to update local issues […] so my support is more realistic.

English is a tool for accessing documents for research and teaching. The teacher educators who study abroad have used foreign teaching materials such as Nam and Quang during their teaching. All of those who are fluent in English participate in teaching in English-language specialized courses, as in the cases of Hung, Nam, and Quang. The use of English as a medium of instruction is not found among those who graduated domestically. Otherwise, they have problems with English when it comes to writing papers or learning English in an organized course. Linh has completed a second bachelor's degree in English and Hong has also registered for a second bachelor's degree in English.

> Thu: My huge limitation is in foreign languages; so, it is difficult for me to read foreign documents.

4.2.2. Ethical manner

Good manners such as cheerfulness, enthusiasm, caring, empathy, and helpfulness convey positive messages to students.

> Hong: If the lecturer is gloomy or irritable, students will not want to learn. Teacher educators must be knowledgeable, enthusiastic, and cheerful.

> Nam: If teaching style and knowledge do not match with leaners' preference, they certainly do not want to learn. When teaching, I try to create the pleasant atmosphere for student leaners. Of course, strict but not over-strict.

Teacher educators see themselves as *role models* for their learners. They expect them to leave positive, exemplary marks on them and to treat their future students well.

Therefore, building and maintaining good behavior are emphasized and practiced in learning and working.

> Thu: I also want my student teachers to treat their future students as properly as how they are treated during their university. So, I'm very enthusiastic while teaching, and I keep maintaining that manner.

4.2.3. Motivation

Another disposition is to possess *the love of knowledge, learning, and research*. The passion for their thirst for knowledge and the love of books make academics work continuously despite hard living and working conditions.

> Linh: A teacher educator must be passionate for learning and research. Without that, I will probably give up very easily. This job required much higher than my own capacity at the beginning. There are other pressures of everyday life.

> Tai: I often tell my students that if one chooses a teaching career, he must love books and knowledge. If he goes for another major, it is also normal that we don't love books.

Although they do not specify their love of knowledge, Nam told his story of working in his teaching profession and spending his money on a famous classical book that made him fall in love with his course of study to this day.

> Nam: Once I read that section of physics book, it hooked my entire attention. I wanted to find the answer for that raised unsolved question. Then, I applied for the university examination to become a scientist despite being disapproved by my parents.

The feeling of being obsessed with becoming a teacher is an epiphany of love for teaching. During Thu's studies in accounting, this obsession surfaced when she watched her lectures, which led her to abandon those studies and retake the exam at the University of Education.

> Thu: I have been obsessed since high school, maybe it's owing to limited information for job hunting. I think I'm only suitable for pedagogy major. I used to study another major—accounting; but, when I saw the lecturer, I really liked them; so, I quit that university and studied to become a teacher.

The love of teaching is found in Hung, although he struggled with his doctor and experienced confusion at the beginning of his career. He is mindful of teaching as a profession with hard living conditions.

> Hung: To be a teacher, one should like their job. There is no need to love it too much, but at least a little. A teacher's life is quite hard. If you don't like it, you cannot do it.

These motivations can be both innate and developed during their actual work. Linh described the changing process, in which she developed her love for the teaching profession. She started teaching without loving it; however, after years of being serious about it and putting all her efforts into it, she discovered "quite alluring qualities" about the subject and began to love her subject.

> Linh: I did not intend to choose my major at first […] That's why I didn't like it at first; but I thought I had to do my best too. Doing so, I saw some alluring features about my field […] Many of my learners did not like their major at first, and I told them my own story for their reflection […] I think that if we do not understand something, we may not like it.

Tai also thought about his path to becoming a college professor. It is his love and innate talent for teaching. What drives him to develop is the imitation of his idol professor, who is knowledgeable and wealthy.

> Tai: That was when I began studying at HNUE, I read about that ideal professor [….] For me, he is a gorgeous person, with a tough character and a great personality. He gave me the extravagant feeling that a university professor is very honorable, classy, scholarly, gifted, and wealthy.

4.2.4. Self-reflection

Self-reflection of professional development and personal values contributes to a better self-image of teacher educators. When being asked about the message teacher educators want to convey to their students while teaching, the following were mentioned: staying active and creative, working with the best, being aware of the sacred profession, and remaining resilient. In addition to these characteristics, the metaphors they used to describe themselves as a starfish, ant, turtle, rice panicle, and sunflower reflected the values they wanted to convey to their students.

Staying active and creative is most mentioned among teacher educators including Thu, Nam, and Quang. Thu symbolized herself as an ant that keeps collecting food pieces.

> Thu: It is too hard to choose the bee [laughs]. I will choose the ant; it is not as fast as a bee. It keeps collecting pieces after pieces […] I always want students to have initiative, creativity, and flexibility in study and life.

Nam has agreed to metaphorize himself as a starfish. He wants his students to investigate and discuss during the lesson.

> Nam: When I teach, I want students to really participate in the lesson. I told students that they should not be afraid to ask, because every question is silly [laughs]; so, don't be afraid to ask if it's "dumb." I try to create an atmosphere like that.

Quang describes himself as a turtle with a clear direction and steady progress. He wants his students to be creative and independent.

> Quang: I often think of the turtle. with a clear direction, it will reach the destination. It's better to make the turtle run faster [laughs]. […] I value creativity and independence […] In teaching or research, I encourage students to be curious and ask questions.

Work with your best—this is the second most important message. Linh symbolizes herself as a rice panicle, which shows humility.

> Linh: I usually tell my students that whatever you do, try to do your best. I thought I am not as good as my friends. Thanks to my working spirit, I can also have some successes.

> Nam: Actually, I always try to work to the best of my ability. I also don't like to stand out; I just want to be in my shell and work according to my interests and abilities. Whether someone knows or appreciates me or not, I don't care about that.

An awareness of the profession's sacredness influences teacher educators to make the learners aware of their impact on the future students.

> Tai: When I teach, I often tell my student teachers that they have more power than I do. They will teach future students, who are like an empty paper. Hence, the influence on the thinking and personality of the students is huge.

> Thu: I want to keep things very sacred between teacher educators and learners. I do not demand anything (material) from my student teachers. I build a relationship with learners based on respect and non-material benefits.

Remaining resilient and positive is mentioned by Hong, who chose the sunflower as her symbol. She encouraged her learners to remain positive and resilient despite challenges.

> Hong: I often tell my students that there are challenges that make us feel discouraged, even hopeless. We should not be too pessimistic because they give us strength to help us grow up.

5. Discussion

Participants' perceived competencies show similarities to the literature in knowledge and skill areas including (1) subject content

knowledge, (2) teaching skill, (3) research knowledge and (4) collaboration (Koster et al., 2005; Smith, 2005; Blašková et al., 2014; Duţă et al., 2014). Interpersonal understanding in the conceptual framework is an element embedded in collaboration competency.

The reality of education and multidisciplinary knowledge of cultures found in this study is a new competency in the existing literature. In addition, English-language proficiency is important for teaching and research activities. As a result of internationalization of higher education, the number of published academic papers in international journals has a place in promotion criteria of teacher educators; hence, improving English linguistic ability is important (MacPhail et al., 2019). ICT is less mentioned than other competencies but is often used for finding teaching and research materials (Nam, Hong) or for assessing learners (Quang). Technological competency is blurred comparing to others in this study; however, Dervenis et al. (2022) confirmed that technological competency is an emerged skill of university professionals due to the COVID-19 pandemic.

Self-reflection is not only about professional needs but also about the personal values that teacher educators bring to work and convey to learners. Reflection about their own practices bring lessons to benefit themselves, learners, and their institutions (Smith, 2005; DeCuir, 2017). Reflection about teacher educators' values informs how they work, overcome life difficulties, convey messages to and support learners.

The ethical manner of teacher educators reflects both their professional and ethical demeanor, which is supported by Celik (2011) in the example of appropriate behavior. Being friendly, caring, enthusiastic, and supportive signifies a conducive learning environment for student teachers. Student teachers in previous studies also agreed that these positive attitudes make good teacher educators (Smith, 2005; Doan, 2011). Additionally, awareness of the profession's sacredness is prominent in the cases of teacher educators. This mindset motivates them to self-reflect on their teaching skills and proper manner so that they can be a good role model for their learners. The role model trait is significantly shown in teacher educators' personal competency including their positive mental, spiritual, and behavioral aspect (Dervenis et al., 2022).

Motivational competency of teacher educators includes the love for knowledge and learning is considered a professional calling or career aspiration (Richter et al., 2021). This motive is fundamental to professionals' motivation to work and ensures that people are committed to their profession. This finding confirms the findings in Sipeki et al. (2022), in which the internal motivation of teacher educators promotes them to be life-long learners. This inner motive acts as a personal impulse that spurs professionals to go above and beyond what is required to teach. Comparing to recruitment and promotion criteria of teacher educators regarding diploma, research publications, specialized books, and duration of working in policy documents (The National Assembly, 2019), it is not necessary that teacher educators possess the love for learning. Yet, this study found that this vocational calling is essential for one to enjoy doing and commit to this job. It keeps them actively engaged in research with various groups such as student teachers, teachers, and other researchers within and outside of their workplace. As mentioned in Blašková et al. (2014), it is useful to look at the work and success of teacher educators from the perspective of their motivation as well as their cognitive abilities. The cases studied support the argument that "the combination of motivation and cognitive skills does more than individual effects" (Blašková et al., 2014, p. 458).

Professionals serve as role models, encouraging and nurturing colleagues and student teachers. Four teacher educators—Nam, Tai, Hung, and Quang—selected inquiry-oriented student teachers during their interactions and nurtured these students for their future academic work. This selection benefits teacher education by receiving and training potential teacher educators before they enter the profession. Professors' concern about selecting their replacements is also found in Vander Klink et al. (2017). Thus, motivated teacher educators bring benefits and value to others who work with them and their institute.

The connections between the four competency areas are illustrated in Figure 1. No categorized competencies are irrelevant. Positive motivation and personal values influence how teacher educators interact with and convey messages to others and how they develop themselves. Self-reflection about their values alerts professors to construct a proper manner and update their knowledge and skills. Hence, motivation and self-reflection are placed at the core of good characteristics of teacher educators.

Competencies are changeable overtime, and the development pathway is learned through studied teacher educators' narratives. Vietnamese teacher educators' professional development includes learning from elders, self-study, participation in organized graduate education courses, and conducting research, which share similarities in the current literature (Ben-Peretz et al., 2010; Dengerink et al., 2015; Ping et al., 2018). Learning from others in a professional community is powerful for new teacher educators. Getting access to this community through the support of supervisors is conducive for their professional development.

This finding is in line with Kirkwood (2009), who stated that being introduced by others positively encourages a person's career development. Two experts—Hong and Tra—were admitted without recommendation from the seniors and later participated less actively in the research. The reason could be that they did not have the support

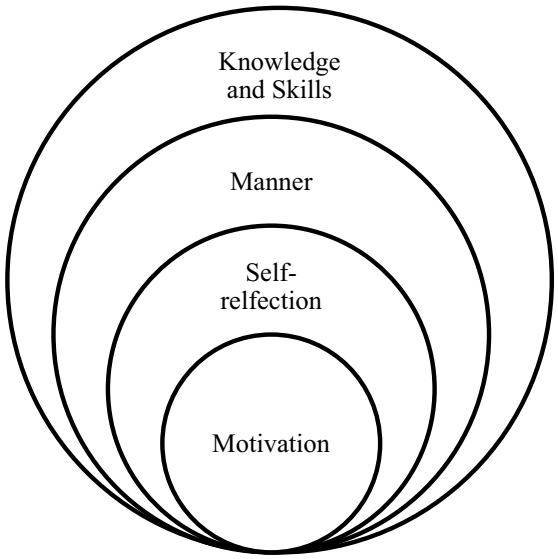

FIGURE 1
Four areas of teacher educators' competencies.

of supervisors or the professional learning community. This professional community is important for newcomers to settle into the work environment, establish a network of professionals, and understand the basic principles of their profession and work environment (Murray and Male, 2005; MacPhail et al., 2019). Senior referral is also an encouragement and responsibility for novices to learn and develop so that they feel they are meeting the expectations of the seniors. In addition, most of the recommended teacher educators have their undergraduate studies in teacher education, a prerequisite that prepares them for their new job (Richter et al., 2021).

Those who entered the profession with a love of teaching, knowledge and learning, and striving for the ideal role model show greater professional commitment than those who entered the profession without these characteristics. This finding is consistent with Richter et al. (2021) and Blašková et al. (2014). In addition, having a positive role model is part of the expectations of novice teachers (Swennen et al., 2009), as they can reflect on the gap between their current level of competence and future expectation (Knowles, 1980).

Another novelty of this study lies in its exploration of the forming of internal motivation in teacher educators over time. Previous studies indicated that motivational competency is a determinant of university professors' work (Blašková et al., 2014; Duță et al., 2014); yet, they did not reveal how this ability changes over time for teacher educators. The motivation with the love for knowledge and their field may emerge over time from self-reflection, as noted by Linh. Interpersonal skills also change over time through working with others, which Thu noted. Older professors become more tolerant, humane, and supportive of younger generations, as in the cases of Linh, Thu, and Tai, compared with themselves at younger ages. This finding suggests that professionals, as self-regulated learners, should be given adequate time and space to learn or reflect about the profession deeply, to develop interpersonal skills, and form the vocational inspiration with teaching.

Metaphors with personal values show us that teacher educators bring their values to their work. This finding supports the idea that teacher educators, as adult learners, bring with them their own experiences, sense of self-identity, and associated habits, which are both a rich resource for their own learning and for others, and a challenge for adult educators to adapt support for individuals (Knowles, 1980; Salleh et al., 2015).

This study has some limitations. First, the number of participants was limited, which prevents generalization of the results. Further, the varied work experience among participants raises the notion of how teacher educators at different career stages consider their prioritized competencies and how long it takes for professionals to be effective in those competencies. As the present study did not study this aspect, future researchers should examine it. In addition, this study was conducted without examining the impact of the current COVID-19 pandemic on the work of teacher educators; therefore, the results cannot specifically identify any competencies that have emerged because of the pandemic. Further research on teacher educator competencies is important to determine whether new competencies are urgent for professionals in this context. Additionally, given that motivational competency can influence one's professional impulse, a mix-method or longitudinal research design would be meaningful for highlighting how this competency affects learning experience of student teachers. The finding can help inform policies on performance-based evaluation of teacher educators, whose current emphasis is on technical skills rather than vocational willingness as the nature of the teaching profession.

6. Conclusion

This study concludes that teacher educators need complex competencies to meet the demands of learners, institutions, social expectations, and the changing society. Competencies regarding knowledge and skills, manner, motivation, and self-reflection are concluded from narratives of teacher educators. With motivation as a core point, the findings well reflect categories in the iceberg model of Spencer and Spencer (1993). Teacher educators learn from their work and constantly develop themselves to respond to the needs of learners and institutions, despite the lack of a professional development framework. This study gathered the voices of practitioners who were both novices and experts in the field. An implication of this study firstly is that the space for self-reflection and forming of a vocational calling needs to be emphasized in the professional development pathway. Vietnamese researchers are proposing a point-based protocol to assess university professors' and teacher educators' work based on a number of criteria. Considering the complex and moral nature of the teacher educator profession, such evaluations are rather rigid and given no adequate attention to autonomy for developing educators' positive values and professional vocation. Vietnamese teacher educators are required to train future teachers with a competency-based approach while they are under the pressure of performance-based evaluations. A program for competency development of teacher educators should be a developmental lever rather than a point-based scale (McLagan, 1980), particularly in an uncertain and vulnerable context that requires a professional to be flexible (Lunenberg and Dengerink, 2021; Vanassche, 2022). A longtime development strategy grounded with practical experiences of practitioners would precisely reflect what teacher educators' work context requires them to possess and how they developed these skills during ongoing reflection. The present study offered insights into these contextual competencies based on narratives of Vietnamese practitioners.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee of the Graduate School of Humanities and Social Sciences (approval no. 3721; January 4, 2021).

The patients/participants provided their written informed consent to participate in this study.

Author contributions

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supporting pre-service teachers in developing research competence

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Introduction: Teachers need research competence to reflect on their teaching and to interpret and implement research-based recommendations. However, many pre-service teachers have critical attitudes toward research, little motivation to engage in research, and comparatively low knowledge of research methods and thereby consequently indicating a low research competence. Flexible online modules in university teaching could be a promising approach to address these issues. Online modules can potentially promote self-determined motivation, but should be sufficiently structured to support learners' need for competence.

Methods: We designed two learning environments with different types of structure: a non-restrictive structured environment and a restrictive structured environment. A total of N = 108 pre-service biology teachers were randomly assigned to the two learning environments.

Results and discussion: Contrary to our assumption, the restrictive type of structure of the learning environment did not lead to a higher perception of competence. This might be a consequence of external pressure, for example, the examination at the end of the course. Regarding pre-service teachers' research competence, we found a decrease in the affective-motivational domain and an increase in the cognitive domain in both learning environments. These results suggest that fostering pre-service teachers' research competence should focus on the affective-motivational domain. In order to positively affect this domain, care must be taken to ensure that structuring elements are not experienced as control and that given choices are meaningful to students.

KEYWORDS

structured learning environment, perceived competence, research competence, pre-service teacher education, basic psychological needs

1. Introduction

Schools and universities are responsible for preparing learners for working with data. Learners should be able to evaluate empirical results and analyze, present, and interpret data. The respective competence profile provides a basis for evidence-based decisions (Humpert et al., 2006) and is known as research competence (Wessels et al., 2018). Research competence is not a clearly defined term. It is usually interpreted in subject-specific terms (Thiel and Böttcher, 2014; Gess et al., 2017) and is a relatively new goal of teacher education (OECD, 2005). In German teacher education, research competence is considered an objective of higher education (The German Science and Humanities Council, 2006) and an integral part of teachers' professional competence (MSW NRW, 2010). It ensures that (pre-service) teachers can interpret

scientific sources and studies (e.g., PISA, TIMSS, Hattie study; Fichten and Meyer, 2014), act competently in the classroom, make objective, reliable, and valid assessments of students' performance (Humpert et al., 2006; Mandinach and Gummer, 2016; KMK, 2019b), and continuously develop teaching quality (e.g., see Johnson et al., 2014).

Research shows that students as well as pre-service teachers find university courses on research methodology, which is needed to be competent in research, uninteresting, irrelevant, challenging, and have a poor attitude toward research (Vittengl et al., 2004; Spronken-Smith, 2005; Ball and Pelco, 2006; Braguglia and Jackson, 2012; Earley, 2014). Previous findings show that students lack motivation and mathematical skills and display a critical attitude toward doing research (Stark and Mandl, 2000). If research competence is a goal of teacher education, learning opportunities must be integrated into teacher education programs (Hochschulrektorenkonferenz (HRK), Kultusministerkonferenz (KMK), Bundesministerium für Bildung und Forschung (BMBF), 2017) to help overcome these problems. Fostering self-determined learning processes could be a beneficial approach as it increases motivation, engagement, and learning performance (see Ryan and Deci, 2017). This could be done for example by using online modules that allow flexible learning.

Online modules allow pre-service teachers to access content individually, regardless of time, and as often as needed (Naidu, 2017) and promote the experience of meaningful choice in engaging with content. This form of autonomous learning, however, can lead to distractions, disorientation, and can be overwhelming to learners (van Loon et al., 2012). Structuring the learning environment can help to avoid such feelings and is crucial in promoting learners' perceptions of competence (Jang et al., 2010). However, structuring the learning environment can be perceived as controlling and can negatively affect the satisfaction of the two basic needs for competence and autonomy and, in turn, learning (Eckes et al., 2018). To investigate our assumptions, we designed two learning environments dealing with research methodologies that differ in their degree of structure: a non-restrictive structured environment and a restrictive structured environment.

2. Theoretical framework

2.1. Research competence

In the 1990s, the instruction paradigm for higher education shifted from teaching to learning (Barr and Tagg, 1995), meaning that students are expected to construct their knowledge rather than receive content. In 1999, this shift was documented by the Bologna Declaration for the European Universities (Bologna Process Committee, 1999) and is expressed in the concept of competence. Klieme and Leutner (2006) describe competence as a behavioral disposition (cognitive domain) that can be trained in the sense of skills (see also Koeppen et al., 2008). Weinert (2001) expands this definition and includes abilities in the affective-motivational domain. This holistic concept of competence refers to the ability and willingness to meet the challenges of a situation. In the context of teachers' professional research, Baumert and Kunter (2013) build on Weinert's (2001) model. Here, teachers' professional competence is defined as a profession-related "amalgam" of abilities in the affective-motivational and cognitive domains. The abilities in the *affective-motivational domain* describe the motivational orientations and self-regulatory abilities of (pre-service) teachers. These abilities are related to classroom actions and the management of one's own resources (Baumert and Kunter, 2013). A teacher's motivation and passion for her profession and subject can impact learners and their performance (Kunter et al., 2020). Responsible management of one's resources is important for teachers because it can affect the quality of the profession, the quality of teaching, and the length of time in the profession (Baumert and Kunter, 2013). The abilities of the affective-motivational domain of research competence have only been investigated in a few studies in previous research (Deicke et al., 2014; Schumacher, 2020; Wessels et al., 2020). The *cognitive domain* describes the professional knowledge of (pre-service) teachers. A teacher's professional and competent action is shown in an appropriate assessment and analysis of situations as well as subsequent reflection (Kunter, 2011) and is taught in the framework of teacher training (MSW NRW, 2010; KMK, 2019a).

Research competence refers to this concept that encompasses a range of knowledge, attitudes, and behaviors that are essential for successful research (Wessels et al., 2018). Research competence includes skills such as critical thinking, ethical reasoning, and the ability to effectively communicate research findings (see Böttcher and Thiel, 2018; Mkrttchian and Belyanina, 2018). Related to research competence is research engagement, which Borg (2010) defines as a link between "engagement in research," which means, for example, doing research, and "engagement with research," which means, for example, reading and using research.

Studies on research competence primarily focused on cognitive learnable abilities (according to Klieme and Leutner, 2006; Böttcher and Thiel, 2017; Gess et al., 2019), and the results demonstrated an increase in the cognitive domain after participating in a research course (Böttcher and Thiel, 2017). The interaction of abilities in the affective-motivational and cognitive domains is relevant for the formation of (research) competence (Blömeke et al., 2015; Zlatkin-Troitschanskaia et al., 2015), influences performance and coping with professional demands (Kunter et al., 2013) and, thus, supports action in practice (Baumert and Kunter, 2013). Previous studies find an increase in student knowledge and a decrease in students' attitudes toward research after a research methods course (Sizemore and Lewandowski, 2009; Wessels et al., 2020). To optimally support the cognitive learning process and counteract a decrease in motivational variables, measures can be implemented to foster motivation in dealing with research content. Such measures can be derived from self-determination theory (Ryan and Deci, 2017), which will be discussed in the following section.

2.2. Basic psychological needs

Self-determination theory (SDT; Ryan and Deci, 2017) distinguishes extrinsic and intrinsic motivation. Extrinsically motivated behavior is performed with instrumental purpose and is characterized by pursuing goals independent of the action. Intrinsically motivated behavior reflects actions with the sole purpose of performing the action (Ryan and Deci, 2017, 2020). In these actions, individuals perceive an internal locus of causality (Ryan and Deci, 2017, 2020). The experience of pleasure and interest

sustains intrinsic motivation (Ryan and Deci, 2002). Regarding SDT (Ryan and Deci, 2017), long-lasting and sustainable learning is based on self-determined motivation. Self-determined motivational qualities (such as intrinsic motivation) lead to higher engagement and better learning performance (Reeve and Jang, 2006; Ryan and Deci, 2017). SDT (Ryan and Deci, 2017) assumes that satisfying basic psychological needs is a precondition for self-determined motivation, for example, while learning. Two of these basic psychological needs are relevant to our study: the need for competence and autonomy (Ryan and Deci, 2017, 2020). The need for competence describes the individual's desire to experience and improve one's abilities through interaction with the environment (Ryan and Deci, 2017, 2020). The need for autonomy describes the desire to perform actions voluntarily, to be the origin of one's actions, and to feel that one has a choice (Reeve et al., 2003; Ryan and Deci, 2017). Although, for a long time, only the satisfaction of these needs was considered, recent findings suggest that it is also important to consider the frustration of these needs (Heissel et al., 2018). This perspective arises from the fact that satisfaction and frustration are not a one-dimensional construct and do not act contrarily to each other (Heissel et al., 2018).

SDT suggests designing measures according to the abovementioned needs to support motivational variables in the learning process, such as acquiring research competence. To support the need for competence, the learning environment must provide sufficient structure (Jang et al., 2010; Ryan and Deci, 2017). Structure is of special importance for learning environments that address complex content. If such learning environments provide too little structure, they can evoke disorientation, create distractions, and overwhelm learners (van Loon et al., 2012). However, if the structure is perceived as control, it can negatively impact perceptions of autonomy and self-determined motivation (Jang et al., 2010; Eckes et al., 2018). Based on these assumptions, we investigated the following research question:

Do differently structured learning environments impact the development of research competence in pre-service biology teachers?

Based on the theoretical background, the following hypotheses can be derived:

> H_1: Pre-service teachers who receive restrictive structure express a higher self-assessed affective-motivational domain of research competence than students who receive non-restrictive structure.
>
> H_2: Pre-service teachers who receive restrictive structure express a higher self-assessed cognitive domain of research competence than students who receive non-restrictive structure.
>
> H_3: Pre-service teachers who receive restrictive structure perceive a higher satisfaction of their needs for autonomy and competence than students who receive non-restrictive structure.
>
> H_4: Pre-service teachers who receive restrictive structure perceive a lower frustration of their needs for autonomy and competence than students who receive non-restrictive structure.

3. Materials and methods

3.1. Sample

The study was conducted as part of a biology education postgraduate module in the master's program at a German university. Data were collected from the summer semester of 2020 to the summer semester of 2021. Participants gave their consent to use their anonymous data for scientific purposes. Longitudinal data from $N = 108$ pre-service biology teachers ($M_{age} = 25.33$ years, $SD_{age} = 3.89$ years; $M_{semester} = 2.81$, $SD_{semester} = 1.01$; 82.4% female, 0.9% diverse, 1.9% gender not specified) were analyzed. The non-restrictive structured group consisted of 56 pre-service teachers ($M_{age} = 25.30$ years, $SD_{age} = 3.31$ years; $M_{semester} = 2.88$, $SD_{semester} = 0.94$; 82.1% female, 1.8% diverse, 3.6% gender not specified) whereas 52 pre-service teachers were part of the restrictive structured group ($M_{age} = 25.37$ years, $SD_{age} = 4.46$ years; $M_{semester} = 2.73$, $SD_{semester} = 1.09$; 82.7% female).

3.2. Study design and procedure

The developed research course was first examined in the current study. All investigated pre-service teachers took part in this course. In the research course, the pre-service teachers learned about the theoretical background of empirical research. Moreover, the course contained research methods and insights into subject-specific research. Thus, the pre-service teachers had the chance to learn about research methods and to develop research competence. The content was taught digitally with the help of online modules (asynchronous). Before the start of the course, the pre-service biology teachers were randomly assigned to two learning environments (treatments): non-restrictive structured or restrictive structured. Both groups worked with online modules, providing learning opportunities on biology education research methodology. Each module consisted of multiple sequences. Between each sequence, content-based questions were positioned. In the restrictive structured treatment, the pre-service teachers could not proceed to the following sequence until answering the questions correctly (in the sense of mastery-learning; Bloom, 1978). The tasks were repeated as often as necessary until they were solved correctly. The non-restrictive structured group worked with the same modules, but the questions did not have to be answered (correctly) to proceed to the following sequence. The pre-service teachers in this group were also able to answer the content questions as many times as they wanted.

This quasi-experimental intervention study includes three measurement time points. Pre-service teachers' self-assessed abilities in affective-motivational and cognitive domains were assessed in a pre-posttest design. Basic needs were assessed in the middle of the course (mid-term) and at the end (posttest). A research course lasted one semester (about 14 weeks). There were approximately eleven weeks between the pretest and the posttest. At the pretest and posttest, research competence was assessed using self-assessments and demographic data (pretest only). A mid-term survey for basic need satisfaction and frustration was administered approximately six weeks after the pretest.

3.3. Measurements

The research competence was assessed by using two scales, each scale for one domain of research competence. For the **affective-motivational domain** three subscales were used (see Table 1). The subscale *finding joy in conducting research* of the affective-motivational domain was assessed with a 5-point rating scale (1 = "I do not enjoy this at all," 5 = "I enjoy this very much"; Wessels et al., 2018). The other subscales (*value-related interest in research*, *perceived benefits of research for practice*) deployed a 5-point rating scale as well but with different wording (1 = "strongly disagree," 5 = "strongly agree"; Wessels et al., 2018). These subscales were evaluated by Wessels et al. (2018) and were also used by Schumacher (2020) to evaluate pre-service biology teachers research competence after a long-term internship.

For the **cognitive domain**, we used the evaluated subscales (see Table 2) by Böttcher and Thiel (2018). The subscales deployed a 5-point rating scale ranging from 1 = "strongly disagree" to 5 = "strongly agree" (Böttcher and Thiel, 2018).

The items of both domains the affective-motivational and the cognitive one were adapted to biology education (see Tables 1, 2; Böttcher and Thiel, 2018; Wessels et al., 2018).

To evaluate how the different learning environments (non-restrictive structured and restrictive structured) affect the basic psychological needs, we assessed **basic need satisfaction and frustration** (mid-term survey and posttest) with four subscales (BPNSFS; Heissel et al., 2018). Theses scales are part of a validated German measurement instrument by Heissel et al. (2018). The items were rated on a 5-point rating scale (1 = "strongly disagree," 5 = "strongly agree"; Heissel et al., 2018) and adapted to the online modules (see Table 3).

All scales' reliabilities were estimated using Cronbach's alpha, which was found to be disputable to excellent (DeVellis and Thorpe, 2022) and adequate for our analyses (Lienert and Raatz, 1998).

3.4. Data analyses

To investigate differences between the two treatments and different points in time (pretest and posttest), we ran repeated measures multivariate analyses of variance (MANOVA) for each domain of research competence (affective-motivational and cognitive, respectively; H_1 and H_2). We also applied a MANOVA to investigate differences between the treatments regarding basic psychological need satisfaction and frustration (scale: BPNSFS) taking into account two time points of measurement (mid-term and posttest; H_3 and H_4). In a final step, we used oneway *t*-tests to check whether the values in research competence differed significantly from the scale mean. That is, we checked whether the values were significantly above or below the scale average. Because of using multiple testing, we corrected the significance level according to Bonferroni-Holm for each domain of research competence separately.

4. Results

We investigated whether differently structured learning environments affect the development of research competence in pre-service biology teachers (H_1 and H_2). Repeated measures MANOVA showed no significant time x treatment effect in the affective-motivational domain, $F(3, 103) = 1.16$, $p = 0.329$, $\eta_p^2 = 0.033$, indicating that the treatment did not affect the affective-motivational domain of research competence over the time. However, repeated measures MANOVA showed a large significant main effect (Cohen, 1988) of time on the affective-motivational domain of research competence, $F(3, 103) = 5.93$, $p < 0.001$, $\eta_p^2 = 0.147$. All affective-motivational domain subscales decreased over time (see Table 4).

Repeated measures MANOVA showed no significant time x treatment effect in the cognitive domain as well, $F(5, 102) = 0.58$, $p = 0.713$, $\eta_p^2 = 0.028$, indicating that the treatment did not affect the cognitive domain of research competence over time. However, repeated measures MANOVA showed a large significant main effect (Cohen, 1988) of time on the cognitive domain of research competence, $F(5, 102) = 19.57$, $p < 0.001$, $\eta_p^2 = 0.490$. While the affective-motivational domain's abilities decreased, the cognitive domain's abilities increased (see Table 5).

Moreover, we examined the effects of differently structured learning environments on pre-service biology teachers' basic psychological need satisfaction and frustration (scale: BPNSFS; H_3 and H_4). In the mid-term survey, the MANOVA showed no statistically significant differences between the treatments in any of the four subscales, $F(4, 103) = 1.28$, $p = 0.282$, $\eta_p^2 = 0.047$ (see Table 6). This also applies to the posttest, $F(4, 103) = 1.04$, $p = 0.389$, $\eta_p^2 = 0.039$ (see Table 6).

Regarding the oneway *t*-tests for the affective-motivational domain of research competence, results show no significant differences from the scale average for finding joy in conducting research in the pre- and posttest. We further found that the subscales value-related interest in research (pretest Cohen's $d = 0.62$; posttest Cohen's $d = 0.75$) and perceived benefits of research for practice (pretest Cohen's $d = 0.53$; posttest Cohen's $d = 0.58$) were significantly higher than the scale average in the pre- and posttest with a medium effect (see Table 7).

Regarding the oneway *t*-tests for the cognitive domain of research competence we found that the subscales skills in reflecting on research finding (pretest Cohen's $d = 0.68$; posttest Cohen's $d = 0.65$) and communication skills (pretest Cohen's $d = 0.77$; posttest Cohen's $d = 0.76$) were significantly higher than the scale average in the pre- and posttest with a medium effect. For the subscale content knowledge, we found significantly lower values than the scale average in the pretest with a medium effect (Cohen's $d = 0.64$), but no difference from the scale average in the posttest. Regarding the subscales skills in reviewing the state of research and methodological skills, no significant differences from the scale average were found in the pretest, whereas significant differences occurred in the posttest. In the posttest, the values were significantly higher than the scale average with a medium effect (skills in reviewing the state of research: Cohen's $d = 0.79$; methodological skills: Cohen's $d = 0.68$; see Table 8).

5. Discussion

In our study, we aimed to investigate whether differently structured learning environments affect the development of research competence in pre-service biology teachers (H_1 and H_2). Regarding the preconditions for developing research competence, we found that the degree of structure did not impact the pre-service teachers'

TABLE 1 List of scales used with sample item and Cronbach's alpha (α) of pretest and posttest regarding affective-motivational domain of research competence.

Subscale (number of items)	Time	Example	α
Finding joy in conducting research (11)	Pretest Posttest	I enjoy developing an own research question.	0.88 0.91
Value-related interest in research (6)	Pretest Posttest	Research in biology education contributes to solving current problems relevant to schools.	0.77 0.86
Perceived benefits of research for practice (6)	Pretest Posttest	Extensive scientific knowledge is important for coping with everyday school life.	0.66 0.77

TABLE 2 List of scales used with sample item and Cronbach's alpha (α) of pretest and posttest regarding cognitive domain of research competence.

Subscale (number of items)	Time	Example	α
Skills in reviewing the state of research (4)	Pretest Posttest	I know how and where to target a search of the state of research regarding biology education.	0.85 0.88
Methodological skills (7)	Pretest Posttest	I am able to plan a research process.	0.86 0.89
Skills in reflecting on research findings (5)	Pretest Posttest	I am able to adequately interpret my own research findings by relating them to key theories in biology education.	0.87 0.88
Communication skills (4)	Pretest Posttest	I can write up research findings in accordance with the current conventions in biology education.	0.77 0.81
Content knowledge (8)	Pretest Posttest	I have a good overview of the main (current) research findings in biology education.	0.87 0.89

TABLE 3 List of scales used with sample item and Cronbach's alpha (α) of mid-term survey and posttest regarding BPNSFS.

Subscale (number of items)	Time	Example	α
Autonomy satisfaction (4)	Mid-term Posttest	I feel a sense of choice and freedom in studying the online modules.	0.73 0.74
Autonomy frustration (4)	Mid-term Posttest	Most of the things in studying the online modules feel like "I have to."	0.84 0.86
Competence satisfaction (4)	Mid-term Posttest	I feel confident that I can do things regarding the online modules well.	0.84 0.89
Competence frustration (4)	Mid-term Posttest	I have serious doubts about whether I can do things regarding the online modules well.	0.84 0.82

TABLE 4 Means, standard deviations, and the results of the univariate analyses of variance (F- and p-values) concerning the subscales of the affective-motivational domain of research competence (main effect of time).

Subscales	Univariate			Pretest		Posttest	
	F^a	p	η_p^2	M	SD	M	SD
Finding joy in conducting research	8.64	0.004	0.076	3.14	0.75	2.99	0.81
Value-related interest in research	7.49	0.007	0.067	3.52	0.62	3.37	0.75
Perceived benefits of research for practice	8.58	0.004	0.076	3.63	0.53	3.48	0.58

[a]Univariate $df = 1, 105$. $N = 107$.

perceived competence or autonomy in both the satisfaction and frustration scales (H_3 and H_4). We assumed that the content-based questions between the sequences of the online modules could provide additional guidance but might also be perceived as control, thereby affecting the experience of competence positively and that one of autonomy negatively (see Jang et al., 2010; Eckes et al., 2018). Such effects cannot be found in our data. Perceiving competence is the result of expressing and expanding one's competencies in interacting with the environment (see Ryan and Deci, 2017). It might be that the online modules did not, or only to a small degree, allow such interaction. Furthermore, it could be that the pre-service teachers in the restrictive structured group experienced the structure as a kind of control and not as guidance in their learning process. However, this effect is rather unlikely, considering that the values for competence

TABLE 5 Means, standard deviations, and the results of the univariate analyses of variance (*F*- and *p*-values) concerning the subscales of the cognitive domain of research competence (main effect of time).

Subscales	Univariate			Pretest		Posttest	
	F^a	*p*	η_p^2	*M*	*SD*	*M*	*SD*
Skills in reviewing the state of research	51.82	< 0.001	0.328	2.98	0.84	3.53	0.79
Methodological skills	17.65	< 0.001	0.143	3.13	0.65	3.41	0.68
Skills in reflecting on research findings	7.99	0.006	0.070	3.32	0.68	3.52	0.65
Communication skills	7.73	0.006	0.068	3.42	0.77	3.63	0.76
Content knowledge	91.12	< 0.001	0.462	2.20	0.64	2.96	0.73

[a]Univariate $df = 1, 106$. $N = 108$.

TABLE 6 Means and standard deviations of the subscales of the BPNSFS in the middle (mid-term survey) and at the end of the course (posttest) for each treatment.

Subscales	Mid-term				Posttest			
	Non-restrictive structured		Restrictive structured		Non-restrictive structured		Restrictive structured	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Autonomy satisfaction	2.25	0.74	2.21	0.71	2.31	0.73	2.19	0.74
Autonomy frustration	3.78	0.69	3.73	0.83	3.68	0.90	3.66	1.01
Competence satisfaction	3.05	0.83	3.27	0.72	3.16	0.85	3.30	0.79
Competence frustration	2.72	0.85	2.37	0.81	2.52	0.90	2.23	0.75

Non-restrictive structured: $n = 56$; Restrictive structured: $n = 52$.

TABLE 7 Results of tests for significant deviation of the mean values from the scale average (M=3) of the subscales of the affective-motivational domain of research competence.

Subscales	Pretest				Posttest			
	M	*SD*	*t*(107)	*p*	*M*	*SD*	*t*(107)	*p*
Finding joy in conducting research	3.14	0.75	1.98	0.100	2.99	0.81	−0.16	0.872
Value-related interest in research	3.52	0.62	8.83	0.006	3.37	0.75	5.16	0.006
Perceived benefits of research for practice	3.63	0.53	12.55	0.006	3.48	0.58	8.69	0.006

TABLE 8 Results of tests for significant deviation of the mean values from the scale average (M=3) of the subscales of the cognitive domain of research competence.

Subscales	Pretest				Posttest			
	M	*SD*	*t*(107)	*p*	*M*	*SD*	*t*(107)	*p*
Skills in reviewing the state of research	2.98	0.84	−0.29	>0.999	3.53	0.79	6.93	0.010
Methodological skills	3.13	0.65	2.02	0.138	3.41	0.68	6.25	0.010
Skills in reflecting on research findings	3.32	0.68	4.96	0.010	3.52	0.65	8.26	0.010
Communication skills	3.42	0.77	5.68	0.010	3.63	0.76	8.73	0.010
Content knowledge	2.20	0.64	−13.14	0.010	2.96	0.73	−0.52	>0.999

satisfaction in both groups studied were moderate (see Table 6). These values indicate that the pre-service teachers in both groups perceived themselves as moderately competent in dealing with the content what should be highlighted positively.

A possible reason why no effects were detected on autonomy satisfaction and frustration is that the needs for competence and autonomy are mutually dependent (Krapp, 2005; Ryan and Deci, 2017). If no effects are found on one scale, no effects can be expected on the other scale. This can be explained as follows: To express and expand their competencies, individuals need autonomy (Krapp, 2005; Ryan and Deci, 2017). At the same time, autonomy is only needed if the individual possesses corresponding competencies (Krapp, 2005; Ryan and Deci, 2017). In our study, one might have expected that the pre-service teachers in the non-restrictive structured environment express a higher perception of autonomy since they had choices about their learning process. Apparently, the provided choice was not

perceived as meaningful (see Katz and Assor, 2007). This might stem from the fact that the choice was merely whether and when the pre-service teachers wanted to learn the content and whether they wanted to test themselves between the sequences of the online modules. Thus, the pre-service teachers were not allowed to choose what they wanted to learn; in addition, they had to learn the content anyway for the examination at the end of the semester, which took place shortly after our last survey. At this point, the pre-service teachers may experience themselves just as competent as the pre-service teachers in the restrictive structured group since they no longer had a choice to postpone learning the content. The decreasing abilities in the affective-motivational and the increasing ones in the cognitive domain lend credence to this assumption. To design meaningful choices, the pre-service teachers should have been given freedom of choice regarding the task content or difficulty.

Regarding the development of research competence (H_1 and H_2), our study shows that the pre-service teachers' self-assessed abilities in the affective-motivational domain decrease over time and increase in the cognitive domain (regardless of the treatment). Nevertheless, participants in our study rate their abilities in the affective-motivational domain as moderate in the pre- and posttest. This result is consistent with Schumacher (2020) findings on the affective-motivational domain in another sample of pre-service teachers. It should be emphasized that the pre-service biology teachers rated themselves significantly higher in the two subscales of the affective-motivational domain (value-related interest in research and perceived benefits of research for practice) before and after the intervention compared to the scale average. The decline of self-assessed abilities in the affective-motivational domain may be due to the perception that research is difficult to plan, complex, and open-ended. Pre-service teachers learn that the validity of results can be low and that results are (sometimes) only preliminary (Wessels et al., 2020). Moreover, the scientific work and statistical requirements present potential hurdles for pre-service teachers. Overcoming these hurdles could be complicated when having a lack of research methodological competence (Braguglia and Jackson, 2012; Riewerts et al., 2018), low research-related motivation (Fichten, 2010b), and a low interest in research (Vittengl et al., 2004; Braguglia and Jackson, 2012). Low motivation in dealing with research-related topics and low interest in these topics might stem from students perceiving the content of having little relevance to their future professional path (see Ryan and Deci, 2017). The increase in self-assessed abilities in the cognitive domain (regardless of treatment) indicates that the pre-service teachers learned about research. This can be underscored by the oneway *t*-test that we calculated for the content knowledge subscale. In the pretest the pre-service teachers rated themselves significantly lower compared to the scale average, but this was not significant in the posttest. This is also confirmed by the results of the oneway *t*-test for the subscales skills in reviewing the state of research and methodological skills. In both subscales, the pre-service teachers rated themselves significantly higher in the posttest compared to the scale average.

6. Limitations and implications

Although our findings provide important starting points for further research and teaching, we must address our study's limitations. A first limitation of this study is that the test instrument assessing research competence was based on the pre-service teachers' self-assessment, so bias may have occurred in their perceptions of their abilities. In future studies, a more objective measure, such as a knowledge performance test (pre- and posttest), should be implemented to check the adequacy of the pre-service teachers' self-perception. Moreover, it should be taken into account that the posttest does not take place immediately before an exam in order to avoid that the exam preparation affects the findings.

Second, this study did not assess whether the pre-service biology teachers perceived the given freedom of choice as such, that is, whether the choice was meaningful for the pre-service biology teachers. Therefore, measures to assess the perceived meaningfulness of choices might be integrated in future research (Meyer-Ahrens and Wilde, 2013). Moreover, freedom of choice could be operationalized differently in future studies. Freedom of choice can be given by choosing the context in which the content is taught, for example (practical vs. theoretical or the field of research) or by choosing the difficulty level of the tasks to assess one's knowledge. With a special focus on structuring the learning environment and, consequently, the perception of competence, integrating other learning aids, such as prompts, could also be considered.

Last, recording the use of the online modules, for example, the time the pre-service teachers spent dealing with them, would have helped interpret our results more precisely. In the non-restrictive structured group, it might be that the online modules were only clicked through, and the interim questions were not used for learning/self-monitoring.

7. Conclusion and contribution to the teaching and learning

In both treatments, the affective-motivational domain of research competence was rated lower and the cognitive domain higher in the posttest. This could speak for the fact, that the online modules have affected the cognitive domain positively. However, no differences between the treatments were found. Differences could not be found for the pre-service teachers' need satisfaction and frustration either. However, the moderate values that we found for the pre-service teachers' competence satisfaction indicate that the pre-service teachers in both groups (regardless of restriction) perceived themselves to be moderately competent in dealing with the content.

For teacher training, it can be summarized that (pre-service) biology teachers should be sensitized to the relevance of statistical knowledge and research competence, as these can be useful for their (later) professional practice (see Braguglia and Jackson, 2012). Research competence can, for example, offer innovative perspectives for the further development of the educational system or enrich personal development (Albert, 2016) and contributes to the acquisition or sustainability of professionalism (see Fichten, 2010a; Altrichter and Soukup-Altrichter, 2014; Albert, 2016). One way to gain this competence might be for pre-service teachers conduct own research or carry out relevant elements of a research process. In this way, they might experience the relevance and usefulness for their later professional practice. In this way, perceived competence may be fostered. Moreover, practical and specific content (relevant to schools) can lead to increased enjoyment of research (see Wessels et al., 2020). Teacher education might therefore emphasize the

practical value of research competence, as this can also increase skills in the affective-motivational domain (see Wessels et al., 2020).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics committee of Bielefeld University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

JG and KS supervised the project. FS, JG, KS, and LFG developed the conception and design of the study. JG, LFG, and LG collected the data. LG wrote the manuscript and made the statistical analyses with the support of FS, JG, and NG. FS, JG, KS, LFG, and NG have proofread the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The sizzle and fizzle of teacher evaluation in the United States and the selective use of research evidence

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In 2009, the United States funded the largest federal educational reform effort in the nation's history. Referred to as *Race to the Top* (RTTT), a cornerstone of this effort was the high-stakes evaluation of all teachers, with a significant emphasis on the use of highly researched statistical methods that ascribed changes in student test scores to a teacher's quality. The widespread endorsement of these policies across a broad range of the political spectrum was based on a theory of action that faced technical, organizational, and political challenges. Enthusiasm for these evaluation efforts was substantially muted in a mere 5 years. Among a number of factors, we argue that the framing of the problem together with privileging particular lines of research and voices, as well as the lack of consideration of other frames and attention to other research and voices, resulted in an evidence base that was wholly insufficient to justify the large-scale policy changes that were enacted.

KEYWORDS

teacher evaluation, assessment, evidence use, teacher quality, policy formation

1. Introduction

Teacher evaluation in the United States has been an important K-12 education policy issue for the past 25 years. In this article, we will describe the evolution and design of national in-service teacher evaluation policies as part of a major educational reform initiative, how policies were implemented, and why many of them failed. We argue that these policies were doomed from the start for many reasons, including weak theories of action as a result of inadequate attention to research and critical stakeholders, weak measures to explain causal attribution, organizational issues, and lack of consideration to how teacher evaluation systems affect schools in marginalized communities.

As part of the federal response to an economic crisis, the U. S. Congress enacted the American Recovery and Reinvestment Act of 2009, a massive and unprecedented stimulus package of over $800B (Congressional Budget Office, 2012). Included in this package was an equally unprecedented $4.35B for educational reform, known as *Race to the Top* (RTTT). The most important consideration in states' applications was their plan for implementing the evaluation of educators, including both teachers and principals.

These evaluation systems represented a change in how teacher evaluations in the United States were to be conducted, as they focused, in large part, on how individual teachers contributed to student learning as measured by standardized test scores and other types of assessment measures. While evaluation systems also included measures like classroom

observations, this focus on using student learning measures to evaluate teachers was an effort relatively unique to the United States (Williams and Engel, 2012). The push for these systems was strongly bipartisan, motivated by concerns about student learning as well as very pointed critiques of teachers and, particularly, teacher unions (see Katz and Rose, 2013; Maranto et al., 2016). This bipartisan agreement also led to the charter school boom of the 2000s.

The enthusiasm for teacher evaluation was fully shared by policy leaders across the country, as they argued that evaluation would be a powerful tool to aid teachers in their ability to support their students. The two largest funders of these efforts were the U. S. Department of Education and the Bill and Melinda Gates Foundation. Arne Duncan, U. S. Secretary of Education at the time, said, "Teachers support evaluations based on multiple measures: student growth, classroom observation and feedback from peers and parents" (Duncan, 2009). Bill Gates, speaking for his Foundation, stated, "Students deserve great teachers. And teachers deserve the support they need to become great" (Gates and Gates, 2018).

Though RTTT marked a major policy shift in American education, its genesis was long in the making. For some 40 years, policymakers had consistently focused on the comparatively poor academic performance of U. S. students as measured by national and international assessments. The most recent policy iteration was based on a broad body of research evidence that was used to justify the need to improve teaching quality, generally, and the need to reform teacher evaluation practices, specifically. Indeed, it was virtually certain that research papers and policy statements alike would begin their arguments by pointing out that teachers were the most important school-based factor in determining students' academic outcomes. This research was used to support the implementation of teacher evaluation policies in 40+ states by 2013. The fervor for these policies represented the confluence of the promise that teachers were the single most important factor in determining student outcomes (the qualifier of *school-based* was often lost in policy discussions) and the promise of measurement technologies that could identify teacher quality with appropriate precision. The sizzle was palpable.

The enthusiasm for teacher evaluation and its related policies was short-lived. By 2015, the federal government had abandoned teacher evaluation as a requirement for federal funding. Foundations that had been major supporters of these initiatives shifted their attention elsewhere. While teacher evaluation did not disappear completely, many states abandoned the use of student growth scores as a required component of teacher evaluations.

Research over the last number of years has revealed the many ways in which the policies did not live up to their promise. For the most part, the goal of improving student achievement was not realized. Constituent measures were shown to be unreliable and biased. Inadequate attention was given to implementation and organizational issues and their impact on students, teachers, and schools in marginalized communities. Educators, in general, soon became vocal opponents of the policies.

In this paper, we argue that a critical reason for the failure of RTTT to realize its promise was that the research base that was used to support the theory of action for teacher evaluation was, from its inception, inadequate to support ambitious policy goals. We consider the arc of history that led to teacher evaluation as a core educational reform policy, the research that motivated the policy, the limits of that research, and the resulting outcomes of the policy. We use this to highlight that using research evidence to create policy is limited to the extent that the research is not sufficient to address the complexity of the problem it is trying to address.

2. Setting the stage for RTTT – the role of federal policy in educational reform

Historically, educational policy in the United States was a responsibility of individual states and local districts. The establishment of a cabinet-level Department of Education did not occur until 1980 and was politically contested as usurping states' responsibilities (Stallings, 2002). During the 1980s, several landmark reports that laid the groundwork for RTTT (National Commission on Excellence in Education, 1983; Carnegie Forum on Education and the Economy, 1986) were issued. These reports were authored by commissions that consisted of leaders in education, government, and business and came to a set of conclusions, largely based on test score performance and international comparisons, that were at the core of reform efforts for the next 40 years:

- Public schools are bastions of mediocrity, and students are underachieving.
- This mediocrity has direct implications for the nation's economic well-being.
- The federal government has a role in improving our nation's education.

These reports led to two generations of educational reform efforts characterized by various initiatives to: specify what both students and teachers needed to know and be able to do in the form of standards; increase testing of student achievement; increase testing of teachers for licensure and certification; and implement a range of accountability efforts to hold states and schools accountable for educational performance. These policies were embodied in landmark legislation such as the *Improving America's Schools Act* (IASA) of 1994 and the *No Child Left Behind Act of 2001* (NCLB; officially, the *Elementary and Secondary Education Act* [ESEA]).

NCLB was particularly interesting in that it called for schools to make adequate yearly progress (AYP) on achievement scores in such a way that all students would be 100% proficient 13 years later (2013–14). It became clear that states were trying to navigate the policy by setting lower standards for proficiency, setting minimal growth targets early in the AYP trajectory, and seeking exceptions. All of this had significant implications for how schools were judged and for which schools were labeled as "failing" (Polikoff et al., 2014; Davidson et al., 2015). By most metrics, NCLB did not lead to meaningful gains for students, and international comparisons remained troubling for policymakers (e.g., Dee and Jacob, 2011; Lee and Reeves, 2012). The ineffectiveness of school-based accountability led policymakers to shift their focus to teachers as the target of educational reform. Several lines of research laid the foundation for what was to become the most far-reaching policy initiative focused on teacher evaluation, both globally and historically.

3. The research basis and process for teacher evaluation

Gitomer and Marshall (in press) reviewed key research efforts that provided the justification for the teacher evaluation policies embedded in the RTTT program. The first line of research focused on *teacher effects*, a statistical determination in which the outcome was changes in student year-to-year achievement on annual standardized achievement scores, and the target input(s) were the teachers who taught each student. Using a range of regression-based approaches (Nye et al., 2004), researchers identified teachers as the single most important school-based factor associated with student outcomes. These studies attempted to control for student and school characteristics in order to obtain unconfounded estimates of teacher effects, although such efforts are imperfect in controlling for all non-teacher effects (Lockwood and Castellano, 2017).

For many years, researchers had tried to identify teacher characteristics that were associated with teacher effects on student learning. Looking at metrics commonly used for teacher compensation, such as years of service, degree attainment, and academic credits, researchers consistently found limited associations with student achievement (e.g., Kane et al., 2008; Harris and Sass, 2011). Though student experience was initially related to student outcomes, that relationship disappeared after the first 5 years of practice (Clotfelter et al., 2010). Similarly, professional certification status and domain-specific coursework had minimal relationships with student achievement growth (Wayne and Youngs, 2003; Goe, 2007).

If policymakers could not rely on teacher inputs as a measure of teacher quality, research also makes clear that traditional teacher evaluation practices did not lead to very credible or informative reports about teacher practice. Though teacher evaluation was long embedded in educational systems, Weisberg et al. (2009) reported that teacher evaluation systems did not identify or remove weak teachers and provided inflated and non-differentiated reports of teacher quality.

The inability to find consistent relationships of teacher inputs to student outcomes and the limited utility of evaluations led policymakers and researchers to turn their attention to other directions. Specifically, they were intrigued with the statistical approaches being promoted by prominent statistician, William Sanders, who had developed an approach known as *Value-Added Modeling* (VAM; Sanders and Horn, 1994). VAM used multiple years of prior test scores for each student to estimate the contribution of a specific teacher to the annual growth of all the students in that teacher's classroom. Aggregate VAM scores are standardized so that all teachers in a particular cohort (e.g., a school district or state) are compared in terms of a standardized score relative to the mean score (0) of the cohort. The promise and allure of Sanders' VAM was that it was designed to address potential issues of fairness by using prior student achievement as a control to encompass all potential factors that might influence student achievement. Other VAM models that largely followed Sanders' approach also emerged, but these models varied on how they treated covariates and other model specifics (see Braun, 2005; Harris, 2011, for basic introductions to VAM).

Policymakers also became interested in whether compensation systems could be used to improve the quality of teaching. Pay-for-performance systems were developed in a number of states and districts. The Tennessee system, using Sanders' VAM models, provided additional compensation to teachers with high VAM scores (Sanders and Horn, 1994). Denver public schools developed a more comprehensive compensation model that included annual evaluations and working in high-needs schools.

Finally, research that examined the relationship of teacher practice to student outcomes had also been conducted. Studies examined the effects of particular pedagogical strategies (e.g., Murnane and Phillips, 1981) as well as the relationship of teachers' scores on classroom observation protocols to the achievement growth of their students (Milanowski, 2004; Kane et al., 2010).

3.1. The interplay of research and teacher evaluation policy

The convergence of the aforementioned research, and the evidence it produced, was used to shape the teacher evaluation policy that was central to RTTT. To understand why and how these particular lines of research were used, we borrow from two theoretical perspectives—one that considers policy formation in general terms (McDonnell and Weatherford, 2020) and one that considers the sociopolitical context of teaching from a critical race perspective (Nasir et al., 2016). Together, these perspectives help us better understand why certain research evidence was so salient in policy formation, why other research was not attended to, and, ultimately, why the research that guided policy was insufficient to adequately satisfy the ambitious policy goals of RTTT.

McDonnell and Weatherford (2020) described the strategic use of evidence by policymakers to achieve political objectives given a set of goals and beliefs about how best to achieve those goals. In that context, they argued that it was important to understand *what* evidence is given attention as well as *who* is engaged in the production and use of evidence. The *who* includes:

- *researchers*: those who produce original research;
- *policy entrepreneurs*: those who have a strong policy position and marshal research and other evidence to support that position;
- *translators and disseminators*: those people and organizations that have a goal of identifying and communicating high-quality research to policymakers;
- *advocates*: those who represent particular policy positions and put priority on the ends they are trying to achieve; and
- *hybrids*: those who have an advocacy position and also try to operate as translators and disseminators.

Nasir et al. (2016) argued that, in order to have a comprehensive understanding of teaching, one must take into account the multi-level context in which teaching is situated. Yet, research on teaching and the resulting policies have often ignored such complexity. They further contended that the research and policies over the recent past have been guided by particular kinds of framing of the problems to be addressed.

In Nasir et al.'s (2016) framework, there are three levels of context that need to be addressed in any full analysis of teaching. First, there are broad economic and policy macro-trends that include: significant and growing economic inequality; the paradox of increasing racial and ethnic diversity in American schools combined with increasing social class segregation in society and schools; and marketized neoliberalism

(bringing free-market principles to social issues). The second level includes ways that schools and districts adapt to these broader economic and policy macro-trends. The third level focuses on how these other levels influence the nature of instruction and learning environments that students, and particularly marginalized students, encounter. The focus on accountability testing, for example, often results in low-skill test preparation teaching for marginalized students.

Nasir et al. (2016) also adopted Hand et al.'s (2012) conception of operating frames "as a way to examine and reorganize race and power within learning environments. Power plays out in everyday social interaction as individuals become attuned to, coordinate and mobilize around *frames* they engage in during moments of interaction" (Hand et al., 2012, p. 251). The first frame they identify is one of *colorblindness*, a view that "minimizes the existence or consequentiality of race and views policy solutions as best when universal in nature" (Nasir et al., 2016, p. 354). A second frame is *meritocracy*, one that ascribes accomplishment as solely due to the actions of individuals and "allows policy makers to act without acknowledging the systemic nature of racial disparities and diverts attention to the choices of individual actors" (Nasir et al., 2016, p. 353). The final frame, also located in their multi-level hierarchy is *neoliberalism*, which has led to the marketization of schooling and "emanates from three decades of policy that positioned the private sector to be superior to the public sector in providing more efficient social services" (Nasir et al., 2016, p. 355).

Indeed, accountability efforts, particularly those involving the federal government, have engendered significant debate about their role in supporting education as a public good. While the dominant policy argument has long been that accountability efforts exist to improve education and support the enterprise as a public good, others have been far more critical. They have taken more critical stances, such as those embodied by Nasir et al. (2016), to argue for a much more nuanced understanding of how accountability efforts have also served to diminish education as a public good (see Anagnostopoulos et al., 2013).

The research that guided teacher evaluation policy, and how it was conducted and by whom, can help us make sense of how the policy took shape, why the policy was problematic in its uptake by states and districts, and, ultimately, why the initiatives were largely abandoned or dramatically reduced in scope. Using the frameworks provided by both Nasir et al. (2016) and McDonnell and Weatherford (2020), we highlight key aspects of research development and use.

The guiding principles of teacher evaluation grew out of the dominant framing noted by Nasir et al. (2016) that has directed policy perspectives on education for the last several decades. Embedded within this work was the meritocratic perspective that teachers are the primary agent associated with student growth and that their relative success is deserved and an outcome of choices and actions by individuals (teachers and administrators). The VAM models were proffered as ways of overcoming the influence of any contextual factors and, thus, were designed to be pure measures of a teacher's contribution. By controlling for factors such as race and socio-economic status, these models also subscribed to the framing of colorblindness—that evaluation scores are fair estimates of a teacher's quality regardless of a teacher's (or their students') background. Neo-liberal framing was evident throughout the system in hiring and retention policies as well as in the various pay-for-performance schemes that were linked to teacher evaluation.

These framings had important consequences for the kinds of research that was done, who did the research, and how the work was supported. Research on teacher effects was almost always guided by researchers (e.g., Kane et al., 2008; Rockoff et al., 2011) who adopted the three frames identified by Nasir et al. (2016). These researchers, often educational economists, were focused on identifying the "effects" of teaching by adopting methods that were designed to control for contextual effects rather than trying to understand their influence.

As McDonnell and Weatherford (2020) argued, there are multiple actors involved in how research shapes policy and vice versa. The emergence of teacher evaluation policy, including its central features, represented the confluence of a strategic use of evidence to achieve a particular set of objectives. By the time RTTT was developed, the lines between researchers, policy entrepreneurs, and translators and disseminators/advocates had become highly blurred (see DeBray and Houck, 2011). Reckhow and colleagues described how think tanks, foundations, government policymakers, and researchers set a research agenda and policy coordinated to elevate teacher evaluation (see Reckhow and Tompkins-Stange, 2018; Reckhow et al., 2021). All of these players, likewise, were guided by the three frames identified by Nasir et al. (2016). The Bill and Melinda Gates Foundation and the U. S. Department of Education were the two primary drivers of this work. The Gates Foundation funded research, supported intensive district-level reform efforts, provided advocacy, and worked with the U. S. Department of Education. The U. S. Department of Education, through the RTTT program as well as through funding from the Institute of Education Sciences (IES), not only led the policy initiative but was instrumental in leading advocacy efforts (e.g., Duncan, 2009) and funding programs of research that were supportive of the endorsed teacher evaluation efforts. RTTT was driven by a set of core beliefs about public schools, teachers and teacher unions, neo-liberal approaches to the marketization of education, and concerns about academic performance by students in marginalized communities, along with the emergence of research that offered potential solutions.

3.2. The theory of action and implementation plan guiding teacher evaluation policy

In 2009, the U. S. Department of Education announced the RTTT competition and invited states to compete for funds to support educational reform (U. S. Department of Education, 2009). The initiative was based on a theory of action that improved teacher quality would lead to improved student learning. Theories of action specify a cause-and-effect relationship between a policy intervention and a set of desired outcomes (e.g., McDonald, 2009). As articulated by Gitomer and Bell (2013), teacher evaluation was championed as improving teacher quality through four complementary drivers. First, teacher evaluation served an accountability purpose in which teachers (and principals) could be held accountable for student performance. Second, evaluation could support what came to be called *the strategic use of human capital*. In a market-based approach, evaluation results could be used to guide a system of incentives and disincentives to manage the supply of teachers by increasing the supply of effective teachers and removing less effective teachers (e.g., Gordon et al., 2006; Heneman et al., 2006). A third purpose was to improve individual teacher and institutional capacity by including direct measures of classroom instructional quality that could be used as a tool for providing feedback to teachers (e.g., Borko, 2004; Johnson et al., 2004;

Kardos and Johnson, 2007). Finally, teacher evaluation could be used to support evidence-based instructional policy by determining the efficacy of particular policies and interventions (e.g., Rowan et al., 2004, 2009; Rowan and Correnti, 2009).

There were two components related to teacher evaluation that all proposals needed to satisfy:

1. building data systems that measure student growth and success and inform teachers and principals about how they can improve instruction; and
2. recruiting, developing, rewarding, and retaining effective teachers and principals, especially where they are needed most.

Specific criteria that had to be met included:

1. measuring student growth for every student;
2. creating evaluation systems that:
    a. differentiated effectiveness using multiple rating categories and treated student growth as a significant factor; and
    b. were designed and developed with educator involvement;
3. conducting annual teacher evaluations that provided feedback, including information on student growth from their students and classes; and
4. using teacher evaluations to inform decisions regarding:
    a. coaching and development;
    b. compensation, promotion, retention, and advancement;
    c. tenure; and
    d. removal.

By 2011, 19 states received RTTT funding. However, far more states and localities (42 in total) adopted these policies in order to obtain waivers from the NCLB mandates that were still in effect (Gitomer and Marshall, in press). While states, and often, districts within states, varied in how they developed the specifics of their systems, Gitomer and Marshall (in press) described the key features of all systems, their technical limitations, and how they varied across and within states.

One requirement for determining any teacher growth measure is the necessity of defining which students' growth scores should be used in determining a teacher's value-added. The realities of schooling made this a non-trivial problem, and the solutions varied greatly. For example, how should students with high levels of absenteeism be treated? If students move between schools multiple times across the year, how should they be treated in the VAM models? What about situations in which multiple teachers are responsible for the students in a particular classroom (e.g., special education)? Of course, less stable student populations are typically associated with schools with high proportions of minoritized and economically insecure students (see Everson, 2017).

A second issue concerned the inclusion of particular test score results for each teacher. In some models, teachers had evaluation scores that included test results for which they ostensibly had no teaching responsibility.

Third, states had to decide which measures contributed to an evaluation system. Almost all states included a student growth measure and a classroom observation score. But other measures, including student learning objectives (SLOs), principal rating, overall achievement levels of grades and/or schools, and student surveys, were also used in some systems.

Fourth, states needed to decide how the scores from different measures were aggregated for a final evaluation score. Aggregation methods could be compensatory, in which each component is weighted in a linear combination of scores, and a total score is used to determine the appropriate evaluation category for an individual. Another option was to use a conjunctive model, in which a minimum score is required for each of the constituent measures. How scores were weighted in the overall model depended on how highly particular measures were valued relative to others, as well as how much variation was associated with particular measures. Measures that have scores that vary more across individuals will have a greater influence on overall evaluative judgments than measures on which most individuals receive the same score, even if the latter measures are assigned nominal weights.

Fifth, states differed in both the consequences and supports given for particular evaluation scores. Typically, an ineffective rating was associated with some type of probationary status for the first year, which then would require some type of additional professional development and support.

Sixth, measures, particularly those associated with classroom observations, required some type of training of principals and other administrators. While researchers have given great attention to observer training, calibration, and overall quality control of scores (National Research Council, 2008; Bell et al., 2014), in practice, these procedures were often compromised as school districts did not have the time or resources to undertake the kinds of procedures that had been used to validate measures from research studies.

4. Measures and challenges

While states adopted a large number of measures for their teacher evaluation systems, the three measures that were most ubiquitous and most prominent across systems are discussed here. Each of these measures was used to support inferences about a teacher's quality. However, each of these measures had significant technical issues that challenged the validity of using them for such a consequential process.

4.1. Student growth measures

RTTT advocated the use of growth measures to overcome inherent problems associated with making any relative judgments of teachers based on their students' achievement status by separating the effects of teachers from other factors such as demographics, resources, and student prior achievement. The basic logic was that any attributions to teacher effectiveness must be made with respect to the relative year-to-year growth in student achievement. A broad range of growth models were used, including different versions of VAM, as well as a related method, *Student Growth Percentiles* (SGP; Betebenner, 2009). All growth models required multiple years of student test data linked to individual teachers.

Research on growth models made clear that precise, causal estimates of a teacher's contribution to student learning were very fragile. Rowan and Raudenbush (2016) provided a detailed overview of the challenges in using growth models to make high-stakes

decisions about teachers. Reardon and Raudenbush (2009) explained how the fundamental statistical assumptions that are foundational to these models can never be satisfied. Studies have revealed how relative estimates of teacher quality can shift dramatically because of using different estimation techniques (Goldhaber and Theobold, 2013) or different achievement measures (Lockwood et al., 2007; Grossman et al., 2014). Multiple studies have shown that VAM estimates can be statistically biased toward classrooms that have students with higher levels of prior achievement, a situation that growth models were supposed to overcome (Rothstein, 2009, 2017; Raudenbush, 2013). Researchers also found that VAM scores in one testing domain (e.g., reading) could be influenced by the quality of teaching in another domain (e.g., mathematics) (Koedel, 2009).

Scholars in measurement and statistics issued several statements to caution about the use of these models for high-stakes decisions. Baker et al. (2010) produced a consensus statement of several leading educational scholars that cautioned the use of these measures and also highlighted potential unintended consequences, including discouraging teachers from wanting to work in schools with students who had the most academic needs. The American Statistical Association (2014) also released a statement, recognizing the value of VAM to help understand the relationship of different factors to student outcomes when results are aggregated across teachers but also cautioning against using these models to make strong causal statements about individual teachers. Other cautionary and critical statements were made by the National Association of Secondary School Principals (NASSP) in 2015 (see https://www.nassp.org/top-issues-in-education/position-statements/ for the most recent version, updated in 2019; National Association of Secondary School Principals, 2019) and the American Educational Research Association (American Educational Research Association Council, 2015). Several lawsuits challenging the consequences of teacher evaluation efforts were also instituted (see Paige and Amrein-Beardsley, 2020).

4.2. Student learning objectives

As much as growth measures based on student achievement scores were central to this evaluation movement, the fact is that a very large proportion of teachers did not have testing data that would be appropriate for estimating student growth. Testing was only federally mandated, for example, in grades 3–8 mathematics and reading, meaning that teachers in earlier and later grades, as well as those who taught other subjects, would not have students who had multiple years of testing data to analyze. Certain states did, however, impose more encompassing testing requirements.

Thus, in order to address the legislative mandate that teacher evaluation needed to include a "student growth measure," most states adopted SLOs for teachers in non-tested subjects, but many states also used them for all teachers as a complementary measure of student growth. SLOs are a locally determined evaluation of teacher effectiveness by which measurable targets for student achievement are set following an analysis of baseline data. Essentially, SLOs include some prior to instruction measure of student understanding (pre-test) and a post-instruction measure or assessment. The extent to which those targets are met is then used to evaluate the teacher. Within this common definition, specific features of the SLO process have varied substantially (see Crouse et al., 2016).

An SLO consists of three components. The first is the population of students it covers—is the teacher evaluated on the basis of performance by all students in all classrooms and subjects taught by the teacher or just a subset (e.g., only mathematics or reading for an elementary teacher, only one section of a course for a secondary teacher)? The second component is the target of the SLO—do all teachers with the same teaching assignment in a school or district have the same target, or is greater variability part of the design? In addition, the meaningfulness of SLO-based scores is largely a function of the quality control procedures used in the implementation of the SLO process (Crouse et al., 2016).

The third component is the assessment to measure student learning. SLO assessments include locally generated measures as well as standardized, externally developed assessments. Often, classroom assessments such as portfolios or some type of performance assessment are used.

While little research about the quality of SLO measures was done, Crouse et al. (2016) described the inherent problems of using SLOs as a measure of student growth in teacher evaluations. They argued that the validity of such measures for evaluating and comparing teachers could not be justified because of the idiosyncratic nature of their design and implementation. They also pointed out that making causal attributions to a teacher was problematic in light of external factors such as district curriculum, outside tutoring, and student background characteristics that can influence student outcomes. Finally, the use of SLOs was highly variable across states and districts. In some cases, all teachers needed to have an SLO as part of their evaluation. In other instances, only those teachers who did not have standardized test-based growth scores were required to have SLOs. Because the distribution of scores for test-based growth models and SLOs tends to be different, the net effect is that overall evaluation scores could be lower for teachers who have growth estimates based entirely or, in part, on standardized tests as compared with those only having SLOs as their growth measure component.

4.3. Classroom observations

Structured observation protocols, originally designed as tools for professional development (e.g., Danielson, 2007; Pianta et al., 2008), soon became the object of study in research and a key component of teacher evaluation systems under RTTT. These protocols were created around particular views of teaching that drew on research and were organized along sets of cognitive, social, emotional, and classroom management dimensions of instructional quality.

The protocols adopted for teacher evaluation systems were designed to be used across grades and subject areas. Each protocol provided guidelines for how to observe a period of classroom instruction, how to code what was observed, and how to score instruction for the set of criteria that were described in the protocol's scoring rubric (see Bell et al., 2012).

Scores typically involved some form of aggregation of dimensional scores into a total lesson score as well as aggregation of scores across multiple lessons. The management of observations and recording and maintaining of data within school systems was often done with the assistance of commercial observation tools that were designed specifically to support teacher evaluation processes.

Research has shown the limitations of observation protocols in assuring precise and valid estimates of teacher quality. For one, many

factors, other than the quality of the instruction itself, can influence the scores for a particular observation, most especially the observers themselves. Research efforts have tried to moderate these sources of error through careful training and monitoring of observers, using multiple and different observers across multiple observations, and ensuring that there were no conflicts of interest between the observer and the observed that might bias scoring (see Bell et al., 2012, 2014).

As observation measures were used in evaluation systems, it became clear that findings from research studies did not generalize to practice settings. Observation scores in practice are uniformly higher than scores from research studies, for example. Scores in research studies that typically fell in the 2–3 range on 4-point scales fell between 3 and 4 when used in practice (see Sartain et al., 2010; Briggs et al., 2014).

Of course, conditions within practice settings were quite different as observers were not disinterested parties. They knew the teachers and worked with them as part of a professional staff (Harris et al., 2014; Kraft and Gilmour, 2017; Donaldson and Woulfin, 2018), and they gave higher scores for teachers they worked with than for teachers with whom they were not familiar (Ho and Kane, 2013). School administrators must conduct observations by statute, regardless of how well qualified they are to score. Typically, fewer observations were conducted in school evaluations than in research studies, and it was very rare for any system to include multiple observers.

It also became clear, in both research studies and studies of observation in practice, that personal characteristics of the teacher, and especially the students, affected observation scores. There have been consistent findings that teachers of students with weaker academic profiles are assigned lower observation scores (Gitomer et al., 2014; Campbell and Ronfeldt, 2018). In addition, Steinberg and Sartain (2021) found that observation scores of Black teachers were substantially lower than scores for White teachers and that those differences could be accounted for by the achievement levels of their students. Campbell and Ronfeldt (2018) found that male teachers tended to have lower than expected scores than female teachers and that scores were also lower than expected in classrooms with higher concentrations of Black, Latin*[1], male, and low-performing students, a result also found by Garrett and Steinberg (2015).

5. The fizzle of teacher evaluation policy – promises not kept

Despite the tremendous amount of resources, attention, and effort given to teacher evaluation, teacher evaluation had a very short shelf-life as a major educational reform policy. By 2015, the core idea of linking teacher evaluation to student outcomes was abandoned when the ESEA was reauthorized in the form of the *Every Student Succeeds Act* (ESSA, 2015):

> Nothing in this Act shall be construed to authorize or permit the Secretary … as a condition of approval of the State plan, or revisions or amendments to, the State plan, or approval of a waiver request submitted under section 8401, to … prescribe … 'any aspect or parameter of a teacher, principal, or other school leader evaluation system within a State or local educational agency; … indicators or specific measures of teacher, principal, or other school leader effectiveness or quality; (pp. 42–43)

ESSA reflected a change in the entire policy landscape, as teacher evaluation was no longer perceived as the key to improving America's schools. Actors like the Gates Foundation, which had played a major role in advocating for and influencing teacher evaluation policy, also relatively quickly moved in other directions. By 2018, the Foundation publicly acknowledged the modest impact their efforts had made (Gates and Gates, 2018). Other foundations that had been players in the teacher evaluation movement also switched priorities.

There certainly was a great deal of political pushback to the increasing federal role in public education, most especially with the Common Core curricular standards and associated assessments (Loveless, 2021). By 2015, the two cornerstones of education reform—ambitious standards and teacher evaluation—had gone from broad endorsement to policies that were increasingly shunned. Indeed, as the federal mandate disappeared, large numbers of states abandoned, or gave great flexibility to, the use of growth models built on student test scores (Close et al., 2020). Many states, however, continued to mandate some type of classroom observation.

Gitomer and Marshall (in press) reviewed evidence addressing the extent to which teacher evaluation policy efforts met the ambitious goals that were promised upon the launch of RTTT. While the results summarized in this section are representative of what happened across the country, there was variation in how systems were implemented and the kinds of results that were observed. The most notable exception to general findings was found in Washington D. C., which implemented a very well-resourced, comprehensive reform effort that resulted in significant changes to the district's schools (National Research Council, 2015; James and Wyckoff, 2020). The intensive, multi-faceted systemic approach of Washington D. C. stands in contrast to how teacher evaluation was conceptualized and operationalized in most settings.

5.1. The promise of identifying weak teachers

One goal of teacher evaluation was to differentiate teachers based on their effectiveness. However, Kraft and Gilmour (2017) and Stecher et al. (2018) found that evaluation score distributions were largely unchanged from the findings of Weisberg et al. (2009). Grissom and Loeb (2017) noted that principals would give higher scores in an accountability context than they would for professional development. Not surprisingly (see Rowan and Raudenbush, 2016), evaluators in professional contexts consider many factors aside from the performance itself in making ratings (Harris et al., 2014; Donaldson and Woulfin, 2018). Two explanations for the failure to identify weak teachers are (1) inconsistent training of evaluators (i.e.,

1 Latin* is a term that encompasses fluidity of social identities. The asterisk considers variation in self-identification among people of the Latin American diaspora and origin (Salinas, 2020). Latin* responds to (mis)use of *Latinx*, a term reserved for gender-nonconforming peoples of Latin American origin and descent (Salinas and Lozano, 2019).

school leaders); and (2) the difficulty of negatively evaluating colleagues.

5.2. The promise of improving student performance

If the end goal for improving teacher quality through teacher evaluation is that students would benefit, results were disappointing. Stecher et al. (2018) observed null effects in terms of mathematics and English language arts (ELA) achievement in three large school districts across the 6 years of an intensive push to embed teacher evaluation systems. Bleiberg et al. (2021) conducted a cross-state analysis of student achievement by examining test scores before and after each state implemented their evaluation system. They also found null effects that did not vary over time since implementation.

5.3. The promise of changing the composition of the teaching force

Critical to the theory of action underlying this policy was the idea that weaker teachers could be replaced with more effective teachers. Substantial effects were found in Washington D. C. (Dee and Wyckoff, 2017; James and Wyckoff, 2020). While studies with other samples found changes in the teaching force, although to a lesser degree (e.g., Grissom and Bartanen, 2019; Nguyen et al., 2019; Cullen et al., 2021), Stecher et al. (2018) found null effects.

5.4. The promise of supporting more effective professional development

One of the key policy mechanisms for improving teaching quality was to provide better and more targeted professional development. Kraft and Gilmour (2017) and Stecher et al. (2018) did not find any evidence of such improvement and attributed this to the inherent tension between evaluations being used for accountability and high-stakes evaluations on the one hand and then being used for professional development on the other. In such cases, the accountability uses typically dominated and crowded out the professional development messages.

5.5. The promise of contributing to equity

Arguably the most important goal of this educational reform initiative was to improve the quality of teaching in schools that had histories of poor academic performance. Schools in urban and impoverished communities were of particular interest as those areas were the face of the U. S. education crisis (Cuban, 1989). These districts typically had high proportions of Black, Latin*, and Indigenous students, English language learners (ELLs), students considered in need of special education services, as well as the highest proportion of minoritized teachers (Boyd et al., 2010; Ronfeldt et al., 2016; D'Amico et al., 2017).

Again, Washington D. C. was relatively unique in making progress toward these goals, but this was an exception. In most targeted districts, teachers were disincentivized from working in low-performing schools. As we have discussed, teachers of students with weaker academic profiles fare more poorly on teacher evaluations (Drake et al., 2019). The bias that has been observed in these systems across measures is alarming.

There are multiple reasons why teachers of students with weaker academic profiles fare more poorly in these evaluation systems. As previously mentioned, there appears to be some statistical biases in the growth model estimates. Additionally, some low-achieving students have high levels of absenteeism, yet their test scores contribute as much to a teacher's estimate as those of students who rarely miss school. Cowen (2017) found that unhoused students, more likely to be Black and Latin*, are much more transient, almost always impoverished, and have lower achievement levels (i.e., classroom assessments and standardized test scores). Yet, teachers of these students are unfairly treated identically in the growth estimate models.

Classroom observations raise a number of additional issues with respect to equity. Jacob and Walsh (2011), Gitomer et al. (2014), Garrett and Steinberg (2015), Campbell and Ronfeldt (2018), and Steinberg and Sartain (2021) have all found that observation scores are systematically lower for teachers who teach students with weaker academic profiles.

Additionally, Black teachers are more likely to receive lower observation scores (Campbell and Ronfeldt, 2018; Steinberg and Sartain, 2021), and Black teachers who work in schools with predominantly White staff are more likely to receive lower evaluation ratings than those who work at schools with mostly Black colleagues (Drake et al., 2019). Campbell (2020) found that Black women received lower observation scores than White women, even when accounting for other measures of teaching quality, especially in schools where the race of the evaluator differed from that of the teacher.

Unfortunately, there is a paucity of research on the effects of teacher evaluation policies on teachers of students who represent the full range of students in American schools. However, there have been several studies that have discussed the complexity of conducting evaluations of teachers of special education students (Jones et al., 2022) and of English language learners (Turkan and Buzick, 2016).

6. Post-mortem

By almost any definition, the exuberant adoption and endorsement of teacher evaluation as a panacea for the educational problems facing the United States in the 2000s was hardly justified. None of the ambitious goals were satisfied. One of the primary reasons for this disappointment, we argue, is that the research foundations upon which all of this was built were myopic and insufficient to effectively implement and produce results that were technically valid and substantively robust enough to address the complex issues of teaching and learning in American schools.

We can return to the three operating frames that Nasir et al. (2016) identified to highlight the gaps in the research base and policy interpretation and also to demonstrate that the limitations of these frames also have consequences for the technical quality of the evaluation measures. We do not claim that these operating frames are the only reason for the technical problems that surfaced, but we do claim that they played a major role.

The first frame is *colorblindness,* which minimizes the consequences of race and argues that all policy prescriptions should be the same, independent of racial considerations. Yet, the failure to address race and racism in our educational system had profound negative influence on the utility of the evaluation systems. We see that historical forces that have located minoritized students in lower-performing schools and inadequately resourced neighborhoods actually have direct effects on all measures, independent of the actual skills of a particular teacher. We see evidence of significant bias in observation systems that produces lower scores for Black teachers and lower scores for teachers of Black children. And we see all of this as raising skepticism of the fairness of assessment-based systems (Gitomer and Iwatani, 2022).

The second frame is *meritocracy,* which would ascribe accomplishment as solely due to the actions of the individual teacher and their impact on the student, ignoring the systemic nature of racial disparities and also ignoring the interdependence of teachers with other educators, and the resources and constraints they are provided, the tests their students are given, what students experience in other classrooms and at home, and the complex interrelated web of other factors that all have an influence on what goes on in a classroom. Such an approach also ignores the complexity and messiness of conducting assessments and evaluations. Treating all of these factors as either measurement error or factors that can be statistically controlled is to ignore reality and trivialize the educational process. From a technical perspective, we see measures that have a tremendous amount of error associated with them and the fundamental problem that causal claims at an individual level cannot be supported. And, of course, much of the system was predicated on using student standardized achievement test scores as the primary, if not sole, marker of student progress.

The final frame is *neoliberalism*, the idea that market-based incentives and practices can be applied in the educational system. Such simple explanations do not help account for the range of motivations that institutions and individuals have in assigning evaluation scores. The fact that distributions of teacher ratings barely changed, despite being an explicit goal of the policy, points to the failures to understand complex organizational behaviors associated with performance judgments (Rowan and Raudenbush, 2016). The fact that pay-for performance systems have had modest to no effects (Springer et al., 2016) suggests that economic incentives are not sufficient enough to result in desired changes in teaching.

The idea that one could build evaluation systems based on the emergence of a set of attractive technologies and limited and limiting frames, without attending to social, cultural, organizational, political, and even measurement theory and research led to a system that was bound to fizzle.

Essential problems included, first, the failure to resolve the tension between the goals of accountability and professional development. Second, all constituent measures had very significant problems in supporting the kinds of inferences that were needed for a high-stakes evaluation system. While the measures were not without value, they were being asked to carry far more water than the system could support.

Finally, if it was not clear to some at inception, it should be abundantly clear after this grand social experiment that teacher evaluation was not the policy lever to challenge the ubiquitous inequities in our educational system. The systems tended to reify historical inequities rather than upend them. Had attention been paid to researchers who were considering the multi-level nature of educational influences as the system was designed, it is possible that certain missteps could have been avoided.

This experience also highlights the risks associated with conducting policy formation within an echo-chamber of researchers, funders, and intermediaries who all adopt a similar framing of the problem. Without challenge, one can continue to wind up with expensive and taxing policies that are ephemeral.

The fizzle of Race to the Top does not negate concerns about instructional quality, nor does it negate the need for thoughtful evaluation, hiring, and retention practices that are essential to any well-functioning institution.

There is no doubt that much was learned during the time preceding and concurrent with this policy. Classroom observation instruments and SLOs have the potential to be used as they were initially designed—to support professional development. VAM can be useful to understand educational issues at aggregate levels. But having measures alone, developed and researched in one context, is not a warrant for a massive policy initiative. In order to move forward on any kind of major educational reform policies in the future, much more sophisticated and nuanced theories of action will be required.

What might such more productive reforms look like? While it would be presumptuous to suggest a particular design, it is possible to outline certain principles that are critical to consider. We can draw on research that has studied effective schools and effective teaching across different contexts and countries to imagine policies to encourage, as well as those to avoid, in designing approaches to the evaluation of teaching within schools.

1. Teaching is contextually bound, and any attempt to understand and evaluate teaching as a reflection of the teacher alone is inherently misguided. Factors as far-ranging as curriculum, community, food and housing insecurity, school leadership, school and classroom resources, and students' language and culture all have profound effects on what transpires within a given classroom. A history of educational accountability policy in the United States has focused on particular entities in the system (students, schools, principals, teachers) apart from all these contextual issues, and each effort has failed. Any productive evaluation system needs to understand how teaching is influenced by, and influences, this larger context. Only then can more reasonable interpretations of particular actors and actions be made, and only then can more thoughtful decisions of follow-up actions be made.
2. Any system should pay explicit attention to issues of race, language, culture, and power in understanding and supporting classroom interactions. It is not sufficient to simply put forth standards that say all students' needs should be met. We know that there are specific challenges and approaches that engage and support students from different backgrounds (e.g., Ladson-Billings, 2009).
3. To the extent that teachers are held accountable for their teaching, measures should be transparent, actionable, and under teachers' control. A central critique of growth models used in teacher evaluation systems was that they did not meet any of these criteria. Measures that focus on teacher actions,

interactions, and decision-making are those that individuals and systems are more apt to be able to address.

4. The criteria against which teacher effectiveness is measured should reflect a full vision of teaching. The attractiveness of using growth measures was that these metrics were available for large numbers of teachers. They also led to mathematics and reading test scores receiving overwhelming attention, often to the exclusion of other subject areas and almost always to the exclusion of important outcomes of classroom instruction that were not measured by standardized achievement tests. Focusing on a small set of proxy measures for teacher evaluation will inevitably distort school practices (see Rowan and Raudenbush, 2016).
5. Systems should anticipate and try to avoid predictable reactions of how policies will be interpreted and acted upon. The inflation of observation scores and the far lower than anticipated classification of teachers as needing improvement should not have been surprising in light of what we know about how systems respond to performance appraisal systems (Rowan and Raudenbush, 2016). Actors will be less apt to shape responses to policy goals in unintended ways if they are invested in the goals and processes of the system. Any policy needs to be informed and have buy-in from practitioners in the field that is far greater than what was evident in Race to the Top.
6. Systems should have as a dominant goal the development of the educational system, which would include professional development for teachers and school leaders, curricular reform, community relationships, resource analysis, etc. While the Race to the Top system endorsed the rhetoric of professional development, effective efforts that built on the evaluations were not commonplace. Policy, resources, and attention were given to the mechanics of evaluation and human resource management far more than they were to system development. If future teacher evaluation efforts are to be successful, these priorities need to be inverted.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Perspectives on social justice when becoming a teacher-researcher in the practicum: insights from physical education teacher education

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Understanding the role teachers must play in fostering social justice is one of many tasks student teachers learn on practicum. This self-study is a collaborative endeavour between eight Brazilian teacher-researchers who work in multiple teaching positions and settings in different regions of the country. Our assumption within the broader research scope is that being a teacher-researcher has commonalities related to social justice whether teaching in K-12 schools or higher education. We have reconfigured a collaborative, four-stage methodological approach to practitioner research. In this paper, we investigate how one teacher-researcher and university professor – Luiz, the first author – has been transforming his practice towards social justice through the self-study of teacher education practices. His initial dilemma concerned his students' practicum experiences. Through the prompting of his co-authors and critical friends, Luiz reflected on his decisions and assumptions. He presented his analysis to the group which generated the discussion which forms the basis of this paper. The contribution this paper makes is two-fold. One is to exemplify the rigorous method we used to generate alternative perspectives through self-study. The other is to explore the impact of deeply seated social injustices on our teacher education practices.

KEYWORDS

self-study, critical friendship, social justice, physical education, teacher education, collaboration, critical incident technique, complexity thinking

1. Introduction

Social justice has become a strong theme in physical education with many advocating for teachers to orient their physical education programs and practices towards teaching about and for social justice (Azzarito et al., 2017; Hickey et al., 2019; Philpot et al., 2021; Gerdin et al., 2022). Related to this is the concern that contemporary physical education reflects neoliberal practices that contribute to limiting young people's access to meaningful, holistic and empowering schooling experiences that lead to enhanced educational and wellbeing outcomes (Azzarito et al., 2017). This concern is replicated in physical education teacher education (PETE) where there is a substantial history of scholars advocating for student teachers to challenge the *status quo*, value multiple perspectives and knowledges, develop a critical consciousness and take action to enhance equity, democracy and social justice in their future teaching (Hill et al., 2022). However, while there has been much advocacy for social justice as both process and goal of PETE, it is less clear how this process is enacted or how successful students are at translating this into classroom practice (Shelley and McCuaig, 2018; Gerdin et al., 2021; Filgueiras et al., 2023; Flor et al., 2023). With this in mind, this paper is part of a broader project that seeks to better understand the pedagogies and practices that help prepare student teachers with the dispositions, skills and knowledge to take critical actions to transform school physical education to become more socially just. Specifically, we focus in this paper on the experiences of Luiz, the lead author, as he orchestrates a practicum experience for his PETE students to foster their social justice sensibilities.

Achieving a coherent definition of social justice in physical education scholarship is difficult. There are a range of theoretical perspectives and movements through which social justice can be conceptualized (Hill et al., 2022). For the purpose of this study, we start with a working definition of social justice as the concept of ensuring that all individuals and groups within a society have fair and equitable access to resources, opportunities and rights, regardless of their backgrounds or identities (Sensoy and DiAngelo, 2017). This represents a fundamental commitment to addressing and transforming systemic inequities and injustices that may arise from factors such as race, gender, class, sexual orientation and ability, among others. However, when social injustices are so structurally normalized, as in Brazil, it seems to be more common to focus on, and address, socially-unjust issues that advocate for social justice within schooling (Flor et al., 2023).

Freire (1996) argues that for true social justice to flourish, it is necessary to create a society where people have the power to shape their own lives and communities. He believed that education should be liberatory, empowering students to think critically and to take action to transform their communities rather than perpetuating a hierarchical system of dependency and unequal power dynamics. Physical education teachers operating under a social justice paradigm seek to create a more equitable and inclusive educational experience by advocating for the rights of marginalized and oppressed communities and enabling physically active and healthy citizens who in turn contribute to the wellbeing of society as a whole (Wright, 2004). However, achieving a socially-just PETE globally is also challenging due to the precarisation or lack of stability, security and predictability in employment as a result of neoliberal policies (Kirk, 2020).

In terms of impact, the evidence points to the difficulty of transforming students' beliefs and subjectivities (e.g., Muros Ruiz and Fernández-Balboa, 2005) as well as limited evidence of any longer-term change on students' pedagogy once in a school (Mordal-Moen and Green, 2012; Gerdin et al., 2018). Despite this, there has been a strong interest in exploring transformative learning opportunities that challenge taken-for-granted frames of reference and open student teachers up for possible change. For example, in their review of pedagogical practices related to social justice in PETE, Walton-Fissette et al. (2018) identify that teacher educators use a range of intentional and explicit pedagogies, as well as utilizing "teachable moments" to help educate about sociocultural issues. As indicated by the evidence on their longer-term impact, while such pedagogies are important to raising awareness on social justice issues and concepts are necessary, the knowledge, skills, and attitudes gained only have value to the extent that they can translate to meaningful action in school settings. It is the potential of practicum to provide situated and applied learning opportunities that are explored in more depth in this paper.

Practicum is often the first opportunity for student teachers in teacher education programs to work alongside, and with, experienced teachers and be immersed in the culture and problems of everyday practice. The practicum provides an ideal location for students to investigate the nature of school environments and appreciate the diversity and complexity of modern schools (Zeichner, 1986). However, as Gore (2001) argues, "more field experience in and of itself is not necessarily better for pre-service teachers" (p. 126). The need is for a practicum experience that is coherent with and contextualizes the coursework, encourages ongoing inquiry and reflection by the student teacher, provides opportunities to work with collaborating teachers to help pre-service teachers grapple with questions raised by their experience, and is long enough to provide meaningful experience with teaching diverse students. With respect to PETE, there are few examples of reconfiguring the practicum. One example is the way Ovens (2004) used action research and peer coaching to restructure the practicum for 12 final-year physical education students. Analysis of the students' perspectives showed that they felt the alternative provided a purpose to the practicum, increased the level of theorizing and thinking they did about their teaching, gave them more autonomy over decision making and provided quality supervision and feedback. While there was a clear benefit to structuring the practicum in this way, there was a need for a collaborating teacher who could assist with the active inquiry and reflection components of the process.

Recognizing that practicum situates student teachers in the realities of schooling, means also making decisions around which schools and which experiences will provide meaningful learning opportunities for student teachers. In the Brazilian context, there are examples of turning the PETE practicum into a rich experience to foster the students' critical thinking towards a socially-just pedagogical stance (Mendes and Betti, 2017; Vedovatto et al., 2020; Souza Neto and Cyrino, 2022). The first two authors of this paper work collaboratively at the same university. Both have been confronting idealism in their efforts to organize the practicum experience (Sanches Neto et al., 2018; Venâncio and Sanches Neto,

2019; Venâncio et al., 2022). Their students learn how to inquire into their developing teaching practices by being co-supervised in classes with teachers who are teacher-researchers. In this paper, we outline the self-study method we have used to collaboratively understand dilemmas that have perturbed us as teacher-researchers. We have chosen to focus on Luiz's experience of supervising three student teachers on practicum. We describe the context of his dilemma and then discuss the themes that arose from the four-stage method that we used. Luiz considers his reflections in light of the discussions with his colleagues. Finally, we present what the implications might be for other teacher educators.

2. Methodological choices

This paper emerges from a collaborative self-study conducted by the 10 co-authors who are drawn together from various teaching positions, regions and countries by their common interest in critical pedagogy and exploring how to enact more socially just educational practices. Luiz has been a member of this autonomous knowledge community for about 18 years (2005–2023) and the group has provided a safe space for sharing and discussing incidents critical to their teaching (Sanches Neto et al., 2017, 2018, 2022). As Hamilton (2004) notes, making practices public and open for critique can only happen when there is a high level of trust. Once this trust forms, the opportunity to openly share experiences, challenge and question assumptions, and expose colleagues and students to new ways of thinking, and support extending insights to a broader audience through conference presentations and publications all becomes a part of engaging in a collaborative self-study process (Hamilton, 2004).

Collaborative self-study – or more formally known as the Self-Study of Teacher Education Practices (S-STEP) – is a form of inquiry that is broadly characterized as improvement aimed, interactive, employing a range of primarily qualitative methods and undertaken to make its findings available to the professional community (LaBoskey, 2004). In terms of its potential for our work, we are drawn to three features of self-study in particular. The first is that self-study involves the teacher-researcher adopting an inquiry-oriented stance towards their "self-in-practice." This often requires finding a way to step back from the immediacy of practice so one can question and theorize what they are doing (Fletcher and Ovens, 2015). The second is that self-study involves risk and possibly discomfort when one's personal beliefs and practices become challenged (Fletcher and Ovens, 2015). This is why a supportive community of critical friends is so central to conducting an effective self-study (Olan and Edge, 2018). Thirdly, self-study leads to social action because "knowing more about ourselves as teachers and teacher educators changes us, provokes growth, jolts us out of complacency – sometimes radically, in ways that can seem transformative" (Pithouse et al., 2009, p. 48). It was also appropriate for structuring inquiry around the practicum. As Thomas (2017) noted in her work, learning as teacher educators about our own practice in relation to students' learning on their practicum experience – through our exchanges during meetings, reflections on these exchanges and attempts to understand our own contexts based on what we hear from colleagues – would not be possible if we were not researching collaboratively. Following, we outline how we have enacted a collaborative self-study with a group of teacher-researchers committed to investigating social justice pedagogies in physical education.

2.1. The self-study design

The self-study method we employed had four phases. In the first phase, each teacher-researcher initially wrote an unstructured narrative account that they then summarized into a shorter piece which we have called a scene. The scenes represented situations, dilemmas or concerns about social justice in our recent or ongoing teaching practices. This was done to ground the inquiry experientially (Clandinin and Connelly, 2004). We shared our scenes by e-mail with our colleagues. Each colleague was tasked with responding in writing to all of the scenes using a set of reflection prompts (see Appendix A). Our intention was to point out a qualitative itinerary that would allow us to address situated nuances of our own teaching work (Luttrell, 2020).

In the second phase, we each received a file of comments from our colleagues about our scene. We gave ourselves 10 days to synthesize and analyze our colleagues' comments and prepared a summary set of slides to talk to on *Google Meet*©.

In the third phase, we presented our summary and discussed the comments in two online meetings. Each meeting lasted 2 h and was recorded. We provided a conceptual overview, based on our syntheses, and intertwined our practice with a perspective of PETE and teaching that is socially just. Interactions allowed us to reconstruct learning (Schuck and Russell, 2005) at the same time as we were questioning and reflecting again on our own understandings. This allowed us to elaborate on a meta-reflective synthesis from our discussions.

Based on the discussions, in the fourth phase, we identified recurring themes that permeated the different scenes and were critical to our dialogical journey. While discussing as each other's critical friends we drafted collaborative artifacts (Sanches Neto et al., 2023). All of the conversations and discussions took place in Portuguese. Luiz has translated these ideas into English helped by two more experienced researchers (Dawn and Alan) from the S-STEP international community. Sharing his experience of learning through the practicum experience has taken precedence in this paper. From this point, Luiz is referred to in the first person.

2.2. Context of the critical scene

The scene I am sharing is a recent situation that occurred with a practicum group that I taught in the 1st semester of 2022 in-person in the PETE degree program at the Federal University of Ceará (UFC). There were only three students in this course and this was their first practicum in the 5th semester of the 4-year undergraduate teaching degree. To complete this practicum course, students had to be in schools for a total of 80 h and attend 32 h of meetings on campus during the semester. Students were required to spend 20 h in each of the following: a kindergarten, early elementary (Grades 1–5), elementary (Grades 6–9), and high school (Grades 10–12). Typically, students spend 2 mornings per week in schools then attend their other classes on campus throughout the 20-week

semester. However, students can spend up to 6 h per day in schools and up to 30 h per week meaning that the practicum can be condensed into 3 or 4 weeks. I had approached four teachers who I knew to be focused on researching and inquiring into their own practices and asked them to be collaborating teachers. They had all agreed. I hoped that the schools and collaborators I had organized would provide rich, face-to-face experiences for the students after several years of disruption due to the pandemic. The university department sent out the necessary forms for the students to complete prior to beginning any practicum-related activity in each school setting.

As in many countries, there are differences between public and private schools and universities in Brazil. I have organized for students to go into the public system because I am teaching in a publically funded university. During the on-campus meetings there would typically be some value judgments made about the two different systems as students compared their experiences. The public system can be broadly categorized as either being a local, regional or federal network. The local network incorporates kindergarten and elementary schools in each of the 5,570 municipalities. They are usually under-resourced. Regional networks are elementary and high schools funded by the federal district and each of the 26 states in the five regions of the country. Federal networks include professional education at the top ranked high schools. Public educational policies currently under review by the federal government allow schools – either public or private – to offer a narrower range of subject options. Private schools generate their own funding. Both public and private schools generally run part-time timetables for several cohorts so students attend either in the mornings, afternoons or evenings. There are 40 or more students in classes regardless of the system.

2.3. The dilemma in the practicum

I chose to write about the following dilemma in my scene. I used my contacts to ensure that the students would be well supported. One collaborating teacher was a recent graduate of the course and was studying with me for his Master's qualification. Another was an experienced teacher who had completed her Doctorate. The other two teachers were both known to me in a teaching scholarship program as committed teacher-researchers (Lima et al., 2022). All of them have been members of an institutional research group I lead at the university.

Despite my careful screening of the schools and collaborating teachers, the students unilaterally decided that they would not attend one of the schools and made their own arrangements to go to another school that was a private school and closer to their homes. They delayed providing me with any paperwork so I was not aware that they had made changes. Furthermore, the university department responsible for sanctioning the practicum allowed the change because it is not mandatory for students to go to a public school. Defining an appropriate school setting was, however, my responsibility. When I did meet with the students and asked them what their reasons were, they said that they thought they would have access to better resources and that it was more convenient. I wrote about this incident in my scene because I was disappointed and conflicted.

3. Reflections arising from the dilemma

When the others read my scene and we discussed their thoughts and responses, our shared reflections linked the themes to social justice as it was related to differences between private and public schools; power relations and students' right to choose where they wanted to go on practicum; the importance of fostering professional relationships with teacher-researchers and how teacher educators can support them; and control over practicum placements. Keeping a dialogic approach with the students seemed a paramount challenge. Being and educating a teacher-researcher has intricacies related to criticality whether teaching in schools or higher education (Elliott, 2012).

3.1. The difference between private and public

My first issue was that the students believed that they could learn more by doing the practicum in a private school, with more resources, than in a public school, where, according to them, they would have more difficulties. I initially thought the students were prejudiced against the public school and, by extension, against the school students and their social origins.

However, my colleagues challenged me to think differently. Elisabete wondered whether the students were wrong to try to do the practicum at a school that was easier for them to access. She thought that completing a practicum in a private school might be an opportunity for them to be paid on practicum or that it might open the door for a future professional vacancy. Through our discussion, I began to question my assumption that students were opting for private schools just because they were prejudiced towards them and thought they were providing a better quality education than the public schools. I questioned how much awareness student teachers had of their social responsibility to teach all students. Perhaps their conduct was prejudiced? Luciano suggested that it was in line with the false neoliberal view that public institutions are inferior. I was conflicted because the student teachers' choices went against my appreciation of public schools as worthwhile educational institutions. In fact, 90% of students are educated in public schools in Brazil which are free and compulsory.

Ewerton and Isabel offered another perspective. The life experiences during schooling may have influenced my students' behavior. In fact, two students were from public schools and one was from a private school. The complexities of teaching in public schools were discussed over three classes before students went on practicum, including a *WhatsApp*© video call with everyone, including the collaborating teachers in schools. I emphasized the public school system because I believe that it is not worth the public investment to educate teachers to work in the private service. Isabel had raised the point that the highest-ranking universities in the city where these students study are, in fact, free public institutions. The private schools peddle paying for "quality" education at the secondary level in order to secure a position in these contested, but free, public tertiary institutions. Ironically, students with lower grades have to pay for tuition in private universities which are more lowly ranked than public ones. Isabel was surprised that public

university students would bring so many questions and obstacles to knowing the reality of public schools. Our discussion turned to the public and social commitment that practicum students assume when studying at a public university, which we thought could be an alternative topic to consider with the class.

I did not ask about social class and prejudices that my student teachers might have heard from family members or friends about public schools. Didn't they realize that the public school students and their families whom they had opted not to teach, support the university where they study? However, as adults, the responsibility for the positions taken was theirs.

3.2. How much power/choice should student teachers have?

This was a thought that occurred to me again when I was challenged about how I had handled my students' decision to not attend the school I had selected for them. In the first instance, I could have insisted that they complete the practicum in the school as arranged, but I did not. For Freire (1996), our work in education requires problematizing and establishing dialogue. We should respect the choices that students make. Luciano had wondered why I appeared concerned about the impact on the collaborating teacher. Was I masking my own concern about lacking authority? The week after I heard that they had changed one school, the group also tried to make a case that they could not attend the public high school I had chosen. Again, they wanted to go to a private school. However, this time I did not allow them to change their placement and insisted that they remain in the previously stipulated public school. It occurred to me that even though I wanted to treat them as adults and future teacher-researchers, I also felt that I knew what was going to be in their best interests. Willian thought it would be a matter of social justice if I did my best to keep the students in the public school but such a socially-just position would be mine – as their advising professor – not necessarily theirs.

3.3. How can teacher educators support the experience of being a teacher-researcher and collaborating teacher?

Something that became apparent to me in thinking about the issues that had arisen around practicum was my relationship with the collaborating teachers. I had nurtured our professional relationships and have a great deal of respect for them as teacher-researchers. We all practice inquiry, regardless of the age of the students we are teaching.

My expectation is that the practicum students themselves become teacher-researchers and that the shared experience in the practicum would be important in their PETE. In order to try to mobilize them, I recommended reading a research piece carried out by a former advisee, who had graduated from the PETE course, on collaboration networks between teacher-researchers in Fortaleza (Oliveira et al., 2019). Despite having them read about collaboration between teacher-researchers, the students' perspective remained that they would prefer to be placed with any teacher in the private school – regardless of whether or not they had a proven profile of being a teacher-researcher - rather than be in the public school.

My quandary was that the collaborating teacher they had avoided was a relatively inexperienced teacher. I was conscious that having three reluctant student teachers in his class could compromise his work and impact negatively on our future professional relationship. Isabel reinforced my concern and thought that I could create instability for the novice teacher-researcher if I had forced the students to go to the public school. Willian raised doubts about the possible difficulty that any teacher-researcher at the beginning of his career would have with students who studied in private schools.

My decision to insist that the student teachers attend the second public school against their wishes was because I knew the collaborating teacher, co-author Samara, was very experienced, a doctor and, therefore, I believed that the conduct of the students would hardly disturb her (Vieira et al., 2022). As I thought about the discussions around the collaborating teacher's expertise and capacity to supervise student teachers I returned to the selflessness with which collaborating teachers operate. I considered it was unfair on the part of the students to neglect the school teacher's planning. There was no concern even to communicate the decision they made on their own. I wanted to acknowledge the role that collaborating teachers play. Willian had suggested inviting the teacher who my students had avoided to attend their final presentations about the practicum. I thought it was an opportunity to contest the students' perspectives and to confront their prejudice.

3.4. How much control does a teacher educator have over placement?

My colleagues raised several issues concerning the role of the university in my scene. They wanted to know how the students could just change their placement without letting me or the collaborating teacher know. There are guidelines for changing practicum schools. The UFC practicum regulatory agency allows both public and private institutions to be registered to carry out the practicum although there is a preference expressed in documents for practicums to be in public schools. Students can suggest another option if the professor's suggestion for placement is not appropriate for some reason. My understanding had been that this was only done after approval of the change had been given by the professor. It wasn't my intention that students were forced to go to a school they did not want to go to. Nor had I intended to make decisions by myself concerning their placement. I thought that my colleagues in the curriculum unit would be able to support my decision-making and that the itinerary for PETE would be deliberated with the practicum professors and take into consideration the pandemic context.

Luciana raised doubts about the ability we have as teacher educators to generate (self)critical thinking – as teacher-researchers – in the students, especially in public schools. Samara considered the political dimension of the students' behavior – contacting a different teacher and filling out another document to enable the practicum at a private school – went against the ethical standards. I also considered that the students should have a voice in the decision-making process. However, I realized through this

interaction, that the student teachers were not engaging with the profession as teachers. As students, they were focused on making the best of their opportunities rather than committing to teach to the best of their abilities in any setting (Sanches Neto et al., 2021). I wondered whether the practicum office and my colleagues could look for partnerships with schools closer to the university campus and also in a range of other regions in the city. In agreement, Isabel also believes that carrying out the practicum with teacher-researchers who establish partnerships with the university is educative for undergraduate students, which is why it would be worth insisting on having tighter controls over practicum schools and collaborating teachers.

4. Concluding thoughts

Learning from the practicum is a key for students themselves becoming teacher-researchers. For us as teacher educators, "learning to learn about the practicum" (Thomas, 2017, p. 165) is important so we can support the students' criticality and foster their social justice initiatives. In this sense, this paper has two main contributions. Firstly, as an example of the collaborative method we have used to generate alternative perspectives through self-study research. Secondly, recognizing the social injustices that are deeply seated in teacher education in general and in PETE particularly. How this impacts on our assumptions, practices and decisions may be applicable in other contexts.

Hamilton (2004) suggests that opening our research for public discussion contributes to the development of the professional knowledge base and encourages colleagues to consider alternatives. The instrument we used to propose questions, comments, reflections and criticisms based on dialogic conversations (Freire, 1996) is an important artifact, in the sense of enhancing collaboration and critical friendship. Finding rigorous ways to enhance collaboration is a core methodological issue in doing self-study (Fletcher and Hordvik, 2022a,b). The four-stage dialogue process which enabled our shared reflections is a contribution of this self-study to the teacher educator community. Writing to the prompts encouraged us to pause and consider the others' lived experience and dilemmas. Reflecting on others' comments as we summarized and prepared our presentations was a way to ensure transparency and honesty, with ourselves and others.

The following themes which arose through the process and meta-reflective syntheses permeate Luiz's dilemma in relation to social justice. The first theme is the realization (or perhaps resignation) that educating teacher-researchers through the practicum experience is always going to be fraught. This is the students' first opportunity to work alongside, with, and as, teachers. Is it too much to expect them to also develop teacher-as-researcher skills and to be mindful of the systemic social justice issues? How can we help students develop an awareness of their social responsibility to teach all students which, to our mind, is incumbent upon the profession? How much autonomy can we afford them to decide where and with whom they want to collaborate? With the best of intentions, Luiz grappled with thinking that he knew what was going to be in their best interests. But, do we ever know what is best or appropriate for another?

The second theme was the recognition and appreciation of the diverse realities experienced by each student and collaborating teacher. Initially, we had debated whether students should be obligated to undertake teaching practice in public schools due to our strong opinions on their merits. Moreover, we believed it was customary to honor the arranged placements at the designated schools. However, at the end of the semester, Luiz made a surprising discovery. One of the students, who had received their education in a public school, had wanted to attend a private school to gain firsthand experience of the contrasting educational environments. Equally important, the student had personal reasons, such as proximity to home and financial considerations, that necessitated working at a school closer to their home. The collaborating teacher whose class the students had not attended accepted the invitation to attend the students' final presentations. His contribution to the meeting was much appreciated by the students. Luiz felt that the teacher's *mana* (or existential power) was restored and he was looking forward to working with him in future years.

The third theme that emerges is the significance of fostering a culture of respectful collaboration within teaching networks. This encompasses the university professors overseeing the practicum, the collaborating teachers, and the students themselves and requires open and critical dialogue amongst all parties. While acknowledging and respecting the autonomy and freedom of PETE students to learn, it is imperative not to use this as an excuse for disregarding the importance of political engagement and the value of education in public schools. Above all, it is distressingly common to encounter injustices within Brazilian societal and educational structures, making it crucial for Luiz, as a teacher educator, to be mindful of the risk of perpetuating these injustices. This awareness should extend to any teacher-researcher who is genuinely committed to promoting social justice.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

All authors contributed to the conception and design of the study. LS, LV, LC, WC, EV, SB, IF, and EF wrote sections of the manuscript and contributed equally to the data generation and analysis. LS organized the database and wrote the first draft of this manuscript. DG and AO contributed to methodology revision, manuscript read and wordsmithing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix A

Reflection prompts (developed by Luciana Venâncio and used with permission).

I have doubts about… The intention in this topic is to identify and compare different positions – argument	I think you said that… The intention in this topic is to rephrase and actively listen – dialogue	I did not know that… The intention in this topic is to highlight diverse concepts – living, experience and absences
In my opinion… The intention in this topic is to list the hypotheses and deductions – epistemological gaps and limits	I hope that… The intention in this topic is to infer and propose suggestions – movement	I agree with you… The intention in this topic is to draw together ideas – thinking

Source: Sanches Neto et al. (2023, p. 56).

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Juxtaposition of being professional and becoming professional: lessons from a nationwide study on teachers' conceptions of their professional status

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Introduction: When teachers are being professional in terms of professional standards, they follow their daily routine to produce quality work and wish to be seen as professionals in terms of their status. This is easier said than accomplished. In Pakistan, teaching has become a profession of last resort for many educated young individuals, despite efforts to raise the profession's status by investing in improving teacher management, fostering political support for teacher licensing, and prioritizing teacher development. Although there are examples where reform initiatives have shown positive outcomes in the classroom, the prevailing situation is such that these examples often go unnoticed due to the reforms failing to make a substantial impact, particularly in public school classrooms. Teachers are frequently criticized for their substandard practice and lack of rigorous preparation. The professional status of teachers, therefore, continues to show a declining trend. However, teachers seem to disagree with notions that appear to de-professionalize their profession.

Methods: Large-scale nationwide research was conducted to explore and understand teachers' perspectives on their professional status and the measures that have been taken to enhance their status from a broad perspective by using a survey design. Data were collected from 4,165 teachers from four provinces of Pakistan using a multistage stratified sampling technique to ensure the sample was representative of the entire country. The collected data were analyzed using both descriptive and inferential statistical techniques. Factor analysis was conducted to find the key underlying dimensions of attributes to unpack teachers' core professional competencies.

Results: The research study utilized the teachers' lens to highlight and discuss the interplay between how they see themselves as professionals in terms of their status and regard, how they strive to be professionals in terms of practicing professional standards (the being), and how various measures have been undertaken to enhance teachers' status so that they can be seen as a professional (the becoming).

Discussion: The key premise of the research study is that teachers, when they are being professional, they also need to be recognized as professionals for greater and demonstrable execution of professional standards at the classroom level.

KEYWORDS

being professional, becoming professional, school teachers, professional competencies, ideological beliefs, personal empowerment

1. Introduction

Over the past two decades, concerted efforts have been made globally to upgrade the profession and improve the quality of teaching and learning by investing strategically in teacher development. For example, Darling-Hammond (2017) presented teacher education policy reforms and practices in Australia, Canada, Finland, and Singapore in comparison with the United States. There are also examples of initial teacher education programs from diverse contexts, such as Jamaica, Greece, and Nigeria (Chalari et al., 2023).

On the one hand, teacher development initiatives have borne good results in many quarters and have helped teachers produce better quality work; on the other hand, these have pushed teachers to do more work, following a compliant mode with very little reward or recognition, resulting in educators questioning their sense of professionalism (Furlong et al., 2000; Flores and Shiroma, 2003; Hall and Schulz, 2003; Rizvi and Elliott, 2007). When teachers are being professional (Hargreaves, 2000) in terms of the professional standards, they follow their daily routine to produce quality work and also wish to be seen as professionals (Hargreaves, 2000) in terms of their status, standing, regard, and levels of professional reward.

Research studies on the status of teachers and the teaching profession (Hargreaves et al., 2006; Burns and Darling-Hammond, 2014; Symeonidis, 2015; Dolton et al., 2018; Price and Weatherby, 2018; Thompson, 2021) have brought forward the existing trends of teacher status that exists around the world. There are countries such as China, Japan, South Korea, New Zealand, Finland, and Singapore where the teaching profession is highly valued and teachers are being professional, enabling students to learn more effectively (Burns and Darling-Hammond, 2014; Darling-Hammond, 2017; Dolton et al., 2018). The positive perceptions of their status are not only linked to better students' learning but also closely tied to various critical aspects of quality education. These perceptions help teachers become professionals through continuous professional development, involvement in research, collegial collaboration with other teachers, and engagement in decision-making (Symeonidis, 2015). There are also examples where, despite efforts to raise the status of the profession by investing in improving teacher management, developing political will for teacher licensing and certification, increasing equity in teacher placement, improving the school environment, and prioritizing teacher development, teachers' professional status have remained a point of concern. As per the Global Teacher Status Index 2018, most significant declines in teachers' status were witnessed in Greece (2nd out of 21 in 2013 down to 6th out of 21 in 2018) and Egypt (6th out of 21 in 2013 down to 12th out of 21 in 2018) (Dolton et al., 2018). In Pakistan, the reforms have generally failed to make a substantial impact, particularly at the public school classroom level, where the teachers are criticized for their substandard practice and lack of rigorous preparation. Their professional status, therefore, continues to show a declining trend. However, teachers seem to disagree with the notions that appear to de-professionalize the profession. Previous studies have found teachers defending their own profession and considering themselves as confident and capable professionals, unlike the popular opinion of regarding teachers as detached professionals (Rizvi and Elliott, 2005, 2007), highlighting the gap between rhetoric and reality in terms of teachers' professional standing and status. This research study uses the perspective of teachers to illustrate and discuss the interplay or juxtaposition between how teachers see themselves as professionals in terms of their status and regard, how they strive to be professionals in terms of practicing professional standards (the being), and how various measures have been undertaken to enhance teachers' status so that they can be recognized as professionals (the becoming). Figure 1 reflects the two-way construction between being professional and becoming professional, which is theoretically elaborated in the subsequent section and forms the basis of the research reported in this study.

2. Being a professional and becoming a professional: exploring the construct

Simply put, the being refers to the professional identity that teachers associate with and the professionalism that encapsulates their professional identity. Since UNESCO's 1966 recommendation, which recognized teachers as professionals and defined their professionalism as (a) a form of public service that requires expert knowledge and specialized skills acquired through rigorous and continuing study and (b) a sense of personal and corporate responsibility for the education and welfare of the pupils in their charge (UNESCO and ILO, 2008), systematic initiatives to unravel the meaning of a teacher's professionalism and professional identity have gained momentum.

Kelchtermans (2009) defined professional identity as self-understanding. He explained that self-understanding encompasses one's understanding of oneself at a certain moment in time (product) and the recognition that this product results from an ongoing process of making sense of one's experience and their impact on self (Kelchtermans, 2009, p. 261). For Connelly and Clandinin (1999), teachers' identities are shaped by the stories they live by and are given meaning through the knowledge formed within the landscapes in which teachers work and discuss their personal and collective experiences (Craig, 1999). Clandinin et al. (2006) explained that the stories to live by are multiple, fluid, and ever-evolving. Consequently, professional identity is understood as a dynamic ongoing process (Conway, 2001) that is situational (Korthagen, 2017) and emotionally developed (Day, 2004). It plays a key role in teachers' commitment, distinguishing those who are caring, dedicated, and prioritize their profession from those who put their own interests first (Day et al., 2005).

The dynamic ongoing process of professional identity formation can be observed in a study conducted to explore the relationships between school reforms and teacher professionalism in Pakistan. The study illustrated that, in reform initiatives where reformers develop trust relationships with teachers, develop their capacities, and provide them with opportunities to expand upon their capabilities, teachers regard themselves (self-understanding) as confident and capable professionals who can make decisions and undertake responsibilities, who understand that it is important to collaborate and learn from one another, and who are willing to undertake leadership roles (Rizvi, 2003; Rizvi and Elliott,

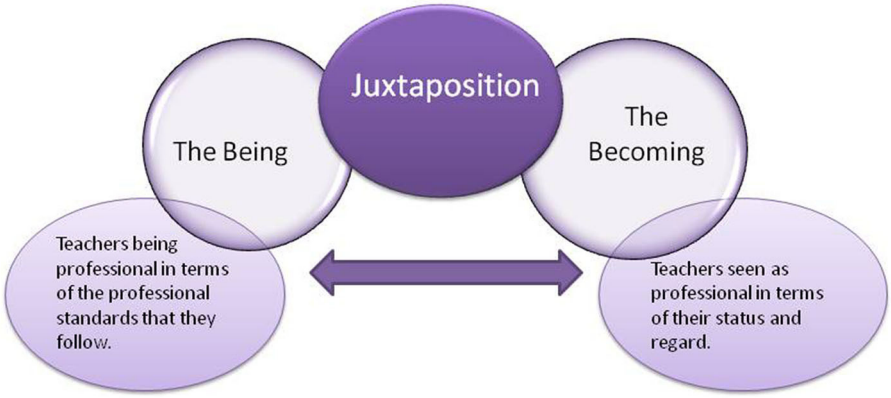

FIGURE 1
Juxtaposition of being professional and becoming professional (initial framework).

2005). The evidence here presents a group of teachers who are being professional.

However, questions have been raised about teachers' sense of professionalism and the professional standards that they adhere to when stories of teachers mishandling their professional responsibilities become known through popular media. Evaluation studies on teachers' classroom practices in Pakistan have also yielded mixed results. Kizilbash (1998) and the Social Policy and Development Centre (SPDC) (2003) reported that effective practices last only until the program's life and then generally fade away. In addition, there are reports (Rizvi and Nagy, 2016) that illustrate a continued but average-to-moderate impact at the school classroom level after the program ends. Furthermore, there are examples of failing schools (Hoodbhoy, 1998; Ishaq, 2019), raising serious questions about teachers' professionalism and professional practice and directing attention toward a group of teachers who need support in developing professional practice.

The attention has thus been diverted to becoming a professional, a notion closely tied to measures taken for teacher professionalization and raising teachers' status so that teachers who are being professional can be seen as professionals and so that concrete actions can be taken to enhance teachers' professional practice, ultimately leading to student learning and school improvement. Processes of teacher development in contexts such as Finland, Singapore, Canada, and Australia (Darling-Hammond, 2017) have augmented some practical routes, such as standards for teaching and special clinical training approaches, which have brought teachers' status to the forefront. For example, through a clinical training approach aiming at balancing teachers' professional and personal competencies, Finland has managed to achieve teaching as a respected profession in which teachers have ample authority and autonomy, including responsibility for curriculum design and student assessment, which engages them in a continuous reflection of practice. Another example is the Australian Institute for Teaching and School Leadership (AITSL), which is working with various states to implement processes of appraising teachers at different points in their careers and is recognizing increasing levels of accomplishments. While these examples offer important insights, they cannot be conclusive as each country has its own unique context and cultural heritage within which the being and the becoming of professionals are set. However, the contexts within which teachers work are also changing. For example, cosmopolitanism has transcended boundaries and can be found throughout Asia with its variety of religious and cultural traditions (Rizvi and Choo, 2020). The global pandemic has also redefined teachers' work and has illustrated various avenues of learning such as homeschooling and online forms of remote learning (Ross et al., 2021; Mifsud and Day, 2022).

Evidence suggests that, in changing times, teachers should be seen as autonomous professionals, not mere executors of plans. This means that teachers' voices, needs, and aspirations must be considered in the planning and implementation of teacher policies (Karousiou et al., 2019). In addition, teachers' professional relationships, collaboration with their colleagues, and meaningful reflection influence their becoming professional (Davey, 2013; Korthagen, 2017; Rizvi, 2017), suggesting that being professional needs to be more intertwined with becoming professional.

3. Being and becoming professional within the educational context in Pakistan

There are three distinctive school systems in Pakistan:

- Government (public sector) system of primary and secondary schools.
- Private school system (community-based, non-profit, and for-profit schools).
- Religious school (Deeni Madaris) system.

According to The Academy of Educational Planning and Management (2021), Pakistan currently has a total of 305,763 schools, out of which 189,748 (62%) are public sector schools and 116,015 (38%) are private sector schools, a figure that also includes 31,115 Deeni Madaris. The Pakistan Social Living Standards Measurement Survey 2019–2020 revealed that Pakistan is struggling to meet quality standards with a large number of

TABLE 1 Sector-wise distribution of teacher training institutes.

Sector	Teacher training institutes	Enrollment	Teaching faculty
Public	158 (73%)	70,862 (93%)	3,493 (92%)
Private	59 (27%)	5,365 (7%)	298 (8%)

The Academy of Educational Planning and Management (2018).

out-of-school children, a net school enrollment rate of 64% at the primary school level (6–10), and a literacy rate (10 years and above) just ~60%.

In 1947, when Pakistan became independent, teachers were considered the key agents by transforming the ideals of the newly found nation's leaders who wished to shift the emphasis of education from colonial-administrative objectives to a professional and technical bias suiting a non-dependent, progressive economy (Hoodbhoy, 1998). The years that followed saw a boom of privatization in education, implementation of several small and large-scale educational reforms, and renewed focus on public–private partnerships.

Traditionally, teacher development in Pakistan has followed two key pathways: Pre-service teacher education and in-service teacher education. According to the National Education Census, there are 217 teacher training institutions in the country. Table 1 gives the sector-wise (public/private) distribution of teacher training institutions, enrollment of teacher training institutions, and the total number of teaching faculty of the institutions.

The latter part of the 20th century saw the emergence of a number of initiatives to further teachers' classroom teaching competency and, consequently, their professional status. These reform initiatives were mostly foreign-funded and managed by governmental and non-governmental organizations. For example, the main goal of the Sindh Primary Education Development Program funded by the World Bank was to improve access to primary education, especially for girls, with equity and quality (The Bureau of Curriculum and Extension Wing, 1997). Aga Khan University's Institute for Educational Development (AKU-IED) took part in the USAID-funded Education Sector Reform Assistance initiatives in 2000 to deliver effective and relevant teacher education and development programs, with a focus on improving classroom teaching practice in the province of Sindh using an indigenous approach called the cluster-based mentoring program. The World Bank and UK DFID funded the Punjab Education Sector Reform Program. Started in 2003, this program has undertaken major investments in education with three overarching goals: improving access, quality, and governance in education. In 2009, the Department of Foreign Affairs, Trade, and Development and the Aga Khan Foundation funded AKU-IED's Strengthening Teacher Education in Pakistan project to develop teachers' capacity in four key subject areas: math, science, social studies, and English.

While there are examples of positive effects of reform initiatives at the classroom level (Rizvi and Elliott, 2005; Riaz, 2008; Rizvi and Nagy, 2016; Aslam et al., 2019) and on many hardworking and dedicated teachers (Memon and Bana, 2005; Shamim and Farah, 2005; Safida, 2006; Rizvi, 2015, 2019), the situation is such that these examples mostly go unnoticed because the reforms generally failed to make a substantial impact at the classroom level. Teachers' professional status continued to show a downward trend. It has been argued that the teacher development initiatives failed to make a substantial impact due to various reasons: they did not account for each school's contextual reality, the training was conducted in places away from the school, teacher development and implementation plans were prepared by experts without involving the teachers, and a poor accountability and monitoring system failed to sustain teacher initiatives. Previous research studies (Rizvi, 2003; Hasan, 2007; Rizvi and Elliott, 2007; Siddiqui, 2010) have illustrated that a myriad of top-down reform agendas left teachers bewildered, unmotivated, and doubtful of their own capabilities to successfully improve the teaching and learning processes.

More recently, the government has undertaken some concrete measures to formalize, streamline, and institutionalize in-service and pre-service teacher training and accreditation processes and, consequently, enhance teachers' professional status. In November 2008, under the Strengthening Teacher Education in Pakistan initiative, the Ministry of Education adopted and notified 10 National Professional Standards for Teachers in Pakistan. These standards define competencies, skills, and attributes deemed as essential targets for teachers and teacher educators (Ministry of Education, 2009). The National Education Policy (Ministry of Education, 2009) presents 22 key policy drivers, which address issues concerning pre-service training and standardization of qualifications; professional development; teacher remuneration, career progression and status; and governance and management of the teaching force. Provincial governments, particularly the former Directorate of Staff Development and currently the Quaid-e-Azam Academy for Educational Development in Punjab, have systematically engaged in a paradigm shift from traditional cascade models to continuous professional development, encouraging an interactive and constructivist approach to learning based on the processes of reflection, collaborative work, mentoring, and problem-solving (UNESCO Centre of Education and Consciousness, 2013). Teacher licensing is a major initiative that has been taken in recent years to raise the professional capacity of teachers and to professionalize the teaching workforce. This is the first time in the history of Pakistan that teachers will be obtaining licenses as a testimony to their teaching quality and professional standing (Ali and Ahmed, 2022). In 2012, the Higher Education Commission revised the curriculum for the B.Ed. (Hons.) elementary and the Associate Degree in Education. In line with the standards of other professional degrees such as medicine, engineering, or law, the 4-year B.Ed. (Hons.) degree intends to develop teachers as professionals who require comprehensive content knowledge and intensive professional training (Higher Education Commission (HEC), 2012).

The report on the status of teachers in Pakistan makes an important claim that "once the new training programs and policies are fully in place teachers will be better prepared to respond to the educational needs and aspirations of all children" (UNESCO Centre of Education and Consciousness, 2013, p. 28). Pakistan's educational history consists of detailed and

comprehensive documents and idealistic reform initiatives that were created with a lot of enthusiasm and fervor but could not bear the results that they were intended to bear. It has been argued elsewhere (Rizvi, 2015) that policymakers need to realize that, unless teachers are recognized as professionals who are actively involved in the decision-making apparatus and assume leadership roles, who build collaborative teams and networks, and who are passionate and morally strong, these targets of quality education may remain unachievable.

Large-scale nationwide research was conducted to explore and understand teachers' perspectives on their professional status and the measures that have been taken in the past and are currently being taken to enhance teachers' status from a broad perspective, using a survey design. The research addressed the following questions:

1. What are teachers' perspectives about their professional status?
2. What measures have been taken to enhance teachers' status?

This research study focuses on the juxtaposition or interplay between how teachers see themselves as professionals in terms of their status and regard, how they strive to be professionals in terms of practicing professional standards (the being), and what measures have been undertaken to enhance teachers' status (the becoming).

4. Materials and methods

Data were collected from 4,165 teachers from the four provinces of Pakistan, namely, Punjab, Sind, Khyber Pakhtunkhwa, and Baluchistan, as well as other regions (Islamabad, Azad Jammu Kashmir, and Gilgit-Baltistan) using a multistage stratified sampling technique to ensure that the sample was representative of the entire country.

4.1. Sampling decisions

Teachers were selected proportionately from the four provinces, namely, Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan, as well as other regions, which included the Islamabad Capital Territory (ICT), Azad Jammu and Kashmir (AJK), and Gilgit-Baltistan (GB), to make the sampling representative of the teaching levels in the provinces/regions. From each province, urban and rural districts were selected. A total of 09 districts were included in this study.

Pakistan's 2023 population is estimated at 240,485,658 people at mid-year. Out of the total population, 34.7% is urban (83,500,516 people in 2023) and 65% is rural (156,985,142 people in 2023) (Worldometer, 2020). The current rural-urban divide concerning the aggregate teaching force in Pakistan is 59.51% and 40.48%, respectively (The Academy of Educational Planning and Management, 2021). It was, therefore, important to select teachers from both rural and urban regions.

Within each urban and rural district, both public and private schools were randomly selected. From these schools, teachers were randomly selected. All teachers teaching at the elementary, middle, and secondary levels from the randomly selected schools from each district were included in the study. This category also included school principals. All school principals/vice-principals and school in-charge/section heads were invited to participate in the survey research. The estimated sample size of teachers was 5,100. In all, 4165 teachers participated in the study, representing a response rate of 81.6%. The percentage of teachers from each province/region corresponded approximately to the percentage of teachers stated by official AEPAM Statistics, 2016–17 (The Academy of Educational Planning and Management, 2018). Table 2 presents the region and district-wise distribution of the participants.

TABLE 2 Distribution of participants.

Province/ region	District	No. of teachers	
		Public	Private
Punjab	Lahore	501	455
	Faisalabad	383	140
	Rawalpindi	384	116
	Sheikhupura	122	63
Sindh	Karachi	238	528
	Sukkur	179	005
KPK	Peshawar	172	117
	Chitral	162	115
Baluchistan	Quetta	114	41
Other regions	Islamabad	—	60
	Gilgit-Baltistan	94	117
	Azad Jammu Kashmir	43	16
Total		2,392	1,773

TABLE 3 Teachers' key characteristics.

Key characteristics	Teachers from public schools	Teachers from private schools
Number of teachers	2,392 (57%)	1,773 (43%)
Female teachers	1,443 (60%)	1,561 (88%)
Male teachers	949 (40%)	208 (12%)
Age ≥ 40	1,275 (55%)	598 (34%)
Experience ≥ 15 years	1,295 (55%)	486 (28%)
Academic qualification (M.A./M.Sc./M.Com.)	1,468 (63%)	1,021 (58%)
Professional qualification (M.Ed. and B.Ed.)	1,756 (73%)	623 (35%)
Salaries ≥ 50,000	1,019 (45%)	358 (20%)

4.2. Sample characteristics

The demographic analysis illustrated that the teachers come from diverse backgrounds. Teachers from both public schools (57%) and private schools (43%) participated in the study from different districts of Pakistan. They came from high- to low-income schools. They taught different subjects at different levels, from primary to higher secondary. There were both and male teachers. Approximately, an equal number of teachers above ($n = 1{,}837$) and below ($n = 2{,}177$) the age of 40 participated in the study. Overall, 43% of the teachers had teaching experience of more than 15 years, and 57% had teaching experience of less than 15 years. The key characteristics are presented in Table 3.

4.3. Description of the questionnaire

The data were collected from teachers with the help of a purposefully developed structured questionnaire. Using information from various available studies in the literature (Herrmann, 1972; Hoyle, 2001; Rice, 2005; Hargreaves et al., 2006; Ministry of Education, 2009; Burns and Darling-Hammond, 2014; Lankford et al., 2014; Symeonidis, 2015), the researcher's own experience, and the concepts noted in the theoretical background, a questionnaire was designed.

The questionnaire comprised four parts. Part A of the questionnaire requested demographic or factual information concerning the respondents' gender, age, place of work, and personal and professional biographical data. It also contained some general background information about the context. Part B asked the teachers to report on a Likert scale to capture their perceptions about their professional status from various angles. Part C collected the teachers' views on the various measures that have been undertaken to enhance their professional status. Part D provided teachers with an opportunity to express any general issues or concerns.

4.4. Refining and piloting of questionnaire

The questionnaire was translated into the national language of Pakistan, as well as the local languages of the different respondents. Members of the research team translated the tools themselves, with support from local language experts to retain the literal meaning of the items in the tools. The research assistants' training and regular monitoring of the work also ensured the collection of reliable and authentic data. Furthermore, the questionnaire's reliability was measured using the internal consistency method associated with Cronbach's alpha. Its content validity was established by giving the tool to six educators with expertise in the content areas to read the tools specifically for the purpose of checking that the items were measuring the concepts that they were supposed to measure.

The questionnaire was pilot-tested with ~100 respondents for the purpose of checking the reliability, time consumption, and content comprehensiveness. The purposes of piloting the tools were as follows:

- To refine the questionnaire.
- To assess the viability of pursuing a large nationwide study.
- To assess the feasibility of entry and logistical plans.

The key points of improvement from the pilot were as follows:

- Clarification of the meanings of several items in the questionnaires.
- Improvement of the instructions for the questionnaire.
- Improvement of the training procedures for administering the questionnaires.
- Inclusion of items related to teaching during emergency situations to give due coverage to teachers' status in the changing scenario and also to facilitate the mental and emotional engagement of the respondents with the questionnaire.

4.5. Data collection procedures

Eighteen research assistants worked with the core team members to collect data from the selected districts. A 2-day online training exercise was arranged for the research assistants. The training aimed to provide a detailed description of the data collection tools. Issues related to the administration of the data collection instruments and research ethics were also discussed with the research assistants.

Research assistants self-administered the questionnaires among the teachers and collected them back at a time suggested by the teachers. Considering the pandemic situation, flexibility was added to the design. A hybrid data collection method that included both face-to-face and online portions was employed. Data from most private schools were collected using online means. Online meetings were held with the school principals to discuss data collection modalities and the number of participants required from each school. Data collection tools were shared and discussed with the school principals. The online data submission process was kept anonymous to uphold ethical principles.

4.6. Follow-up and supervision of field-based tasks

Online monitoring and supervision were organized due to the COVID-19 pandemic situation. This involved more perseverance and exhaustive engagement with the research team than what was originally planned.

Regular meetings were organized with all the research assistants once a week until they had completed data collection. The meetings provided avenues of intellectual discourse and emotional connection to the research assistants hailing from diverse contexts and realities. As the research required direct administration of the questionnaire to all the teachers, open, supportive, and transparent channels of communication through emails and WhatsApp groups were established so that field-based concerns could be communicated and resolved in a timely manner.

4.7. Data analysis techniques

The data were analyzed using both descriptive and inferential statistical techniques using SPSS within two constructs: the being and the becoming. The analysis and results of Part B of the questionnaire will be addressed first in Section 5, exploring the being professional construct (how teachers see themselves as professionals in terms of their status and regard and how they strive to be professionals in terms of practicing professional standards), followed by the analysis of Part C of the questionnaire in Section 6, exploring the becoming professional construct (what measures have been undertaken to enhance teachers' professional practice). Section 7 will bring together the discussion on the being and the becoming professional constructs for drawing meaningful themes and implications.

5. Results and analysis of the being professional construct

Teachers' responses to items written to investigate teachers' professional status were collected on a 5-point Likert scale consisting of 24 items. The responses were converted into a numerical scale. The numerical value assigned to each response is given below:

Strongly Agree (SA)	Agree (A)	Uncertain (U)	Disagree (D)	Strongly Disagree (SD)
5	4	3	2	1

The frequency distribution of each variable was calculated using the SPSS. The principal components analysis (PCA) method was used to extract the factors. These were rotated using the Varimax rotation to produce a more meaningful interpretation of the underlying structure of teachers' status.

Four criteria were used to extract factors. First, the criterion of simple structure was employed. This means that the items that loaded for more than one factor were either omitted to achieve a purer measure of the different dimensions of teacher status or they were assigned to the factor for which they had the highest loading value, provided that the item also contributed to the meaning of the factor. Second, items were evaluated for conceptual clarity. This means that those items that loaded on a factor with a value greater than or equal to 0.40 and those that contributed logically to the meaning of the factor were considered significant for the factor. Third, items were eliminated if they substantially reduced the internal consistency of the items in the factor, as measured by Cronbach's alpha. Fourth, Kaiser's (Bryman and Cramer, 2005) criteria and Cattell's (Bryman and Cramer, 2005) scree test method were employed to decide the number of factors to be retained. Only those factors that had eigenvalues greater than 1 or that lay before the point at which the eigenvalues seemed to level off were retained.

Three factors explain the being professional construct of the professional status. For overall schools, the three factors had eigenvalues exceeding 1, and they explained 24.42%, 8.70%, and 4.70% of the variance, respectively. For public schools, the three factors had eigenvalues exceeding 1, and they explained 25.04%, 9.89%, and 4.72% of the variance, respectively. Similarly, for private schools, the three factors had eigenvalues exceeding 1, and they explained 25.01%, 5.26%, and 4.30% of the variance, respectively.

Factor 1 was titled "The Professional in the Being Professional Construct of Teachers' Status," Factor 2 was titled "The Ideological Values in the Being Professional Construct of Teachers' Status," and Factor 3 was titled "The Personal Empowerment in the Being Professional Construct of Teachers' Status". Tables 4, 5, 7 present these factors with their factor loadings. For the sake of brevity, views of "Agree" and "Strongly Agree" were collapsed together to form one view of "Agree" that is numerically equal to 3 and represented by "A." Similarly, views of "Disagree" and "Strongly Disagree" were collapsed together to form one view of "Disagree" that is numerically equal to 1 and represented by "D." Views of "Uncertain" values remained unchanged but were assigned a new numerical value equal to 2 and represented by "U." This rule has been applied to all the tables that present factors.

Inspection of the correlation matrix for the three factors revealed the presence of many coefficients of 0.3 and above. The Kaiser–Meyer–Olkin value for both public and private school teachers was 0.88 overall. For the public school scale, the Kaiser–Meyer–Olkin value was 0.885. For the private school scale, the Kaiser–Meyer–Olkin value was 0.876. The Kaiser–Meyer–Olkin value for the three factors exceeded the recommended value of 0.6 (Pallant, 2001). Bartlett's test of sphericity (Pallant, 2001) for the factors also reached statistical significance, supporting the factorability of the correlation matrix.

5.1. Professional competencies in the being professional construct

The PCA revealed a presence of strong professional construct with item loadings ranging from 0.436 to 0.771 (Table 4) in the three school categories (overall, public, and private), illustrating high to moderate correlation (more than 0.40) with the factor. The respondents' perception counts for the items (except for PTS 17) illustrated strong agreement ranging between 86% and 95% (Table 4). The Cronbach's alpha values of 0.831 for the public school and 0.835 for the private schools and overall demonstrated strong internal consistency of the items.

The same items were loaded in three school categories with the exception of PTS 17, which was loaded only in public schools. Public school teachers perceive their capacity to modify curriculum content or delivery to fulfill the learning needs of their students as an important dimension of their being professional construct. However, only 65% of the public school teachers agreed with this item, 17% were uncertain, and 18% disagreed (Table 4). Additional analysis was performed to unpack the levels of agreement between classroom teachers and principals. The principal category also included vice-principals, coordinators, and school in-charge or section heads. The analysis revealed that both teachers (n = 1318, 65%) and school principals (n = 200, 65%) felt equally enabled in terms of modifying the curriculum content or delivery to fulfill the learning needs of their students (Figure 2). This finding is important as it illustrates that teachers feel as enabled

TABLE 4 Factor 1.

Factor 1: Professional competencies in the being professional construct of teachers' status												
	Overall schools				Public schools				Private schools			
Items	Loading	A	U	D	Loading	A	U	D	Loading	A	U	D
PTS 16: I am regarded as a good teacher in my community because I use diverse and modern instructional practices in my class.	0.61	3,639 (88%)	318 (8%)	174 (4%)	0.57	2,024 (86%)	211 (9%)	125 (5%)	0.64	1,615 (91%)	107 (6%)	49 (3%)
PTS 17: I can modify the curriculum content or delivery to fulfill the learning needs of my students.			—	—	0.44	1,526 (65%)	406 (17%)	417 (18%)	—	—	—	—
PTS 18: I believe that I have the ethical responsibility to educate students for life and not only for passing school exams.	0.69	3,906 (94%)	142 (3%)	99 (3%)	0.67	2,200 (93%)	86 (3%)	89 (4%)	0.66	1,706 (96%)	56 (3%)	10 (1%)
PTS 19: Parents consider me a good teacher as my students are mostly high achievers.	0.69	3,731 (89%)	322 (8%)	93 (3%)	0.71	2,121 (89%)	183 (8%)	70 (3%)	0.66	1,610 (91%)	139 (8%)	23 (1%)
PTS 20: I feel that I am a better teacher because of my teacher training.	0.71	3,783 (91%)	258 (6%)	100 (3%)	0.72	2,134 (90)	162 (7%)	76 (3%)	0.68	1,649 (94%)	96 (5%)	24 (1%)
PTS 21: I feel that I am prepared to modify my teaching as per the changing requirements due to emergencies (e.g., teaching in the post-COVID-19 classroom).	0.73	3,775 (91%)	255 (6%)	118 (3%)	0.74	2,102 (88%)	189 (8%)	86 (4%)	0.71	1,673 (94%)	66 (4%)	32 (2%)
PTS 22: I make use of various professional development opportunities to enhance my teaching skills.	0.75	3,780 (92%)	229 (6%)	127 (3%)	0.77	2,091 (89%)	161 (7%)	112 (4%)	0.71	1,689 (95%)	68 (4%)	32 (2%)
PTS 24: I plan my lesson based on the reflections from the previous class.	0.64	3,806 (91%)	244 (6%)	135 (3%)	0.62	2,091 (89%)	164 (7%)	109 (4%)	0.65	1,665 (94%)	80 (5%)	26 (1%)
Cronbach's Alpha Values	0.835				0.831				0.835			

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TABLE 5 Factor 2.

Factor 2: Ideological beliefs in the being professional construct of teachers' status												
	Overall schools				Public schools				Private schools			
Items	Loading	A	U	D	Loading	A	U	D	Loading	A	U	D
PTS 02: I joined the teaching profession by choice	0.67	3,813 (92%)	182 (4%)	152 (4%)	0.68	2,186 (92%)	102 (4%)	89 (4%)	0.67	1,627 (92%)	80 (5%)	63 (3%)
PTS 03: I believe that I play a key role in developing children as independent and responsible citizens of Pakistan	0.61	3,968 (96%)	139 (3%)	46 (1%)	0.68	2,240 (94%)	105 (4%)	37 (2%)	0.63	1,728 (97%)	34 (2%)	9 (1%)
PTS 06: I am responsible for setting moral standards for my students	0.60	3,942 (95%)	122 (3%)	82 (2%)	0.56	2,246 (94%)	74 (3%)	58 (3%)	0.60	1,696 (96%)	48 (3%)	24 (1%)
PTS 10: My work environment at school determines my status	0.43	3,447 (84%)	415 (10%)	264 (6%)	0.42	2,003 (85%)	205 (9%)	155 (6%)	0.49	1,444 (82%)	210 (12%)	109 (6%)
PTS 11: I feel that, according to the norms of my society, teaching is the most respectable profession for me	0.61	3,604 (87%)	316 (8%)	229 (5%)	0.59	2,097 (88%)	166 (7%)	115 (5%)	0.61	1,507 (85%)	150 (8%)	114 (7%)
Cronbach's Alpha values	0.728				0.742				0.712			

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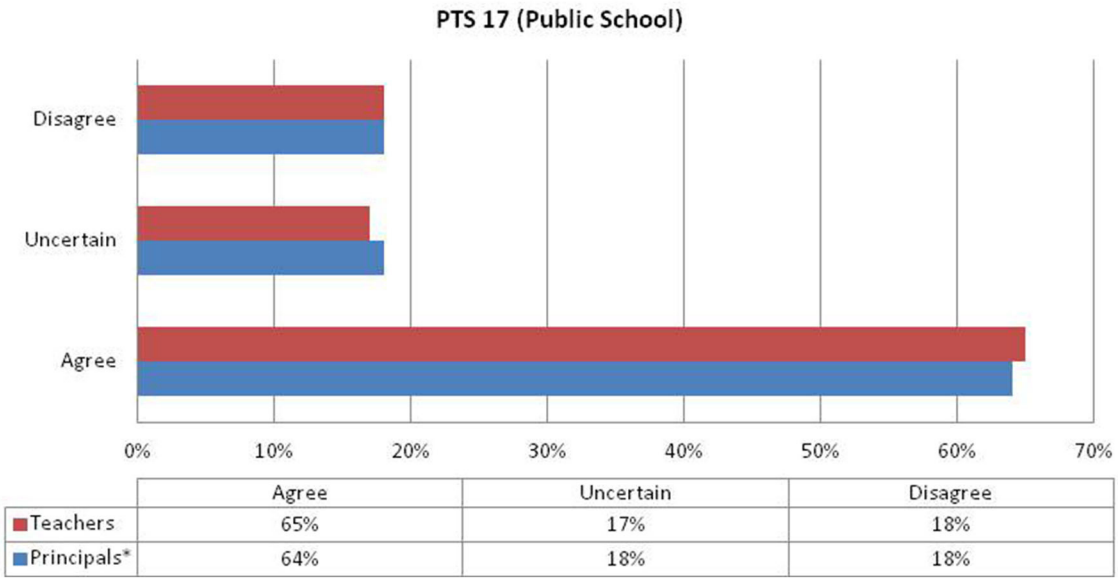

	Agree	Uncertain	Disagree
Teachers	65%	17%	18%
Principals*	64%	18%	18%

FIGURE 2
PTS 17 - I can modify the curriculum content or delivery to fulfill the learning needs of my students (Public School). *Also included vice-principals, coordinators and school in-charge or section heads.

as school principals regarding curriculum modification at the classroom level.

The professional competencies in the being professional construct of teachers' status emerged as significant in all three school categories—overall, public, and private. This dimension entails the quality, range, and flexibility of teachers' classroom work and the way they develop as professionals to undertake school improvement initiatives and to bring positive change at the classroom level (Hargreaves, 2000).

Teachers perceive that parents and the community consider them good teachers when they use diverse and modern instructional practices in their classes and when their students are high achievers (PTS 16 and 19). This appreciation, according to the teachers, is an important determinant of their professional status and provides evidence of their being professional. The other determinants of teachers' professional beings are as follows: fulfilling their ethical responsibility to educate students for life, planning lessons based on reflection from previous classes, making use of various professional opportunities to enhance teaching skills, and modifying practices due to emergencies such as teaching in the post-COVID-19 classrooms. However, low counts on PTS 17 should be a matter of concern for educational managers and trainers as every teacher should feel enabled to modify content or delivery to fulfill the learning needs of their students.

These findings are particularly important on two counts. First, they illustrate what constitutes "being professional" in the professional status. Second, implicit within PTS 16 and PTS 19 are teachers' claims of "becoming professional," which require acceptance and appreciation from parents and community members. Many large-scale top-down reforms with good intentions have failed to make a substantial impact at the classroom level (Rizvi and Elliott, 2005; Rizvi and Nagy, 2016) because of their detachment from particular school realities, and the teachers' professional status continued to show a downward trend. It is important to see later in the results what relevant measures have been taken to foster teachers' professional status.

5.2. Ideological beliefs in the being professional construct of teachers' status factor

Item loadings for ideological beliefs in the being professional construct ranged from 0.421 to 0.683 (Table 5), illustrating moderate correlation (0.40 > but > 0.70) with the factor. The same items were loaded in three school categories. The perception counts illustrated strong agreement ranging between 97% and 82%. The Cronbach's alpha values of 0.742 for the public school and 0.712 for the private school demonstrated strong internal consistency within the items (Table 5).

It is clear from the analysis that teachers' professional being is also ideologically constructed. This may be because theoretically, teachers in Pakistan enjoy an elevated status due to their central ideological role in the character-building, social, behavioral, and mental development of Pakistani children. Islam, which is the dominant religion in Pakistan, also pays a lot of respect to the teaching profession. School teachers appear to corroborate the theoretical notions by confirming that they play a key role in developing children as independent and responsible citizens (PTS 03 - public 94% and private 97%) and that they are responsible for setting moral standards for their students (PTS 06 - public 94% and private 96%). Similarly, 88% of public school teachers and 85% of

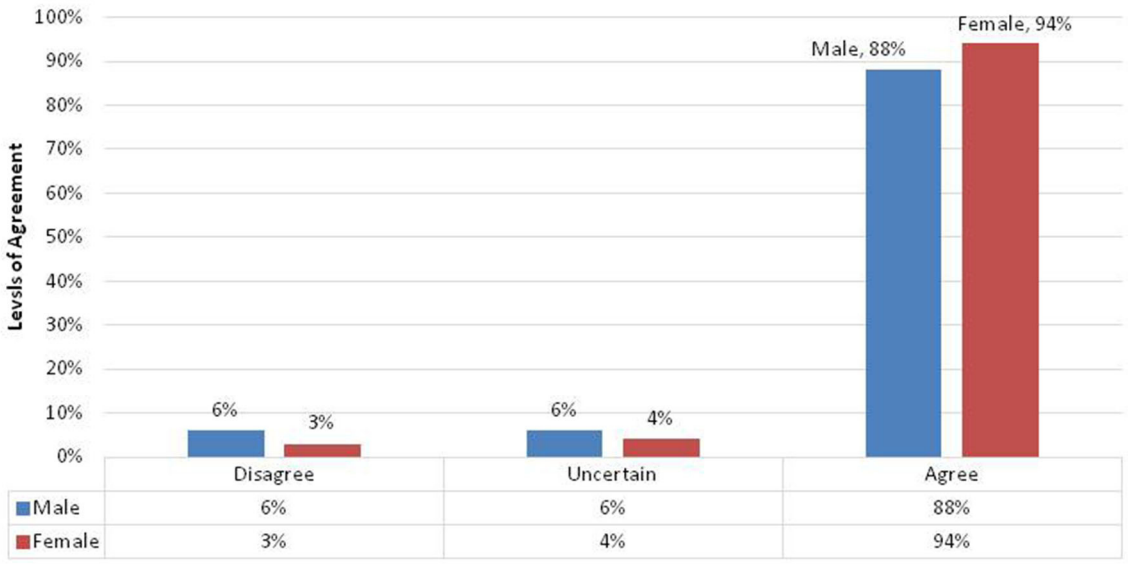

FIGURE 3
Public and private school teachers' perceptions of teaching as a profession by choice.

private school teachers believe that teaching is the most respectable profession for them in Pakistan (PTS 11).

There are two important findings in this construct. First, teachers from both public and private schools voiced that they joined the teaching profession by choice (PTS 02 - 92% both public and private). These findings are in complete contrast to the general view that teaching is the last profession of choice, particularly for male teachers (Ministry of Education, 2009). Since most of the teachers in the sample were women (72%), additional analysis was performed to unpack the levels of agreement of both male and female teachers separately. Additional analysis revealed that teaching was a profession of choice for both male ($n = 1{,}006$, 88%) and female ($n = 2{,}803$, 94%) teachers (Figure 3).

The other important finding is that, in teachers' views (public 88% and private 85%), the working environment plays an important role in helping them being professional and determining their professional status (PTS 10). Relating it to the ideological perspective, one can see the relationship of the school environment with other items factored in, signifying that teachers need a conducive learning environment for fulfilling their moral responsibilities and playing their role in developing children as responsible citizens. The additional analysis illustrated a significant correlation of PTS 10 with other items in the scale (Table 6).

5.3. Personal empowerment in the being professional construct of teachers' status factor

The personal empowerment in the being professional construct of teachers' status construct had loading values ranging from 0.415 to 0.748, illustrating a high to moderate correlation (more than 0.40) with the factor (Table 7). The same items (except PTS 17) were loaded in all school types. The internal consistency measures of Cronbach's alpha were lower than those of other constructs. However, they were retained because of their meaningfulness to the study and also because of high inter-item correlation.

Through this construct, teachers illustrated that their personal identity as capable and confident beings is an important determinant of their professional status. Most of the teachers from public schools (86%) and private schools (78%) reported that they play an important role in policy and planning at their school level (PTS 04). However, the number of teachers who, according to them, are involved in policy and planning at the national and/or provincial level is relatively small, at 53% for both public and private schools (PTS 05). PTS 17 was loaded in the private school category. The same item was loaded in the public school category in Factor 1 (Section 5.1). Although public school teachers feel that they have the capacity, they are not necessarily empowered to make changes in the curriculum content or delivery; contrarily, the majority of the private school teachers ($n = 1476$, 83%) feel empowered to modify the curriculum content or content delivery to fulfill the learning needs of their students.

Additional analysis was performed to unpack the levels of agreement between private classroom teachers and principals. The analysis revealed that both teachers ($n = 1305$, 83%) and school principals ($n = 167$, 83%) felt equally empowered in terms of modifying the curriculum content or delivery to fulfill the learning needs of their students (Figure 4). This finding is important as it demonstrates that private school teachers and principals feel equally empowered regarding curriculum modification at the classroom level.

PTS 23 illustrated that private school teachers (59%) appear to feel more empowered to make changes at the school level than public school teachers (46%). This difference in perceptions appears to be rooted in the different school setups. Public schools

TABLE 6 Correlation of teachers' perceptions of the school environment with other items in the scale.

Correlations							
			PTS2	PTS3	PTS6	PTS10	PTS11
Spearman's Rho	PTS10	Correlation coefficient	0.367	0.263	0.363	1.000	0.509
		Sig. (2-tailed)	0.000	0.000	0.000	.	0.000
		N	4,110	4,115	4,111	4,126	4,119

are managed by the government, supported by government funds, and mandated by the government's curriculum. Contrarily, private institutions are managed by private owners who generate their own funds for managing schools. It may be that private schools' teachers have more of a vested interest in their schools and, therefore, they feel more in authority to make changes.

6. Results and analysis of the becoming professional construct

The teachers' responses to items written to investigate measures to enhance teachers' professional status were collected through questions of varying types, from Yes or No questions to 3-point and 5-point scales. Descriptive analysis of the data was conducted using frequency distributions mainly to unpack the measures that have been taken to enhance the professional competencies of teachers. Wherever applicable, a follow-up analysis was conducted to provide further explanation.

Teachers were invited to respond to a number of specific measures subsumed under six broad categories, namely, general opportunities, specific professional development opportunities, teachers' work patterns, teachers' employment, salaries and benefits, other benefits, and teachers' work conditions. Table 8 summarizes the two specific measures that both public and private teachers identified as the most occurring and the two that they identified as the least occurring under each broad category. The measures were based on the counts of teachers' levels of agreement and disagreement with the items in each overall category.

Table 8 presents interesting patterns. The findings illustrate how being professional and becoming professional intersect and intertwine. For example, in the being professional construct, teachers portrayed themselves as competent professionals who can modify teaching and curriculum to suit students' needs and the changing contexts with the help of various professional development opportunities. Teachers' portrayal connects well with a number of most-occurring measures. These are related to developing teachers' professional competencies such as arranging planned and organized professional development programs for them, providing them with avenues to bring their learning from continuous professional development to the classrooms, and making provisions for continuous professional development, which results in greater recognition in a particular skill or area of specialization. This resultantly connects to the findings relating to the professional capacities in the being professional construct as the most significant dimension of teachers' professional status. The relationship illustrated here is not conclusive, but the pattern is very obvious.

The findings also illustrate that, while teachers recognize the importance of professional development, they have limited opportunities for receiving grants for furthering their professional qualifications or for receiving free pre-service or in-service education. Teachers' work patterns suggest that they are mostly held accountable through various measures, but they are less involved in matters related to educational policy and planning, including matters related to teaching during the pandemic.

A similar pattern was observed in teachers' work conditions, where teachers had more decision-making freedom in some matters. For example, a higher percentage of teachers reported that they could determine their teaching methods and could also ask for improvement in the work conditions, but the percentage of teachers who could ask for a salary raise or change in their employment condition was small. Similarly, while most of the teachers were employed on a permanent basis, enjoyed job security, and had obtained a salary raise during the last 10 years, most of them were still not satisfied with their existing salaries and felt that their salaries were not comparable to salaries in other professions with similar qualifications.

7. Juxtaposition of being professional and becoming professional: discussion and implications

It is very clear from the analysis that teachers identify with being professional and they wish to be seen as professionals. The core of the "Professional Competencies in the Being Professional Construct of Teachers' Status" factor comprises teacher knowledge, teacher pedagogy, teacher engagement, and teacher learning and preparation (also for emergency situations). While teacher knowledge, teacher pedagogy, and teacher engagement define teacher professionalism, teacher learning and preparation call for professionalizing the profession. Teachers shared that key measures to facilitate their learning and preparation within the becoming professional construct comprise the provision of planned and organized professional development programs for teachers (such as workshops, short-duration training, etc.) and the provision of opportunities to bring learning in real classrooms for greater recognition in a particular skill or area of specialization. This is in accordance with Hargreaves's (2000) notion that, when teachers are being professional in terms of the professional standards, they follow their daily routine to produce quality work and wish to be seen as professionals (Hargreaves, 2000) in terms of their status, standing, regard, and levels of professional reward. This is easier said than accomplished, particularly in a country like Pakistan, where, as noted earlier, it has been generally reported

TABLE 7 Factor 3.

Factor 3: Personal empowerment in the being professional construct of teachers' status													
		Overall schools				Public schools				Private schools			
Items	Loading	A	U	D	Loading	A	U	D	Loading	A	U	D
PTS 04: I play an instrumental role in policy and planning at my school level	0.52	3,408 (83%)	431 (10%)	307 (7%)	0.52	2,029 (86%)	214 (9%)	134 (5%)	0.75	1,379 (78%)	217 (12%)	173 (10%)
PTS 05: I play an instrumental role in policy and planning at the national and/or provincial level	0.70	2,179 (53%)	766 (18%)	1,175 (29%)	0.70	1,254 (53%)	409 (17%)	697 (30%)	0.70	925 (53%)	357 (20%)	478 (27%)
PTS 17: I can modify the curriculum content or content delivery to fulfill the learning needs of my students	0.45	3,002 (72%)	574 (14%)	542 (14%)	—	—	—	—	0.42	1,476 (83%)	168 (10%)	125 (7%)
PTS 23: I feel that I am empowered enough to make changes in my school	0.60	2,125 (52%)	953 (23%)	1,046 (25%)	0.45	1,090 (46%)	539 (23%)	726 (31%)	0.56	1,035 (59%)	414 (23%)	320 (18%)
Cronbach's Alpha Values		0.585			0.511				0.674			

that teaching has become the profession of the last resort for most educated young persons (Ministry of Education, 2009), despite efforts to raise the status of the profession by investing in improving teacher management, developing political will for teacher licensing and certification, increasing equity in teacher placement, improving the school environment, and investing in teacher development (Government of Pakistan, 2017, 2018). Experts often flip Hargreaves's (2000) notion to argue that if teachers wish to be seen as professionals in terms of their status and regard, they must always strive to be professionals in terms of practicing professional standards. They cite examples to illustrate the breadth of teachers' incapacities in relating with students, engaging students in learning, and promoting students' learning (Ministry of Education, 2009; Pre-service Teacher Education Program Pakistan/USAID, 2010). They argue that teachers need to engage in continuous learning and preparation for greater and demonstrable execution of professional standards at the classroom level to enhance their professional standing and their own sense of professionalism. Ignoring teachers' calls for being professional would kill and overturn even the most creatively designed professional development programs (Hargreaves, 2002; Rizvi, 2015).

The "Personal Empowerment in the Being Professional Construct of Teachers" Status factor calls for regarding teachers as capable professionals who have the capacity to influence and drive improvements in their own learning and in the learning of the children in their care. The personal construct highlighted in this study brings to the surface teachers' conceptualization of re-professionalizing the profession in a drive to enhance their status. Teachers' involvement in policy and planning at the school, provincial, or national level and teacher empowerment have emerged as two important components of this construct. Teachers shared that they can play an important role in policy and planning. The analysis of the measures taken to help teachers become professionals revealed that they are mostly held accountable through various measures, but they are less involved in matters related to educational policy and planning at the national, provincial, or regional level, including matters related to teaching during the pandemic. This means that a detached planning approach, which the literature has already highlighted as problematic (Furlong et al., 2000; Flores and Shiroma, 2003; Hall and Schulz, 2003), is still being practiced in Pakistan. It is dismal to note that nearly 50% of the teachers in the sample did not feel empowered to make changes even at the school level.

These findings contradict teachers' ideological beliefs, which are reflected through the core values emerging from the "Ideological Beliefs in the Being Professional Construct of Teachers' Status" factor, where they consider themselves ethical professionals who are responsible for building the moral and ethical character of students so that they become independent and responsible citizens of Pakistan. In his address at the first educational conference held in Pakistan soon after achieving independence in 1947, Quaid-e-Azam, Muhammad Ali Jinnah (Mujahid and Merchant, 2007) accorded an important responsibility and a prominent status to Pakistani teachers for building the character of future generations. This policy has continued since then,

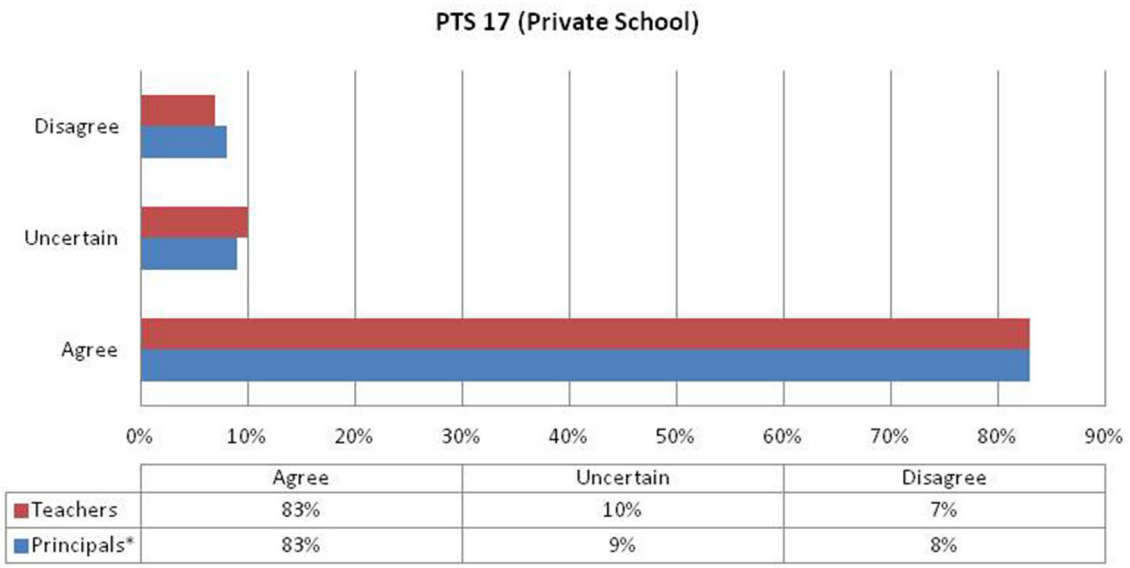

FIGURE 4
PTS 17 - I can modify the curriculum content or delivery to fulfill the learning needs of my students (Private School). *Also included vice-principals, coordinators and school in-charge or section heads.

TABLE 8 Overall most- and least-occurring specific measures.

No	Broad categories	Specific measures			
		First-most occurring	Second-most occurring	First-least occurring	Second-least occurring
1	General opportunities	Received a salary raise in the last 10 years	Planned and organized professional development programs, such as workshops, and short-duration training, for teachers	Nominated for membership in a professional association (e.g., SPELT)	Received grant/scholarship to further professional qualifications, such as obtaining an educational degree
2	Specific professional development opportunities	CPD results in greater teacher recognition in a particular skill or area of specialization	The school facilitates me in bringing CPD learning into the real classroom	Teachers receive free in-service teacher education/training sponsored by the government	Teachers receive free pre-service teacher education sponsored by the government
3	Teachers' work patterns	Teachers are held accountable through various measures such as appraisals and test results	Teachers are held accountable through inspections and supervision	Teachers are involved in matters related to educational policy at the national/regional/school level	Teachers' views are sought on various educational issues, such as alternate solutions for teaching in emergencies like teaching in a pandemic situation
4	Teachers' employment, salaries, and benefits	Most of the teachers are employed on a permanent basis	Teachers enjoy job security	Teachers' salaries are comparable to those of other professions with similar qualification.	Teachers' salaries are linked to students' performance in exams
5	Other benefits	Sick leave with pay	Maternity/paternity leave	Special provisions for teaching from home such as internet connection and updated device	Fuel allowances
6	Teachers' work conditions	I have the freedom to determine how to teach according to professional standards without any interference	I can ask for improvements in the working conditions from the relevant authorities	I can ask for a raise in my salary if I believe I meet the criteria	I can ask for revisions in my conditions of employment from the relevant authorities

at least theoretically. Realistically, as the measures in Table 8 illustrate, the salaries of the teachers on whose shoulders lie the responsibility of building the character of future generations are not even comparable to those of other professions in Pakistan; teachers are expected to abide by ethical standards but cannot ask for revisions in their conditions of employment or alter

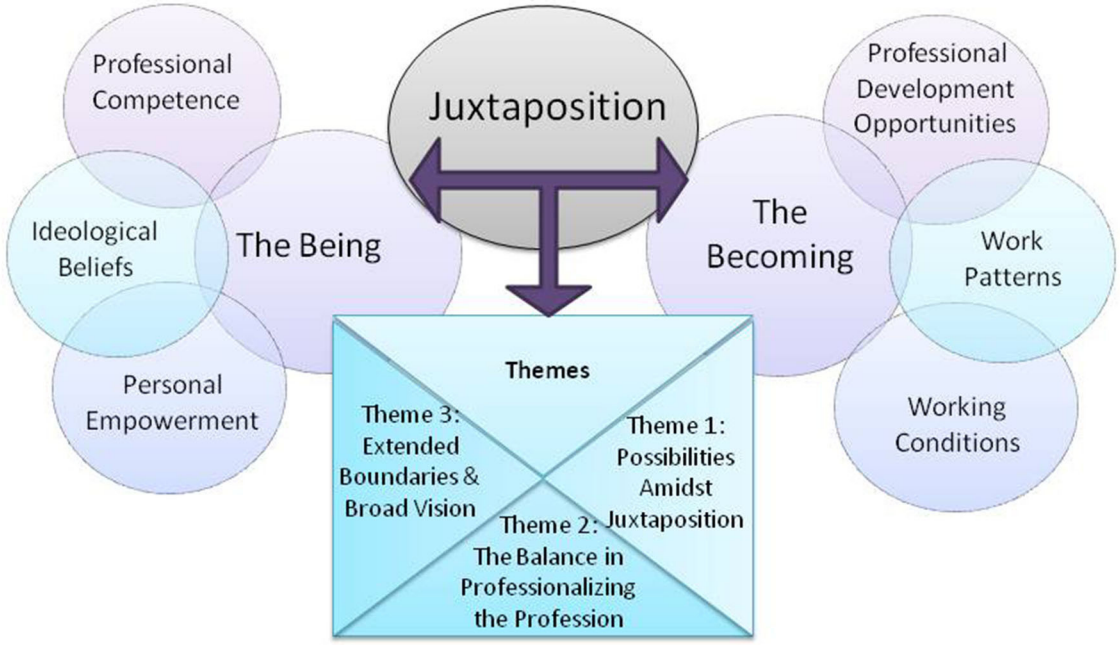

FIGURE 5
Juxtaposition of being professional and becoming professional (informed framework).

their work environment for judicial execution of their ethical work practice.

While dilemmas abound and tensions persist in the way of professionalizing the teaching profession, the juxtaposition of the being professional and becoming professional constructs has also drawn attention to a number of possibilities for creating equitable, futuristic, and judicial teacher education programs. These are illustrated with the help of three key themes for preparing and recognizing teachers as professionals. The themes have emerged from the careful analysis of the three factors presented in Sections 5.1, 5.2, and 5.3, as well as the general and specific opportunities for enhancing teachers' professional status presented in the Results and Analysis of the Becoming Professional Construct section. A discussion of these themes culminates into specific implications for the relevant authorities in Pakistan, in particular, but it may also be relevant for educational authorities in related global contexts to make informed decisions for drawing meaningful and authentic connections between being professional and becoming professionals. Figure 5 illustrates this relationship. It is a progression from the initial framework to the informed framework, illustrating how the juxtaposition of the key factors of being professional and the key measures of becoming professionals generate key themes of recognizing teachers as professionals and enhancing their status.

7.1. Theme one: possibilities amid juxtaposition

The reciprocal relationship illustrated in juxtaposition is important for defining teachers' study programs. For example, the enhancement of teachers' professional status takes place when measures that contribute to defining teachers' status are also taken. Teachers, as professional beings, must understand children's needs and prepare them for the unforeseen future. This is only possible when teachers are also prepared for such roles and responsibilities.

In making an argument for teachers as activist professionals, Groundwater-Smith and Sachs (2002) called for thorough preparedness of teachers working at all levels. They argued that teacher education programs need to be based on the principles of critical pedagogy, preparing and enabling teachers to challenge the practices that are geared toward de-professionalizing the profession. Rigorous preparation, creative engagement, theory-driven practice, professional autonomy, and professional standards have been identified globally as the core of teacher professionalism and professionalization (Swann et al., 2010).

The findings strongly imply that policymakers and educational planners should focus on preparing and recognizing teachers as autonomous professionals capable of realizing more fully the professional standards, which they highlighted in this research, with the help of futuristic and judicious teacher preparation and development programs based on principles of inclusion and teacher empowerment (Korthagen, 2017; Cochran-Smith et al., 2022). If teachers continue to be treated as technicians with little or no control over their own development, then ambitious plans such as teacher licensing and accreditation will lose their true significance.

Planning of teacher education programs, which are detached from teachers' ideals, beliefs, and aspirations, may not produce any results no matter how progressive and forward-looking they are. The research presented a broad general overview of teachers' perceptions. This can serve as an authentic foundation for teacher training and development; however, since each individual is unique, there is also a need for more in-depth research that can bring

to light teachers' viewpoints on their own professional growth and development.

7.2. Theme two: the balance in professionalizing the profession

The analysis of teachers' work patterns presented a misbalance in the measures taken for professionalizing the profession. Most of the teachers agreed to the fact that they are held accountable for their work through various measures such as appraisal, test results, inspection, and supervision. However, relatively small percentage of teachers expressed that they were trusted to use their professional judgment and expertise, that their views were sought on various educational issues, and that they were involved in matters related to educational policy. These findings suggest that there is a tilt in balance toward various accountability measures compelling teachers to fulfill their responsibilities. Measures that treat teachers as responsible professionals are less in practice when in fact findings illustrated that teachers consider themselves ethical professionals whose responsibility is to educate students for life. These findings clearly suggest that responsibility must precede and supersede accountability (Hargreaves and Shirley, 2009). Hargreaves and Shirley (2009) also cited the example of Finland, where teachers are held together by cultures of trust, cooperation, and responsibility and where teachers feel responsible for all the students they affect. An accountable and transparent teaching profession is important, but there must be other creative ways to achieve this to re-professionalize (Williamson and Morgan, 2009) the teaching profession. The teaching profession based on principles of democracy, trust, justice, and equity (Groundwater-Smith and Sachs, 2002) can counteract the inclination toward a centrally controlled teaching profession and can also open avenues for opportunities for education debates and practices.

Policymakers and educational leaders need to understand that finding a balance is a tall but necessary order. Students are diverse, but so are teachers. Teachers are expected to respect the cultural diversity of the students. This can only happen if the teachers' own diversity is appreciated and respected. It is imperative that the profession is able to attract and retain teachers who have the commitment and passion to improve the quality of teaching and learning in their contexts.

7.3. Theme three: extending the boundaries and broadening the vision

Teachers' professionalism and professionalization is, in fact, a global phenomenon of importance for all concerned. Many issues highlighted by Edwards (cited in Thompson, 2021) in the global report on the status of teachers are quite similar to the issues we discovered in this research. The report gathered perspectives from multiple countries and multiple organizations across the globe. In this respect, it would be fair to say that teachers' status has a universal connotation. Edwards (cited in Thompson, 2021) stated that teachers can no longer be isolated. If education authorities want to improve the quality of education, they need to listen to teachers. Karousiou et al. (2019) asserted that policymakers who seek the successful restructuring of education systems will unavoidably have to respect and support teachers' professional being.

There are implications for policymakers and educational managers to structure avenues of global dialogues among teachers from diverse national and international contexts so that they can learn from each other, work collaboratively toward resolving their issues, and uplift their professional status. These avenues can include but may not be limited to the formation of professional associations, membership in the existing associations, and strengthening of professional networks through various programs.

8. Limitations of the study

The limitations, such as respondents' non-responsiveness for some items and their tendency to agree with positive items inherent in the quantitative self-report survey design, were addressed by collecting a large amount of data from diverse participants in different school settings spread across various regions of Pakistan. Resource and time constraints influenced sampling decisions. For example, it was decided to collect data from at least two districts from each province, except for Balochistan where only one district was selected due to its wide terrain.

The initial plan of collecting data from Deeni Madaris could not be materialized due to the COVID-19 pandemic situation. Some Deeni Madaris appeared interested at first. However, following the COVID-19 situation, they lost interest.

9. Conclusion

The research, guided by two broad research questions, provided a holistic understanding of teachers' notions of being professional and how these notions can lead to an informed program of enhancing teachers' professional status and standing. When teachers are being professional, they also need to be recognized as professionals. It was important to use empirical analysis pragmatically to reach out to a diverse group of teachers and ensure maximum participation from various regions of Pakistan using self-report data. A large number of participating teachers helped us counter the inherent bias in self-reports. However, they could not provide elaborations, which were required in some responses. Nevertheless, teachers openly and confidently shared their conceptions about their professional selves, their ideological selves, and their personal selves as capable professionals who can use their personal agency to define and lead their professional status. However, first, they need to be equipped with knowledge, confidence, and skills to make informed decisions and to improve the lives of the children under their care. If teachers are being

empowered, they also need emotional strength, trust, and economic stability.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Tutoring in the metaverse. Study on student-teachers' and tutors' perceptions about NPC tutor

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Introduction: The metaverse is defined as a new frontier for anyone's everyday life and a new challenge for the training and the professional development. The extended reality of the metaverse offers a new learning environment in which additional educational roles intervene to support the teaching and learning processes.

Methods: The work explores some aspects of the metaverse as a support for the initial training of teachers. It presents a study on the perceptions that student-teachers and school tutors of a teaching qualification path have, specifically, of the so-called 'non-player characters' (NPC) tutor and peers, in the metaverse. Quantitative and qualitative data were collected via mixed questionnaire and analyzed via descriptive statistics and QDA.

Results: The analysis found some differences in expectations between student-teachers and school tutors with respect to the metaverse, to the new educational roles related and, specifically, to the NPC tutor role. The triangulation of the early data is highlighting a general new look at the possibilities offered by the metaverse – in monitoring the learning program and in decision-making practices – as well as expectation about the teachers training – Artificial Intelligence relationship.

Discussion: The results of study regarding the perceptions of student-teachers and school tutors on the metaverse and on the role of the NPC tutor are offered as insights to be explored, through further investigations, to those responsible for teacher training courses and to the research that today investigates the learning effects of the metaverse as a potential professional training environment.

KEYWORDS

metaverse, tutoring, teacher training, mixed study design, not-played characters

1. Introduction

1.1. Meanings of metaverse

The term "metaverse" was coined by Stephenson (1993) in his science fiction novel "Snow crash" to refer to the three-dimensional space – the operating system called "Black Sphere" – in which the characters of the novel can do what they want and express the social class based on the best resolution of your avatar and the possibility of exclusive access (Duan et al., 2021). The metaverse is "a new computer-mediated environment consisting of virtual worlds in which people act and communicate with each other in real-time via avatars" (Hennig-Thurau et al., 2023). In a broader sense, metaverse is defined as "a 3D digital space mixed with the real world and the virtual world" (Zhang et al., 2022, p. 2; Colazzo and Maragliano, 2022).

The *physical* reality, not digital, is the one in which the person experiences through his/her motor, perceptive and cognitive functions; the *virtual* one, in which experiences are simulated and made immersive by means of specially created technological systems – software, interfaces and peripherals (cybertute, visor, earphones, wired gloves, etc.); the *augmented* one, compared to the previous ones, uses superimposed and computer-generated sensory information. Finally, *mixed* or "hybrid" reality is defined as the mixing of physical and digital reality (Pimentel and Teixeira, 1993; Wu et al., 2013; Di Tore et al., 2020). Thanks to the integrated use of emerging technologies (digital twins, block chain, holography, IoT) (Center for Journalism Studies of Tsinghua University, 2021; Kang, 2021; Lv et al., 2022; Park and Kim, 2022; Prieto et al., 2022), the metaverse is nowadays assumed as *extended* reality (XR), that effectively integrates and overcome the simple sum of *augmented*, *mixed* and *virtual* reality technologies (Park and Kim, 2022; Tu et al., 2023 – see Figure 1). Specifically, in the metaverse interaction performance, evaluation and user emotional responses would be made more vivid by an interaction-feedback system guided and mediated by artificial intelligence that analyzes numerous data in real time (Hennig-Thurau et al., 2023) – see Figure 2.

A number of general considerations have been advanced about the metaverse; many of them are animated by forecasts on the technological market and only partially based on actual research works (Kim, 2021). Among the first, the expectation that "nearly 30% of people will spend two hours a day in the metaverse for work, entertainment, education and socializing by 2027" (Wiles, 2022) is noteworthy. Interest in the metaverse as a work and learning opportunity has increased; perhaps also for this reason, the existing literature on the metaverse is inconsistent, without effective synthesis or consensus (Cho et al., 2023). The critical points would concern the forces of mediation and moderation (flexibilities of algorithms, risk of manipulation, etc.) as well as the interactional formats (user's ability to modify inputs) and will be taken as an object for future investigations especially in the area of humanities and education (Crain and Nadle, 2019; Cusumano et al., 2021).

1.2. Metaverse as new learning environment

The metaverse has heralded as a trend of future education with great potential specially in reference to the overcoming of the limits of space and time and the boundaries of the physical world (Zhang et al., 2022). The need to overcome the space-temporal limits of the traditional, excessively "controlled and circumscribed" learning environment (Kumpulainen and Mikkola, 2015, p. 13), was already expressed in the first reflections on the "extended learning environment" described as "new forms of configurations space-temporal educational approaches that resonate with students" learning lives in and out of school (…) "in which students are engaged in ubiquitous, multimodal and multidimensional, technology-mediated creative learning practices".

From such general learning perspective, the metaverse has been defined also a "new educational environment" (Suzuki et al., 2020; Prieto et al., 2022; Rospigliosi, 2022; Zhang et al., 2022) provided it assures the learner: (a) use of wearable devices; (b) overcoming of limits of time and place, (c) use of digital identities.

One of the typical frameworks of the metaverse in education (Kang, 2021; Zhang et al., 2022, p. 5–see Figure 3) describes the learner's entry into extended reality by means of access (wearable device and avatar) and with the support of technological infrastructures – communication and networks, computing and analysis, modeling and rendering, interaction, authentication – which provide learning "resources" and "scenes" as well as intelligent "not-player character" (NPC).

Focusing on some better detailed definitions of:

- *learning environment* – "complex of apparatuses – conceptual, psychological and social (even before technological and

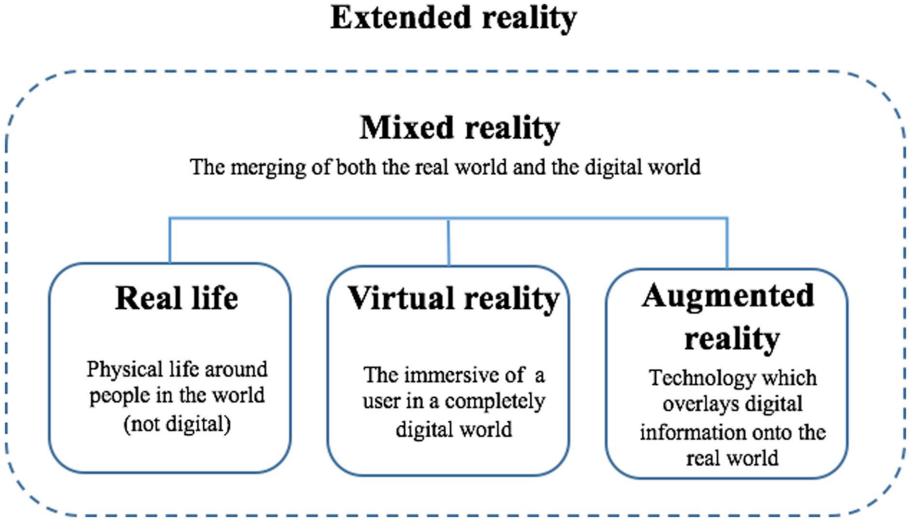

FIGURE 1
Extended reality (adapt.: Simpson, in Prendes-Espinosa and González-Calatayud, 2019).

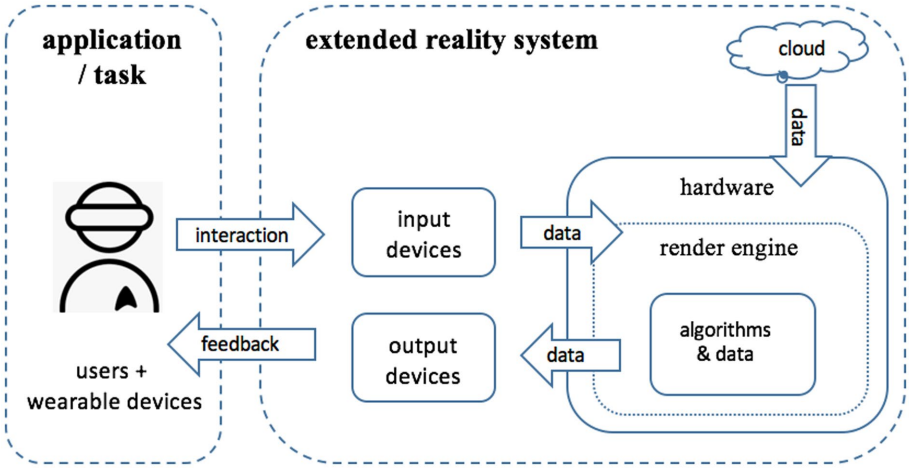

FIGURE 2
Metaverse as system of extended reality (adapt. from 'Major components of an extended reality system' - XR4all, 2023).

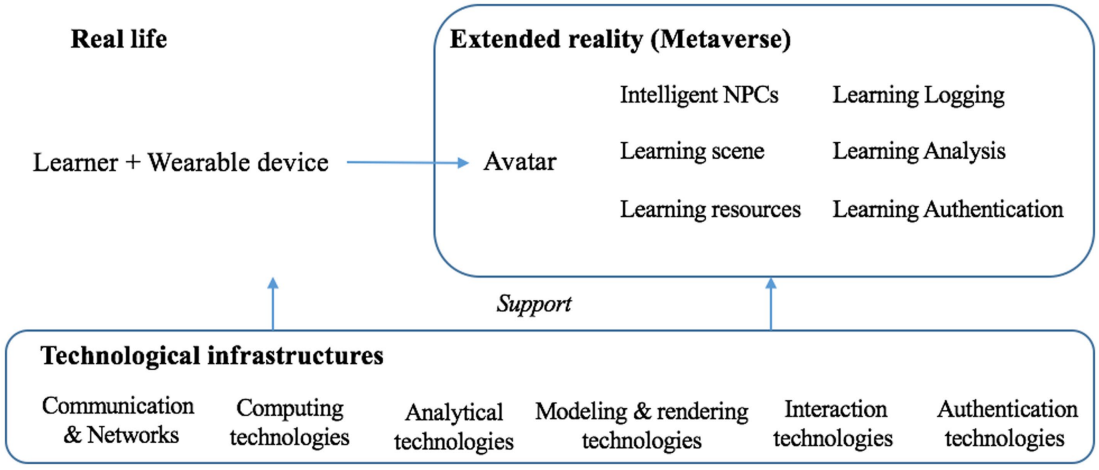

FIGURE 3
Framework of metaverse in education (adapt.: Zhang et al., 2022, p. 5).

instrumental) – suitable for facilitating the occurrence of learning processes through authentic experiences, forms of problem solving, collaborative activities with multi-perspective visions of the studied environment" (Bonaiuti et al., 2017, p. 233);
- *learning context* – "segment of the world occupied by the same people, but in different roles, simultaneously striving for different ends" (Shulman, 1986),

more complex implications emerge linked to the metaverse, assumed as technologically mediated learning environment. The extended reality of the metaverse, by virtue of the technical-technological characteristics as a transmedia environment (Jenkins et al., 2013; Limone, 2021) – similar roles but from different levels, common contents but from different perspectives, will allow each single learning event to take place along ever more extensive meanings, according to potentialities that cannot be definitively predicted but possibly converging. However, metaverse, as new object of educational investigation, needs new theoretical paradigms, conceptual heuristics and learning theories capable to explain the material, social and symbolic aspects involved in learning and knowledge construction processes. The most recent reflections propose eco-systemic (Bearzi, 2022), co-enactive (Pireddu, 2022), simplex (Di Tore, 2022) models.

Among the investigations related to the potential applications of the metaverse in education and, specifically, in teachers training, there are those on the effects of extended learning educational environments on the performance and perceptions of learning of the learners (Hwang and Chien, 2022).

2. Metaverse and teachers training

Among the potential research issues of the metaverse in education, teachers training and, specifically, the professional development of teachers are noted (Zhang et al., 2022). As known, the professional development of teachers is the continuous path that a

teacher carries out to increase his/her teaching expertise within real contexts and through effective relationships with students, expert teachers and other actors of the education system (O'Brien and Jones, 2014; Darling-Hammond et al., 2017; Boeskens et al., 2020; Perla, 2022). The metaverse could offer various opportunities to teachers as an emerging educational technology, especially in order to achieve good preparation – both initial and in-service – which is in itself "a complex and multifaceted undertaking" (Jeon and Jung, 2021).

As already found by the first systematic review (Vasarainen et al., 2021), design, remote collaboration and training would, in general, be the main research application areas of XR. As regards the on-the-job training, the few existing studies concern three areas: collaboration, working practices and evaluation of knowledge transfer (Barreau et al., 2015; Haavik, 2016; Sanchez-Sepulveda et al., 2019).

Such studies focus on different hardware, resort to specific methodologies and innovative ways of collecting research material (e.g., recording the movement of users in virtual reality) in such a way as not to allow an effective comparison. For this reason, still today, after about two years from having assumed extended reality and the metaverse as a learning and professional training environment, one should only speak of "significant potential" rather than "general advantages" clearly confirmed in the working life (Vasarainen et al., 2021, p. 22).

2.1. Metaverse and "new" educational roles

As stated by Jeon and Jung (2021), between the several factors that distinguish the online meeting and the metaverse platform (Table 1) the role of the instructor is the most characterizing: she/he is no longer the leader of the process but an actor with limited possibilities for intervention. This happens because the entire teaching-learning process would in fact be managed by means of new roles – the so-called "non-player characters" (NPCs) – guided by AI to support the arbitration, the simulation and the decision-making process that carry out interventions personalized and improve the interaction of those who participate (Hwang and Chien, 2022; Jovanović and Milosavljević, 2022). Therefore, within the metaverse, the educational support would be given by the roles set by the AI, among which are distinguishable:

- NPC tutor or advisor – "wise" or "expert" support, which offers advice to the user, especially involved in professional contexts and linked to the resolution of complex problems – think of the need for a trainee teacher to continue progressing of the educational program, to monitor the pace of learning of the students, without however losing sight of the timing of each student;
- NPC tutee/student – simulation of a student-teacher relationship, mainly involved in pre-service teacher training – think of the need for a trainee teacher to exercise his or her class management skills without any errors damaging the real student learning;
- NPC peer – peer-to-peer support between learners-users that fosters interaction and discussion underpinning socio-constructivist learning processes.

The most interesting and formatively more delicate aspect is twofold. In the metaverse, the system governed by the AI processes the input data and data coming from the cloud and, through complex algorithms (see Figure 3), provides the user with a more or less extensive repertoire of possible interactive situations (Hajjami and Park, 2023) by which NPCs interact with trainees. Such pre-ordered situations, on the one hand, would have the advantage of focusing the trainee teacher's attention on specific aspects of broader skills – e.g. within the framework of the broad competence of class management, deciding when and whether to interrupt the lesson in progress to intervene on disturbing behavior on the part of some pupils – and thus to encourage reflection in decision-making, not always possible in effective contexts of action. Such a "metadata archive" can help education for at least 4 reasons: it creates an engaging and realistic online classroom, encourages communication, supports immersive learning and enriches the experience through gamification (Çengel and Yildiz, 2022).

However, on the other hand, the educational situations pre-ordered by AI would exclude aspects in any case present in training environments (see internship, practicum), provide safer but less complex experiences, which less stimulate the ability to manage multiple variables simultaneously.

For these reasons NPC roles may appear, on one hand, useful to trainee teachers in terms of supporting their own and students' learning processes (Hwang and Chien, 2022), on the other hand, they could be experienced with anguish on the part of teachers, without the necessary reflection and educational guidance (Zhang et al., 2022). Some recent studies have deepened the perceptions of educators and instructors on the metaverse-based education (Han and Noh, 2021; Çengel and Yildiz, 2022; Gurkan and Bayer, 2023). In the study by Han and Noh (2021), 30 higher education educators were involved who consider the metaverse an appropriate tool for complementary delivery and student-centered learning. The limitations noted by them relate to systems and support for a classroom environment, including curriculum and information related to teaching and learning strategies. The study by Çengel and Yildiz (2022) investigated the attitude of 301 computer science teachers toward metaverse technologies with the aim of validating a three-factor scale (perceived benefit, preparation, and satisfaction), to be developed for further investigations. Gurkan and Bayer (2023) found that about half of 122 teachers involved associates the metaverse more with gaming and

TABLE 1 Difference between online and metaverse platform (adapt.: Jeon and Jung, 2021).

Factors	Online platform	Metaverse platform
Leadership	Teacher > student	Teacher = student
Roles	Event control instructional materials available	Event control not completed co-built educational materials
Formats	Teacher-centered learning knowledge transfer and sharing	Student-centered learning seeking and accessing information
Participation	Available only by teacher	Continuous

entertainment, over half is unaware of the benefits of the platform in education and that all feel the need for adequate training in this regard.

3. A study on student-teachers' and tutors' perceptions of NPC roles in the metaverse

The broader study "Metaverse near future" is conducted at the Department of Human and Social Sciences of the University of Bergamo, starting from January 2023: it aims to formulate some emerging questions about the use of the metaverse in teacher education. A mixed method design was followed (Creswell, 2013; Cameron, 2015) with a sequential system having an "exploratory" phase I of collection of qualitative-quantitative data (through questionnaire), an "incorporated" phase II of collection of qualitative data (via in-depth interview) and a final stage of meta-inference synthesis, still ongoing.

The first phase of a mixed design explanatory study focused on personal considerations that people involved in the teachers training processes – teachers, student-teachers and tutors – are developing with regards to the metaverse as "brand new: virtual space and the possibility for new relationship – intentional o eco-systemic (Bearzi, 2022) – between students, colleagues and trainers.

This paper faces, in particular, the student-teachers' and tutors' perceptions regards the artificial "roles" in the training processes – see NPC tutor/advisor, NPC tutee, NPC peer, programmed by Artificial Intelligence (Hwang and Chien, 2022). The fact-finding survey involved 30 service teachers, as tutors in the qualification courses for primary, middle and high school, and 31 student-teachers enrolled in the Master degree enabling teaching in primary school.

3.1. Research questions

This study addresses the following questions:

(1) What general utility do school tutors and student-teachers perceive with regards to the "new" instructional roles (NPC "tutor", "tutee", and "peer") available in the metaverse?
(2) What specific utility do school tutors and student-teachers perceive of the NPC "tutor" for their teaching and learning?

which were investigated through the analysis of the answers nos. 1–3 in the c. section of the questionnaire – see Table 2.

3.2. Methods

The data was collected through a mixed questionnaire that included closed and open-ended questions concerning the following main sections: (a) sociometric-professional information, (b) general knowledge on metaverse, (c) perceptions about the "new" instructional roles teacher (NPCs "tutor", "tutee", and "peer"), (d) personal considerations – Table 2. This mixed collection tool allowed to obtain at the same time quantitative and qualitative data subjected to triangulation to decide which type is more likely to provide the desired information (Creswell, 2013).

The questionnaire was designed based upon previous works defining the features and the functions of the "new" instructional roles (NPCs "tutor", "tutee", and "peer") available in the metaverse (Hwang and Chien, 2022; Jovanović and Milosavljević, 2022). In order to avoid excessive differences in understanding, these characteristics and functions were summarized in the initial part of the questionnaire and the people involved were invited to read them before answering the questions.

The questionnaire was administered by e-mail between March and April 2023 using random criterion to all tutors of the qualification courses for primary, middle and high school (no. 50) and all student-teachers who followed the Didactics III course within the Master degree enabling teaching in primary school (no. 130). No. 30 responses from school tutors (60%) and no. 31 from student-teachers (2.8%) were received.

3.3. Participants and data analysis

As for the participants, 64.9% of school tutors and 91.2% of student-teachers are female. School tutors are 41.6 years old on average, student teachers 21.5. Most school tutors have master degree (63%) and a diploma (18.5%) while, among student-teachers, 81% have a diploma and 19% a bachelor degree. In terms of experience, participant tutors served in schools as teachers between 5 and 10 years (37%) or over 10 years (37%), while they served as tutors for about 4 years (3.8). Over half of school tutors works in secondary schools (59.3%) and just under a third in primary school (29.6%), while all student-teachers have completed at least 4 years of practicum in primary school.

Quantitative data were analyzed using SPSS (v. 28). Specifically, statistical significance was analyzed with respect to question no. B2, C2, and C3 and a statistical correlation was verified between question no. A3 (qualification) and C2 (specific perceived utility of NPCs "intelligent" tutor role).

TABLE 2 Questionnaire sections and questions, data types.

Section	Information	Data
a. Sociometric-professional information	1. gender, 2. age, 3. qualification, 4. type of school, 5. length of service (*for tutors*), experience at school (*for student-teachers*)	Quantitative
b. General perceptions on metaverse	1. personal definition, 2. agreement with generic expectations on metaverse in education, 3. considerations regarding features and educational challenges	Quantitative
c. Perceptions on the NPCs instructional roles	1. general perceived utility of NPCs instructional roles, 2. specific perceived utility of NPCs "intelligent" tutor role, 3. specific perceived utility of NPCs "intelligent" peer role	Quantitative
d. Personal consideration	1. on metaverse as learning environment	Qualitative

TABLE 3 Agreement with general educational expectation.

Question no. B2 – *How much do you agree with the following statement: "the metaverse will change the way we educate"*		School-tutors	Student-teachers	Total
Strongly disagree	*a.v.*	*4*	*0*	*4*
	%	13.33%	0.0%	6.55%
Disagree	*a.v.*	*7*	*4*	*11*
	%	23.33%	12.90%	18.03%
Quite agree	*a.v.*	*11*	*8*	*19*
	%	**36.66%**	25.80%	31.14%
Agree	*a.v.*	*5*	*15*	*20*
	%	16.60%	**48.38%**	32.78%
Strongly agree	*a.v.*	*3*	*4*	*7*
	%	10.00%	12.90%	11.47%
Total	*a.v.*	30	31	61
	%	100.0%	100.0%	100.0%

*Statistical significance $p < 0.05$. The highest percentage values are in bold.

The text of the open answers (no. D1) was analyzed through a Qualitative Data Analysis (Creswell, 2013), inspired by the Grounded Theory (Charmaz, 2008), a bottom-up procedure that allows to know the investigated phenomenon through the emerging meanings from what was expressed by the people involved. In particular, the coding followed the three typical phases:

1. open coding – carries out a first grouping of textual data into significant text units, with relative identification of labels;
2. axial coding – with the aim of identifying recurring macro-categories that emerge from the significant text units, with relative indication of the number of occurrences;
3. selective coding – by means of the hierarchical ordering of the recurring macro-categories, it allows the final emergence of the "core" categories.

3.4. Findings

The results are presented below by type of data: first the quantitative data collected through closed questions of the questionnaire, then the qualitative ones obtained through the open question.

3.4.1. Agreement that the metaverse will change educational practices

Table 3 shows the absolute values and the response percentages to question no. B2: on one hand, school tutors consider themselves quite in agreement (36.66%), while student teachers mainly indicate an agreement (48.38%), with the prediction that the metaverse will change the world and educational practices.

Table 4 shows the average and standard deviations of the answers to question no. B2. Student-teachers agree more than school tutors that the metaverse will change educational modalities (3.61). However, their dispersion is higher (1.16).

TABLE 4 Average and standard deviation question no. B2.

			School-tutors	Student-teachers	Total
Intelligent "tutor"	Average	.	2.86	3.61	3.24
	Std. dev.		1.16	0.88	1.09

3.4.2. General perceived usefulness of the NPC "tutor"/"peer"/"tutee"

Table 5 shows the absolute and percentage values of perceived utility regarding the NPC, "tutor", "peer", and "tutee" roles – see question no. C1. The NPC role deemed potentially most useful by both school tutors and student-teachers is the "tutor" (37.70%), followed by the "peer" (29.50%). While compared to the NPC "tutor" there is a substantial agreement between school tutors (36.60%) and student-teachers (38.70%), compared to the NPC "peer" and the NPC "tutee", the perceptions are inverted: slight prevalence of the "peer" among student-teachers and of the "tutee" among school-tutors.

3.4.3. Specific perceived usefulness of the NPC "tutor"/"peer"

Tables 6, 7 show the absolute and percentage values of the utility perceived by school tutors and student-teachers regarding, specifically, the NPC roles of "tutor" and "peer" – see question nos. C2 and C3.

Overall, the role of the NPC "tutor" is considered quite useful (47.54%), specifically by two-thirds of the school tutors (66.33%) and by one-thirds of student-teachers (32.26%). It is considered also useful (35.48%) by one-thirds of student-teachers (35.48%). Even the role of the NPC "peer" is considered, overall, quite useful (36.06%), specifically, by a third of school tutors (33.3%) and by just over a third of student teachers (38.70%).

Table 8 shows the average and standard deviations of the answers to question nos. C2 and C3. Student-teachers agree more than school tutors on the usefulness of NPC "tutor" (3.90) and "peer" (3.87). The dispersions for both are quite large, specifically for "intelligent" peer (0.96).

TABLE 5 Perception of usefulness of NPC roles.

Question n. C1 – *Which of the following NPC roles do you think will be useful for your teaching/learning?*		School-tutors	Student-teachers	Total
NPC "tutor"	*a.v.*	*11*	*12*	*23*
	%	**36.60%**	**38.70%**	**37.70%**
NPC "peer"	*a.v.*	*7*	*11*	*18*
	%	23.33%	*35.48%*	29.50%
NPC "tutee"	*a.v.*	*7*	*6*	*13*
	%	*23.33%*	19.35%	21.31%
None	*a.v.*	5	2	7
	%	16.60%	6.45%	11.47%
Total	*a.v.*	30	31	61
	%	100.0%	100.0%	100.0%

*Statistical significance $p < 0.05$. The highest percentage values are in bold.

TABLE 6 Perception of usefulness of NPC "tutor".

Question n. C2 – *How useful do you think the support of the NPC "tutor" will be for your teaching/learning?*			School-tutors	Student-teachers	Total
NPC "tutor"	Very low	*a.v. (%)*	4 (13.33%)	0 (0.0%)	4 (6.56%)
	Low	*a.v. (%)*	4 (13.33%)	1 (3.23%)	5 (8.20%)
	Quite useful	*a.v. (%)*	**19 (63.33%)**	**10 (32.26%)**	**30 (47.54%)**
	Useful	*a.v. (%)*	2 (6.67%)	**11 (35.48%)**	13 (21.31%)
	Very useful	*a.v. (%)*	1 (3.33%)	9 (29.03%)	9 (16.39%)

*Statistical significance $p < 0.05$. The highest percentage values are in bold.

TABLE 7 Perception of usefulness of NPC "peer".

Question n. C3 – *How useful do you think the support of the NPC "peer" will be for your teaching/learning?*			School-tutors	Student-teachers	Total
NPC "peer"	Very low	*a.v. (%)*	2 (6.66%)	0 (0.0%)	2 (3.27%)
	Low	*a.v. (%)*	9 (30%)	1 (3.22%)	10 (16.39%)
	Quite useful	*a.v. (%)*	**10 (33.3%)**	**12 (38.70%)**	**22 (36.06%)**
	Useful	*a.v. (%)*	1 (26.66%)	8 (25.80%)	16 (26.22%)
	Very useful	*a.v. (%)*	1 (3.33%)	10 (32.25%)	11 (18.03%)

*Statistical significance $p < 0.05$. The highest percentage values are in bold.

Table 9 shows the correlation between the average answers to the question no. A3 (qualification) and no. C2 (specific perceived utility of NPC "tutor"). The average of the answers is inversely proportional to the increase in qualification.

The analysis highlights a statistically significant difference between the agreement expressed by school tutors and student-teachers on the general educational expectation on metaverse (see Table 2): tutors seem more cautious than student-teachers about the educational innovativeness of the metaverse and more "compact" in believing it (see Table 3).

The analysis therefore highlights that the NPC "tutor" would seem to be the role on which the general expectations of school tutors and student-teachers are mainly concentrated (see total data in Tables 4, 6). Nevertheless, the student-trachers seem to grasp the educational potential both of NPCs "tutors" and "peers" better than school tutors (see Tables 5, 7).

TABLE 8 Average and standard deviation questions nos. C2 and C3.

		School-tutors	Student-teachers	Total
NPC "tutor"	Average	2.73	**3.90**	3.32
	Std. dev.	0.91	0.87	0.89
NPC "peer"	Average	2.90	**3.87**	3.39
	Std. dev.	0.99	0.92	0.96

The highest percentage values are in bold.

This is, moreover, confirmed by the data on the mean and the standard deviations expressed in Tables 8, 9 on the correlation between data and qualification would also seem to suggest that expectations on the educational potential of the NPC "tutor" decrease as the level of education increases.

As regards the analysis of qualitative data, they were obtained through question no. D1 on personal thoughts on the metaverse. Table 10 shows categories and codes, with relative numbers of occurrences, emerged through a Qualitative Data Analysis of the text corpora (question no. D1) on the "new roles" in the metaverse.

The most quoted NPC role is the "tutor" – see no. 18 occurrences from school-tutors and no. 25 from student-teachers. The school-tutors explain the "tutor" role only by a program-related aspect – support in monitoring the entire learning process of the student-teachers (see Table 9, open coding, "monitoring"). Instead, student-teachers describe the tutor" through three different aspects: one linked to the practicum period (decision-making support), two linked to the program (deadlines and exchange of experiences).

Table 11 specifically shows the most quoted extracts relating to the NPC "tutor" role.

From the texts produced by the school tutors emerge references exclusively addressed to the NPC tutor; from the theses produced by the student-teachers, however, references to both the "tutor" and the "peer" emerge (see Table 10, axial coding). Furthermore, while the school tutors associate the role of the NPC tutor exclusively with the support in monitoring the learning processes of the student-teachers, the student-teachers instead associate this role with more diversified tasks, such as support in decisions during the internship, in meetings the deadlines that mark the training course, in the collection of explanatory evidence of the practicum.

School tutor express a stable image of NPC "tutor": a sort of graphical-analytical interface which helps real tutor to observe and value the progress of the student-teachers (see Table 10). The student-teachers seem, however, to recognize this role having more multifaceted functions ranging from support in the practicum activities (see Table 11, open coding, "decision making") as an expert colleague capable of intervening in complex situations, to support in the collection of documentation relating to the training program (see Table 9, open coding, "collecting documentation").

TABLE 9 Correlation between questions nos. A3 and C2.

Qualification	Diploma	Bachelor degree	Master degree	Ph.d.
Average	3.53	3.20	3	2

4. Discussion

Unlike the study of Gurkan and Bayer (2023), where teachers predominantly associated the metaverse with gaming and entertainment and were unaware of the benefits, the population involved in the present study expresses clear expectations and

TABLE 10 Categories and codes from school tutors' and student-teachers' text corpora ("new roles").

Respondents	Core category	Axial coding	Open coding	No. textual occurrences
School tutors	New roles in the metaverse	NPC "tutor" (No. 18)	Support in monitoring (program)	18
Student-teachers		NPC "tutor" (No. 25)	Support in decision-making (practicum)	12
			Deadline timing (program)	7
			Support in collecting documentation (program)	6
		NPC "peer" (No. 6)	Sharing experience (practicum)	6

TABLE 11 Categories and codes from school-tutor and student-teachers' text corpora (NPC "tutor").

Respondents	Core category	Axial coding	Open coding (no textual occurrences)	Example excerpts
School tutors	New roles in the metaverse	NPG "tutor"	Support in monitoring (program) (No. 18)	"Sometimes it is difficult to keep under control the student teachers' learnings. There is a need for a tool that monitors development and helps me" "I would like you to help me organize the meetings, checks and reports (…) so it would be easier to monitor the progress"
Student-teachers			Support in decision-making (practicum) (No. 11)	"When I do not know how to handle a problem in front of me, I would like someone to suggest me at least some alternatives" "The real effects of interventions are not all predictable. Rather: they are predictable, but from the expert. But I'm not an expert yet. This is why I would like a friendly voice to guide me especially in complex situations"

noteworthy opinions about the metaverse as a new learning environment: cautious on the part of the school tutors, open on the part of the student teachers. The difference could be associated with the functions assumed: school teachers, in the study by Çengel and Yildiz (2022), tutor of future teachers and student teachers – who are assumed to be more sensitive to training processes – in the study just presented. Further studies could offer data and evidence to support or not this hypothesis.

The triangulation on early qualitative-quantitative data is highlighting a general new look at.

the possibilities offered by the metaverse – in monitoring the learning program and in decision-making practices – as well as expectation about the teachers training – Artificial Intelligence relationship. Unlike what is highlighted by reflections and studies on the metaverse regarding the difficulties and disorientation by users in accessing and using technologies (Park and Kim, 2022; Tlili et al., 2022), both groups involved seem to feel no anxiety imagining what new things the metaverse will bring to teacher education. In particular, the school tutors do not report possible interferences of the new "roles" with respect to the trainer's work and the need to intervene on this, however they share more measured expectations, both with respect to the metaverse, in general, and with respect to the role of the NPC "tutor". Student-teachers, on the other hand, communicate slightly higher expectations regarding the metaverse as a professional learning environment and broader expectations regarding the role of the NPC "tutor".

(1) *What general utility do school tutors and student-teachers perceive with regards to the "new" instructional roles (NPC "tutor", "tutee", and "peer") available in the metaverse?*

The analysis carried out on perceptions in the first phase of the study allow to detect some aspect.

In general, the population involved in the study expresses expectations especially regarding the function of "tutor", little regarding the function of "peer", even less regarding the function of "tutee". The "tutee" function is never mentioned in the open answers, while the reference to the "peer" function is mentioned only in the student-teachers' texts.

Differences in expectations between school tutors and student-teachers with respect to the metaverse and the new educational roles related have been found. School tutors seem to be little more cautious regarding the possibilities offered both by the metaverse and by the new educational roles (Table 3, 36.66%), while future teachers show a slightly higher level of expectations, compared to the metaverse in general (Table 3, 48.38%) but above all regarding the new roles related (Table 5, 38.70 and 35.48%). Even the representations regarding the NPC "tutor" that emerged from the analysis of the qualitative data is different: more identifiable and linked to the "program", for the student tutors, more varied and linked to both the program and the practicum, for the student-teachers (Table 11).

This seems to confirm the study by Han and Noh (2021), from the point of view of the teachers. As those 30 higher education educators consider the metaverse an appropriate tool for complementary delivery and student-centered learning but express doubts about the support in the effective management of the classroom, the student tutors involved in the study also attribute to the NPC tutor only a support role in process management, with no link to practice.

(2) *What specific utility do school tutors and student-teachers perceive of the NPC "tutor" for their teaching and learning?*

The expectations of both school tutors and student-teachers seem to converge on the role of the NPC "tutor" (Table 5, 36.60 and 38.70%; Table 6): it is perceived as quite useful for teaching and learning processes (Table 4, 49.18%); by student-teachers it is perceived as fully useful for learning processes (Table 6, 47054). Specifically, the qualitative data offer clues on the functions related to the role of the "intelligent" tutor: as for school tutor, support for monitoring the entire training program of student-teachers; as for student-teachers, support for decision-making in the practicum activities. More moderate expectations, indeed, converge on the role of the NPC "peer" from both school tutors and student-teachers (Table 7, 36.06%). The qualitative data analysis confirms and highlights that only some student-teachers think about the role of the NPC "peer" – associated with the sharing of practicum experiences.

Therefore, a different representation clearly emerges between school tutors and student-teachers regarding: a. NPC instructional roles in the metaverse – school tutors centered only on the "tutor", student teachers also open to the "peer"; b. the function assumed in particular by the NPC "tutor" (for school tutors, only in the supporting of the training process, for student teachers also of support in the practicum practices) (Table 11).

A possible reason for this difference that emerged could be found in the correlation established between the answers and the data on the "qualification" and expressed in Table 9. It turned out that the expectations on the educational potential of the NPC "tutor" decrease as the level of education increases. This suggests that the higher qualification would offers tools and reasons to be wary of the metaverse as a learning environment and of the NPC "tutor" as an effective support to the training processes.

Another reason that would justify this difference would be linked to the type of answers given, both closed and open ones. In fact, it is possible to note that school tutors think of the training process in its overall vision, while student teachers enter into the specifics of practices, first of all the practicum. This different perspective of the training process could influence the idea that tutors and student teachers are developing the NPC "tutor". Also in this case, further studies could offer data and evidence to support or not this hypothesis.

5. Limitation and prospect of the study

The present study addressed the representations that school tutors and student teachers are building regarding the potential of the metaverse for the training of teachers, in particular the new roles governed by AI, such as NPCs "tutor" and "peer". It took the exclusive perspective of teacher training – especially in the construction of the questionnaire and in the implementation of the data analysis. However, the literature referred to at the moment on the metaverse is not specific to teacher education. For this reason, the discussion could be limited in the meanings that emerged and recalibrated thanks to the contribution of future research.

The second limitation concern some characteristic of the population involved. First, the smallness of this population does not allow us to generalize or extend what emerged from the analysis but only suggests some traits that could be better investigated in its second phase and though further more extensive study. Furthermore, the two sub-groups involved are descriptively not comparable. From a

methodological point of view, a convenience sampling was carried out which allowed the student-teachers of the teaching qualification course in primary school to be more easily reached (by sending the questionnaire by e-mail), and, therefore, to become involved in the investigation. Instead, the school tutors were contacted on two occasions and belong to two different schools, primary and secondary schools, respectively. Due to the descriptive non-comparability of the population involved, a descriptive, non-inferential data analysis was performed.

The further limitation of the study is related to the unit of analysis. The perceptions shared by student-teachers and school tutors regarding the metaverse and the NPCs roles are mainly based on second-hand information – articles, videos, discussions, etc. – not on experiences of immersion in the metaverse and interaction with the NPCs roles. The positive attitudes that emerged could therefore denote a personal disposition in favor, not yet a judgment linked to some feedback. However, what emerged is useful to know at least what student-teachers and school tutors need as support in their teaching and learning processes, as already emerged in the study of Gurkan and Bayer (2023).

6. Conclusion for tutoring in teachers training

The present work explains the first results of a study that investigates the representations of school tutors and student teachers on the educational potential of the metaverse, in particular on the roles of the so-called "non-player characters" (Zhang et al., 2022). The first phase of the study finds that the population involved has good expectations, especially regarding the role of the NPC "tutor" – mainly expected as support for monitoring the entire training program, by school tutors, and as support in decision making within the practicum, by student teachers.

The presented study brings out the support needs for professional learning that tutors and student teachers imagine to satisfy through the NPC roles possible by means of AI: in monitoring the learning process of the student-teachers, by school tutors, and in intervening expertly in complex situations in the practicum, by the student-teachers. Such needs expressed by tutors and student teachers could be taken into account by course managers to improve training programs.

Such considerations open scenarios on the limits and potential of AI in supporting and managing professional training processes through the metaverse and, more generally, on the rules and principles of the metaverse in education (Zhang et al., 2022). The choice to establish role-setting in the arbitration, the simulation and the decision-making of the process that favors personalized interventions and interactions (Hwang and Chien, 2022; Jovanović and Milosavljević, 2022) aimed at professional development allow to think about the type of preparation – educational and professional – of the integrated software developer and the necessary collaboration with those responsible for the path, on a professional level. This would prevent the software developer from being seen as a sort of impersonal and imponderable "creator" (Hwang and Chien, 2022).

This level of issues should be addressed not only by the managers and planners of teacher training courses but also by the tutors and student-teachers involved; this would prevent the metaverse from being perceived as yet another "*deus ex machina*" solver of the problems of progress of the educational path. The addiction, as one of the main risks associated with the metaverse, is given by the sensation of total immersion and hyper-reality (Choi and Kim, 2017; Weech et al., 2019; Kye et al., 2021), which especially reaches young students when they lack self-discipline and self-control.

In a broader framework of prevention of false "spiritual satisfaction associated with technologies" (Colazzo and Maragliano, 2022), the presented study warns about the effective preparation of student-teachers and teachers' tutors regarding both the opportunities and the risks which could pose the professional training contexts set up in the metaverse.

The implementation of the metaverse, as learning environment also for the teachers training and professional development, is stimulating and eagerly awaited (Park and Jeong, 2022; Park and Kim, 2022; Thomason, 2022). However, it should be avoided that too high expectations from specific professional profiles – such as teachers, so needy of support in the daily educational work – favor.

idolatrous attitudes toward the metaverse.

As stared by Zhang et al. (2022), teacher professional development is among possible future research directions on the educational valence of the metaverse. In the framework of an eco-systemic development (Bearzi, 2022) of the learning environment, the possibilities of co-evolution between users (tutors and student teachers) and NPCs (intelligent "tutor" and "peer") of the metaverse should be explored. "One can imagine that the NPC characters in the metaverse can learn (be trained)" after interacting with users and "grow" along with the timeline (Hwang and Chien, 2022, p. 2; Zhang et al., 2022). It will be the close collaboration between AI software developers and educators that will make this possible in the not too distant future.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical approval was not required for the studies involving humans because The study does not require approval because the data collected is strictly anonymous. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Building knowledge from the epistemology of the South: the importance of training researchers in initial teacher training

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This study aims to reflect on the importance of considering epistemologies of the South and research training as benchmarks in the initial teacher of educators in the Latin American context. In recent years, there has been a growing recognition of the need to diversify and decolonize knowledge production in education, especially in the Global South. The epistemology of the South provides a conceptual framework that challenges traditional Eurocentric perspectives and promotes alternative ways of knowing and understanding education. To achieve the research objective, a literature review was conducted focusing on key concepts such as Southern epistemology, researcher training, and initial teacher education. The review encompassed academic articles, books and relevant theoretical frameworks. Content analysis techniques were employed to critically examine the literature, identifying themes, theoretical perspectives, and implications for research training in Initial Teacher Education (ITE). The findings of this study suggest that the incorporation of the epistemology of the South into researcher training can have a transformative impact on the educational sector. By adopting ways of knowing and understanding, future researchers can develop a more nuanced and contextualized understanding of educational phenomena. This approach promotes critical thinking skills and encourages researchers to question dominant narratives and power structures in education. Additionally, the study highlights the importance of integrating research training into initial teacher education. By fostering the development and consolidation of research skills and a critical mindset in future teachers, it promotes their transformation into change agents within the Latin American educational system in which they operate. From this perspective, research-oriented teacher training programs empower educators to engage in evidence-based practices, contribute to educational research, and advocate for pedagogical approaches that respond to local contexts and social realities in which they act. This study underscores the need to integrate Southern epistemologies and research training within into initial teacher education. By doing so, we can nurture a new generation of educators with critical thinking skills capable of effecting significant societal changes. This research contributes to the ongoing dialogue on the decolonization of education and promotes the development of inclusive and contextually relevant educational practices.

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KEYWORDS

epistemology of the South, training of researchers, initial teacher training, university, pedagogy

1 Introduction

Currently, one of the most significant challenges in initial teacher training (ITT) in the Latin American context in general, and particularly in Chile, is the implementation of specific actions aimed at achieving quality and social relevance in teacher education (Peña-Sandoval and Venegas-Weber, 2022). This necessarily entails a profound reflection on the political, economic, socio-cultural, curricular, and epistemological aspects, among others, that have underpinned the models used so far for this purpose.

In the opinion of Bigi et al. (2019), initial teacher training (ITT) is a process that should be in constant flux due to the natural dynamism of universities and the variety of components and situations involved in this process. Additionally, there's an obligation to address the range of existing problems in the myriad educational contexts in which teachers will operate in their future professional endeavors. This challenge can only be met through ITT with social relevance, where teachers' reflective capacity, their research skills, and their epistemological training play a fundamental role in understanding the diverse realities they will encounter.

From this perspective, Peña-Sandoval and Venegas-Weber (2022) argue that "Empirical evidence in Chile shows that the quality of ITT depends on the institutional quality of the universities" (p. 88), as well as recognizing another significant group of factors related to the hegemonic models inherited from Eurocentric epistemologies. These models have conditioned the various curricular and educational models that, to date, have silently but powerfully influenced initial teacher education in its various dimensions.

This has led many Latin American teachers, according to authors such as Quijano (2007), De Sousa Santos (2011), Lárez (2012), and Medina (2016), to adopt professional action models focused on the repetition of practices and scripts (often unconsciously) rather than on a professional practice centered on genuine professional praxis. Such praxis allows for the positive transformation of the educational reality, paying attention to contextual needs through the use of research and the application of their investigative skills.

Therefore, from the perspective proposed by De Sousa Santos (2011), it becomes urgent to create new reference models and epistemological frameworks for interpreting reality and giving social relevance to human actions by contextualizing them and allowing the redefinition of their realities based on the progressive awareness of the emergence of these new contextual epistemologies. This implies, as Medina (2020) points out, the need to provide both teachers in initial training and those who train them with the opportunity to situate themselves in time and space, locally. As expressed by Martínez (2013) Gualdieri and Vázquez (2017), it's about providing new ways of knowing, approaching reality, producing and valuing knowledge, and generating new formative instances based on the references of emerging epistemologies from the south.

In this sense, it is relevant, as already pointed out and as noted by Medina (2016), to consider research skills and abilities as pivotal elements in initial teacher education, using Southern epistemologies as references for constructing new frameworks of rational interpretation of reality. It is deemed imperative to deconstruct Eurocentric epistemologies that have become hegemonic in the Latin American context (including South and Central America) and other developing countries in the African continent, which have served as almost exclusive references for the construction of everyday and scientific knowledge (De Sousa Santos, 2011).

This has overlooked the possibility of generating, as pointed out by Rámirez (2008), Escobar (2010), Meneses (2011), and Medina (2016), new ways of conceiving and interpreting reality, based on regional and local elements and specific contextual aspects. Sometimes, this can lead to constructing a unique approach to specific problematized situations, under emerging methods and methodologies proposed from Latin America, as is the case with the systematization of experiences and other approaches derived from Critical Theory and Pedagogy (Rámirez, 2008). In this vein, Medina (2020) states:

> Decolonizing thinking, as part of contemporary social theory, requires understanding the epistemic axes that articulate it in difference. The active participation of certain intellectuals, in which differences, discussions, debates, fractures, and reinventions persist, highlights the heterogeneity of this movement and reaffirms that we cannot properly speak of a single perspective (p. 10).

From this perspective, the relationship between research and pedagogical work become and reconstitute themselves as an inseparable complement to implement educational processes relevant to the realities of educational institutions, their actors, and the various relationships established between them (Núñez et al., 2017; Cervantes, 2019). These give rise to different ontologies that are addressed through the epistemological relationships established between the knowing subject and the object of study. Through the interaction between philosophical categories, represented by the current paradigms for knowledge production and their methods, with operational categories such as methodology, which ultimately constitutes the operationalization of the method and therefore a heuristic category. This provides the teacher in initial training with the possibility to interact with their immediate reality to know it, understand it, analyze it, or transform it as appropriate according to their interests and needs and those of their community (Lárez, 2012; Lárez et al., 2021; Parada et al., 2021).

Therefore, the research problem concerns how the incorporation of this epistemology in the training of researchers in education during initial teacher training would contribute to the development of a more inclusive and contextualized pedagogy (Lárez, 2012; Lárez et al., 2021).

Given the points made in the preceding paragraphs, the objective of this study is to reflect on the importance of considering the

epistemologies of the south and research training as references in the initial teacher training in the Latin American context.

2 Method

This study, given its characteristics, is a documentary research. It was developed under a bibliographic design with a critical-reflective approach, based on the analysis of selected materials concerning the importance of considering southern epistemologies and research training as references in initial teacher training in the Latin American context.

As stated by Gómez et al. (2014), bibliographic review work should allow the researcher to obtain the most relevant information on the topic or field that has become their object of study. This is derived from a universe of documents that can be vast and will require the researchers to have adequate skills in searching, selecting, and reviewing materials. This will enable them to handle the information efficiently to achieve the set objectives.

The corpus used was selected non-probabilistically, using the criteria of convenience and the judgment of the researchers, based on what was proposed by Muñoz (2013) and Gómez et al. (2014). This was done through the use of five (5) databases: ERIC, Education Database; EBSCO; Scopus, and Google Scholar. The descriptors used to compile information were as follows: "southern epistemologies in initial teacher training," "research in initial teacher training," "initial teacher training and epistemologies from the south," "deconstruction of Eurocentric epistemologies and decolonization," "decolonization of initial teacher training," and "research skills in initial teacher training."

The methodology used for the development of this critical-reflective documentary review was structured based on the steps proposed by Gómez and others (2014). They are represented by the following sequence: (a) definition of the problem; (b) information search; (c) organization of information; and (d) analysis of information.

Regarding the techniques for information analysis, content analysis was used. Understood from Andréu's (2002) perspective, it is a technique for interpreting texts, in this case, written ones, which contain information of interest about the study object addressed. When properly and sufficiently analyzed, they provide researchers with knowledge of a specific construct of interest. In our specific case, it was represented by considering southern epistemologies and research as benchmarks for initial teacher training in Latin America.

The content analysis undertaken was operationalized through the development of a methodological sequence consisting of six steps, as outlined by Fernández (2002), and are described as follows: (a) identification of the analysis themes based on the constructs of interest previously established by the researchers; (b) compilation of data from descriptors and the use of selected databases; (c) development of categories and coding scheme, utilizing the constructs of interest selected by the researchers based on the study's objective; (d) application of the coding scheme to a small sample of compiled material; (e) coding of the entire corpus by applying the coding scheme to all compiled and pre-selected documents; and (f) evaluation of coding coherence by checking consistency through processed information. This involved using a data compilation matrix based on the criteria and coding categories employed, allowing for the construction of the presented text.

3 Research and southern epistemologies as new benchmarks for initial teacher training

In its broadest sense, initial teacher training can be defined, according to García (2015), as the "process that allows the future education professional to acquire knowledge, skills, values, and principles to develop the educational teaching process in a specific historical-social and institutional context" (p. 143). In this author's opinion, such training is a complex process that must respond to a set of requirements, ranging from challenges posed by globalization phenomena to the understanding of social change processes, the need for paradigmatic resignification that allows establishing new rational logics to address them, and the adaptation of pedagogical and didactic models that help confront these new contextual realities.

Within this framework of ideas, authors like García (2015) and Montesi et al. (2017) argue that universities are currently concerned about incorporating research into initial teacher training and consider it as one of the fundamental and cross-cutting pillars in their curricula. As García Canclini (2017) maintains, this investigative capacity that aims to be developed in the training teachers seeks to provide them with heuristic tools aimed at continuously strengthening the quality of teaching and the permanent application of pedagogical and didactic principles in interpreting reality. Furthermore, recognizing the transformative power of education, conceiving human beings as socio-cultural beings, intertwined with their contextual conditions, and capable of self-managing them from a critical perspective.

Montesi et al. (2017) believe that research skills are closely related to pedagogy, allowing teachers in initial training to acquire the competencies to reflect on their own practice, with a view to transforming and developing it within a framework of social relevance, within the communities in which they operate. To achieve this, it is essential for the teaching staff to understand each educational reality and the socio-cultural, political, economic, and epistemological elements that converge in them, as well as the practices that have influenced their construction. This necessarily involves proposing real situations that must be addressed from a pedagogy based on scientific evidence and systematically documented under a critical-reflective approach.

In this scenario, the emphasis on initial teacher training should highlight the integration of southern epistemologies and knowledge production as cornerstones for developing research projects and applying procedures linked to the scientific method (Turpo et al., 2020). This approach would enable the construction of problem-based learning, addressing topics pertinent to the discipline, thereby creating a meaningful connection between students and their prospective work environment.

Hence, the incorporation of research into the curricular plans of pedagogical careers is seen as ideal for achieving evidence-based pedagogy (Martínez, 2014). This proposition, as Martínez (2013) suggests, should be accompanied by the use of active methodologies, like problem-based learning and the construction of field observation portfolios in pedagogical practices. Such an approach encourages student-teachers to undertake research based on inquiry, grounded in the school environment where they will presently and futurely operate. This strategy fosters the creation of contextualized knowledge and strengthens initial teacher training, deeply aligned with local realities and student needs.

Authors like Escobar (2010), De Sousa Santos (2011), Medina Melgarejo and Baronnet (2013), and Medina (2020), to name a few, concur that Latin American countries possess distinct and specific characteristics resulting from their unique socio-historical processes. Yet, these attributes have not always been acknowledged and embraced by dominant systems. Nonetheless, the dominance of Eurocentric and Anglo-American epistemological models in political, economic, cultural, social, educational, and scientific-technological realms is undeniable (Herrera et al., 2016). Hence, it is imperative for these elements to be incorporated into initial teacher training processes, approached from a holistic, integrative, and critically reflective perspective, as once proposed by Freire (1971).

In this context, De Sousa Santos (2010) and Herrera et al. (2016) assert that from the 1970s, a resurgence was observed in many Latin American countries. This was largely due to multiple scenarios of inequality, exclusion, and attempts to implement new forms of political, economic, and socio-cultural colonialism, among others, in the region. Such factors carved a societal space for introspection and the collective and individual realization of the necessity to contemplate and forge initiatives. These initiatives were aimed at enabling the region to establish platforms for exchange and political management to tackle its escalating challenges.

In this line of thought, Jaramillo (2003), Acevedo Aguirre (2008), González and Villegas (2009), Ghiso (2011), and Cartin (2011), when referring to the emergence of epistemologies from the South, argue that one of the main objectives of this movement was to construct a more inclusive and diverse epistemological approach, one that valued and promoted the plurality of voices, knowledge, and experiences present in Latin America. Such was the intent, to generate new interpretive frameworks and rational logics to the existing ones, enabling an effective approach to the political, economic, cultural, and social challenges that the region faced and still faces today.

In the opinion of Alvarado and García (2008) and De Sousa Santos (2011), these emerging epistemologies represent an opportunity to decolonize thought and construct a more inclusive theoretical and practical horizon, in which local voices and knowledge are recognized and valued, and the protection of the environment is promoted (Rivera, 2011; Infante, 2013; Gutiérrez et al., 2019; Fontaines et al., 2020; Morales et al., 2020). From this perspective, the aforementioned authors maintain that by questioning the Eurocentric epistemological bases, spaces are opened for the construction of contextualized knowledge and for the emancipation of the Latin American peoples in their struggle for social justice, equity, and autonomy. These elements undoubtedly underscore the importance of including references to the epistemologies of the South as part of the initial teacher training curriculum in the Latin American context.

4 Generating new rational frameworks for interpreting reality based on understanding the epistemological relationship as a reference for knowledge production in and from initial teacher training

As has been mentioned throughout this study, research and the development of investigative skills in initial teacher training should be considered as part of the curriculum used for teacher education. In this regard, Muño and Garay (2015) argue that "Research in education is an increasingly indispensable process to renew and transform school, teaching, and learning environments, achieving quality in education, that is, meeting the needs of students according to their contexts" (p. 390). In the opinion of these authors, it is through the development of investigative competencies that teachers can identify, understand, deepen, take action, and in many cases create viable solutions to problematic educational situations, as well as specific needs for social transformation.

Authors such as Cochran and Lytle (2009) and Muño and Garay (2015) agree that research allows the teacher, both in initial training and in practice, to reflect on their own actions and use educational theory and practice as heuristic tools for emancipation and transformation of reality. This will require, as pointed out by Sobarzo et al. (2021), mastery of the components that establish the epistemological relationship and understanding of the various interactions between them as enhancing elements of the understanding and transformation of reality in general and educational reality in particular (Martínez and Ríos, 2006; Rodríguez, 2009; Cartin, 2011).

Referring to the epistemological relationship, authors like Lárez (2012) and Sobarzo et al. (2021) contend that the relationship between the knowing subject (represented in our case by the teacher in initial training) and the object of study (materialized through the study of different educational realities and their various components) is only possible through the method chosen for this purpose. This method is related to a higher epistemological category, represented by the paradigm, but also by a heuristic category below the method corresponding to the methodology. These relationships and interactions can be clearly observed in Figure 1, which is shown below.

From the perspective presented in the preceding paragraphs, it is important to note, as pointed out by Jaramillo (2003) and Martínez and Ríos (2006), that a clear understanding of the primary epistemological issues associated with the field of research and knowledge production in educational research related to FID ties to several fundamental aspects. These are: (a) the epistemological dimension (represented by the relationship established between the teacher as the knowing subject and the object of study); (b) the ontological dimension (depicting the nature of reality that becomes the teacher's object of study); (c) the axiological dimension (referring to the values present in the teacher-researcher and in the subjects of study when they become the object of study); (d) the teleological dimension (represented by the purpose and uses the teacher will apply to the research results); and (e) the methodological dimension (depicted by the methodology (techniques, instruments, and

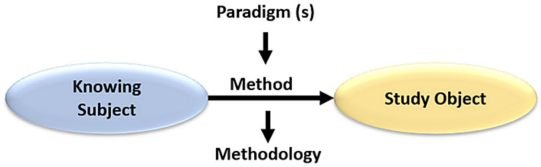

FIGURE 1
The articulation of paradigm, method, and methodology as a reference to ensure methodological consistency in research. Source: Lárez (2012).

procedures) through which the teacher-researcher realizes the investigative process, transitioning from the epistemological categories (paradigm and method) to the operational category represented by the research methodology).

5 Training of educational researchers within the framework of initial teacher training

The training of researchers within the framework of Initial Teacher Training (FID), is seen by Muño and Garay (2015) as not only an urgent need but also a means to the development and refinement of the teaching profession. Referring to the importance of training researchers, Cochran and Lytle (2009) highlight that the development of skills, abilities, and values associated with consolidating investigative competencies from the early stages of teacher training could yield immeasurable benefits.

These benefits are not only for future teachers but also for educational systems and organizations. After all, a teacher is essentially a decision-maker whose research skills could enhance the generation of data, information, and knowledge, serving as a foundation for evidence-based decision-making.

For Cochran and Lytle (2009), "the idea of using research findings in the classroom is linked to professional development programs and teacher professionalization strategies, to school and curriculum improvement seeking structured and organized changes" (p. 4). However, it's also related to making informed decisions about aspects such as educational leadership, curriculum, institutional management, and handling the uncertainty that characterizes the current educational contexts at global, regional, national, and local levels.

In this same vein, Compagnucci and Cardós (2007) argue that integrating research into initial training processes allows educators to timely hone their skills for reflecting on their pedagogical actions. This creates a space for their professional growth through reviewing their professional knowledge, represented by their way of being and existing within the profession. This review is done through a critical and questioning lens on knowledge, how it's generated, how it's used, and the epistemology (or epistemologies) upon which its production and interpretation are based, as well as the realities in which they are immersed.

This is where one of the junctures at which research in Initial Teacher Training intersects with the knowledge of epistemologies from the South. It acts as a structuring, articulating, and cross-cutting element in teacher training and a heuristic tool for understanding the Latin American contextual reality.

This is seen through the deconstruction (Derrida, 2005) and decolonization of the main references that have conditioned the initial teacher training curriculum. Its foundations are deeply rooted in and from Eurocentric epistemologies that shape the understanding and interpretation of reality.

In this context, authors like Martínez (2020) urge initial training teachers to "decolonize" reason, language, the theoretical-practical interpretation of history, social reproduction from the standpoint of leaving its economistic root, and the developmental models that have harmed both the environment and human beings. They also call for redefining epistemic sources to reframe and generate new benchmarks for reality interpretation.

While it's true that the aforementioned elements contain, in the opinion of the authors of this study, a touch of utopia, it's crucial that within the Initial Teacher Training curriculum, methodological pathways are developed. These pathways should contribute in the medium and long term to actualizing these accomplishments around refining the teaching and learning of research and developing investigative competencies in teachers.

Authors such as Lárez (2012), Perazzi and Celman (2017), and Núñez et al. (2017) argue that currently, it's vital to reflect on the didactic aspects of teaching and learning research in order to generate methodologies, strategies, techniques, and didactic sequences that promote the development of research skills in initial teacher training. This necessarily means understanding the nature, not only of the investigative process from the epistemological and methodological perspectives, but also the distinguishing features of the contents in conceptual, procedural, and attitudinal orders, and the features of methodological strategies that allow their integration and lead to the development and consolidation of research competencies in teachers.

In this vein, Sotomayor (2019) emphasizes, when referring to Initial Teacher Training processes, the importance of systematizing the evidence derived from research on formative processes. This is to integrate it into the teaching of courses and to generate specific didactics for the development of research content. All with the purpose of promoting conditions that allow for the construction of genuine meaningful learning around the true development of skills and abilities in such a specific area as research; but also in cross-cutting aspects related to the development of critical thinking and basic and higher mental processes associated with scientific thinking in the social and natural sciences.

Below is Table 1, which synthetically includes some methodologies and activities recommended by Núñez et al. (2017), Perazzi and Celman (2017) and Claure (2019) for teaching and learning research.

The use of active methodologies has a positive impact on students' perception, learning, and grading, allowing them to acquire research skills applied to relevant educational topics and related to their future jobs. By linking research with pedagogy, options for addressing educational problems with methodological support are expanded. However, it should be noted that the use of these methodologies also presents challenges, especially in terms of the time required to implement the procedures associated with each method.

Based on the elements discussed throughout this work, it is clear that the Epistemologies of the South result, on the one hand, from the process of deconstructing Eurocentric Epistemologies, as well as from colonization processes. On the other hand, they represent an effort to generate new systems of knowledge production and management, centered on paradigms, methods, and methodologies alternative to traditional ones. These aim to respond to the contextual conditions specific to a significant group of Central American, South American, Caribbean, and other continents' countries, such as African countries. Despite being dominated by hegemonic Eurocentric epistemologies and considered by them as developing countries or belonging to the third world, these nations have been able to create new reference systems to meet their particular needs and oppose the notion of self-assumed and self-declared superiority by traditional Eurocentric Epistemologies (Meneses, 2016).

From this perspective, as Barrios (2019) points out, the emergence of Epistemologies of the South not only allows for the creation of new rational, relational, interactive, and understanding

TABLE 1 Active methodologies suggested to enhance learning of research in education in initial teacher training.

Methodology	Operational dimension for its execution	Reported results of its application
Feedback methodology	Implemented through formative assessment applied to all practical assignments of the subject, providing written or oral feedback as appropriate in synchronous or asynchronous time.	Students have shown a positive reception and appreciation for having consistent guidance in the construction of their research. It also helps improve student grades in summative assessment.
Research-based learning methodology	This is implemented through the construction of a research preliminary project in the format of a scientific article. This is done under the umbrella of either the quantitative or qualitative paradigm, with the freedom to choose the type of research and theme associated with one of the research lines or areas of the student's major.	Students have given a positive response, expressing that the dynamics of the classes, which consist of conceptual aspects intrinsic to the research methodology, are immediately put into practice in the development of research that is structured step by step.
Research-based learning methodology	It is implemented through the construction of a research pre-project in the format of a scientific article, which is developed under the umbrella of the quantitative or qualitative paradigm, having the freedom to choose the type of research and topic associated with one of the research lines or areas of the degree program being studied.	On the part of the students, a positive response has been obtained, expressing that the dynamics of the classes, which include conceptual aspects of research methodology, are immediately put into practice in the development of research that is structured step by step.

Source(s): Own creation with information adapted from Perazzi and Celman (2017) and Núñez et al. (2017).

logics of reality but also serves as a tool for interpreting these anthropological, sociological, and natural characteristics in a contextualized manner. According to its actors, this interpretation requires a knowledge production model rooted in the local, historical, and even moral context, which entirely escapes the prevailing models for the production of dominant scientific knowledge. It calls for alternative methodologies for knowledge production from a distinct epistemological, ontological, axiological, and teleological standpoint, based on praxeology, dialectics, and the interplay between action-reflection-action as determining elements in transforming reality socially.

Unlike traditional Eurocentric Epistemologies, this new epistemological proposal acknowledges the need not only to promote but also to value knowledge that, from the perspective of hegemonic epistemologies, was deemed non-scientific. It emphasizes the necessity of recognizing as valid the various practices of social classes and groups whose ancestral knowledge and wisdom generation should be equally respected. This approach gives rise to a plurality of knowledge (everyday knowledge, ancestral knowledge, peasant knowledge, among others), which, when approached from alternative epistemological perspectives, can be considered alongside scientific knowledge. They can serve as references for the interpretation and reinterpretation of reality.

Within the framework outlined, it is evident that achieving such objectives requires a robust research-oriented training for teachers. This is not only due to the role education plays in social change processes and the construction of citizenship but also because of the relationship between the quality of education and the initial teacher training received (Vega, 2022). According to this author, the quality of teacher training is associated with the conceptual, practical, and professional dimensions. These dimensions are, in turn, linked to the mastery of the teaching discipline, the ability to plan, execute, and evaluate the teaching and learning process, and the command of research tools to reflect on one's own practice, understand the environment, and engage in educational praxis with social relevance and possibilities for social transformation.

In this frame of reference, the Epistemologies of the South not only enable the creation of new social spaces for transforming educational practices and implementing alternative methodologies for the production of contextualized knowledge but also provide an opportunity to visualize and re-signify traditional, popular, peasant knowledge, among others, as alternative but equally valid knowledge. This is due to the contributions they can make to improving the quality of life and enhancing a better understanding of the world. It favors the adoption of new worldviews alternative to Eurocentric epistemologies that have been considered hegemonic in the fields of natural and social sciences and education.

The ideas presented undoubtedly constitute just one element contributing to the debate on potential interactions. These ideas, based on the concepts discussed, could serve as a reference for a deeper exploration from an epistemological, research-oriented, and educational standpoint. This exploration would serve as a guide for updating the social, ethical, political, and curricular aspects that serve as a reference for teacher education in Central America, South America, the Caribbean, and even in some countries in the African continent, whose characteristics are similar to the Latin American context.

6 Discussion and conclusion

Initial teacher training is a complex, comprehensive, and integrative process that requires careful planning and execution within a quality framework. This framework should provide future teachers with a set of heuristic tools that allow them to reflect on their professional praxis and understand their contextual reality. The aim is to positively transform it through actions with social relevance, oriented toward the collective well-being and improving the quality of life of the population.

From this perspective, both research training and epistemological reflection on the Eurocentric foundations that have permeated the understanding of Latin American social reality to date are challenges. These foundations have limited the construction of new forms of

reality interpretation from a unique contextual viewpoint, designed by and for the South. These challenges are part of the broader goal of achieving true emancipation through the deconstruction of Eurocentric and hegemonic thinking established from the colonization and imperialization processes of Latin American countries by Europe and North America.

To achieve this goal, it is essential to strengthen the critical thinking of teachers from the outset of their initial training. This can be done by developing research competencies and creating social spaces that promote reflection and the construction of new forms of rationality and knowledge interpretation. These new forms should prioritize the understanding of the regional and local without losing sight of the global perspective.

The current Latin American moment demands its actors to look beyond the obvious and create spaces for recognition, mediated by new epistemologies from and for the South. This will allow us as citizens to recognize ourselves and others from a perspective of respect and understanding the various contexts and cultures in the region. To do this, it is imperative to understand the role of education and educators in building new realities based on the real needs of our societies.

Author contributions

MP, JL, and ÓV-G: information seeking and writing and critical review. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Could a playful approach to teaching be a path to resonant connections? Experiences from teacher education in Denmark

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Creative and playful approaches to teaching in teacher education emerge these years. Due to the increasing focus on performance, pace, visible goals, and efficiency in the educational systems within the Western societies, there seem to be a search for new answers when organising teaching within teacher education—also for the future. Based on empirical material created in a large research project in teacher education in Denmark, this paper analyses how playful approaches can contribute to improving conditions for a holistic approach to education, and how these approaches must be linked to concrete pedagogical actions. By applying a theoretical framework of playful approaches to learning in teacher education based on Rosa, Lennon and Skovbjerg, the main contribution of the paper is to point to both pedagogical directions and clarifications when working with playful approaches in teacher education.

KEYWORDS

teacher education, teaching, organisation, playful, learning

1 Introduction

"I think they all get a deeper understanding of the narrative which is: here, we do not do 'nice'. Meaning that we work in a space, a space of trust, where our works of art are not judged by an arbiter of taste." This is how a visual arts teacher describes the kind of experience she intends the students to have in her visual arts class in the teacher education programme. To realise her intentions, she often applies a playful approach to teaching in the class. By doing so, she experiences that competitive performance and result orientation are downsized in the classroom, and experimentation, exploration, and being with others in the present moment are upsized in a meaningful way, without judging what you are currently doing. In the article, we give a more detailed account of her way of working playfully, but for now, we see it as a desire to give students the opportunity to develop their resonant relationship with the world, as the German philosopher and sociologist Rosa (2021) describes it in his book *Resonance*. In the paper, we present evidence that a playful approach holds potential in relation to this endeavour.

Based on empirical material created in the research project *Playful Learning Research Extension* (2018–2023), we investigate how play and playfulness as a form of organisation can enable resonantly abundant, social experiences at the schoolteacher and pre-school teacher educational programme. Our aim is to show how playful approaches to teaching can enable students to form a resonant connection with their education (Rosa and Endres, 2017). Synthesising the concepts of *resonance* from Rosa (2021), the *fleshiness of our existence* from

Lennon (2015), and Skovbjerg (2021a,b) concept of *play practices* enables us to project how teachers may experience resonance in the classroom. With this synthesis, we also want to demonstrate the importance of creating concrete organisational spheres of action where the students work together towards an imagined future (Elkjaer et al., 2021), enabling resonance in the organisational context of *education*.

In this paper, we see the concept of resonance in relation to playful approaches to teaching as a response to the increasing focus on competition, performance, pace, unambiguous goals, and efficiency in the neo-liberal educational policies (Rosa, 2013; Jensen et al., 2022b). The way to fulfil the neoliberal ambitions of speed and efficiency has been to optimise students' thinking skills, cognition, metacognition, and emotional regulation. However, this way of putting one-sided emphasis on thinking and cognition in education seems to entail risks of overlooking the bodily and sensuous aspects of learning, which again entails a risk of emotional stress, because the body is always there in the classroom no matter if the body's needs are addressed or not. Even broader approaches like educational entrepreneurship (Sjøvoll et al., 2011), 21st Century Skills (OECD, 2019), practical expertise (Jensen et al., 2022a), sustainability pedagogy (Lund, 2020), learning through play (Skovbjerg and Sand, 2022), seem to downplay the role of the body and senses when it comes to higher education. In our research context, the effort to employ playful approaches to learning in teacher education is an example of an educational development in which the students' bodies are instrumental to succeed, which is described in this paper. The playful approach addresses deeper fundamental questions in the education system, as it insists that education is not just about educating for the labour market and academic achievement. Playful approaches aim to educate for a holistic, professional life and professional discretion, and they are thus more closely linked to existential questions, which we also find in educational philosophers (Skovbjerg, 2016; Hammershøj, 2018; Biesta, 2019: 48). The question is whether the necessary pedagogical competences and organisational tools to translate the ideas into educational practice exist at all in today's education of schoolteachers and pre-school teachers. A recent review of research in the field indicated that broad approaches to learning are often applied during short, detached events in educational programmes, otherwise focused on performance and pace. Play is often used for either academic optimisation or for making up for the pressure and competition which the students must endure due to the mechanisms of the absence of bodily and sensuous opportunities for learning in existing educational programmes (Jensen et al., 2022a). These ways of using play instrumentally as compensation for various deficits in teaching (often formulated as deficits in students) fail to challenge or question the educational culture and organisational context that puts pressure on young people.

This paper's central aim is therefore to answer the following research questions: *How can playful approaches to teaching contribute to improving the conditions for resonance as a response to a holistic approach to education of teachers? And how can this holistic approach be made concrete through playful practices linked to the fleshiness of our existence and action?* We are thus pointing to both pedagogical directions and philosophical clarifications.

In the next part of the paper, we unfold the synthesis of the three theoretical concepts in the section on theoretical framework. Next, we present the research context and analysis methodology as well as three empirical analysis parts. Finally, we close with a discussion and conclusion.

2 Theoretical framework

In this section, we present the paper's theoretical framework. We start with the concept of resonance in Rosa (2021), then the idea of the fleshiness of our existence, a social, imaginative body in Lennon (2015), and finally the concept of play practices in Skovbjerg (2021a,b). The reason for selecting these three perspectives is that Rosa provides us with a metaphor of how teaching should be organised, Lennon points to the importance of being in a culture *in the flesh* (here in an educational and organisational context) while Skovbjerg's play perspective can combine with the two other perspectives, transforming them all into something specific and action oriented.

2.1 The concept of resonance in Rosa

To Rosa, resonance describes a way of relating to the world that allows for an experience of meaningfulness and a physical, sensuous, and social connection with the world one is part of. The meaningfulness and connectedness arise in and through a relationship with a counterpart and are therefore, according to Rosa, not an inner psychological concept, but a "relationship mode", i.e., a way of describing connections (Rosa, 2021: 174).

Resonance can thus arise in the *relationship* to a counterpart or to the world, which at the same time "speaks with its own voice". As Rosa (2020) writes in his book *The Uncontrollability of the World*, the world has, so to speak, its own character, an inner logic that remains unruly and uncontrollable no matter how hard we try (Rosa, 2020: 44). In his book *Resonance* (Rosa, 2021), Rosa explains his understanding of resonance by using a turning fork as a metaphor—or rather two turning forks, where one makes the other resound by "matching" the other's frequency, making them vibrate together. Since they are two different turning forks, they also have two different "voices," but when their voices vibrate at each other's frequencies, they are in harmony—but still diverse. Translating this metaphor to human, subjective experience, resonance should be seen as something setting the individual's inner reflection or representation of the world or the other person into motion in the interplay with the actual or imagined another world. It should be understood as an experience of being put into vibrant motion, but others or something else, in way that allows one to sound out in response to the other, but in such a manner that one's own voice is liberated and heard, both by oneself and the other person (Rosa, 2021: 124). In this light, resonance implies a liberating and transgressive understanding of our embodied, social, and spatial situatedness in the world. This allows resonant relationships to form, when the individual's voice vibrates with the voices of others or something else. In addition, resonance also insists on the possibility that contradictions, potential conflicts, otherness, and dissonance can be accommodated in the same situation; in Rosa's words, it can create "sizzling" in the collective room, which is felt and processed by the individual subject (Rosa and Endres, 2017). This means that allowing space for contradictory vibrations alongside harmonic resounding can help counteract conformity and compliance, which Rosa refers to as echo chambers (Rosa and Endres, 2017). We consider this way of

looking at resonance, i.e., as a liberating, vibrant space, to be essential for understanding an educational organisational reality in which many voices form the social reality together—not to achieve harmony, but to achieve an organisational context, in which there is space for the individual, and for the diversity and conflicting vibrations and resounding.

At the individual level, an important point for Rosa is that you can only experience resonance if you stay open to the surroundings which you are a part of. In doing so you must be open and ready for Rosa phrases as" let yourself be called for," and to be ready for being reached for by something outside myself. This means that to Rosa, for the resonance relationship to occur, you listen, stay open to what you hear, and that you accept listening for this call. According to Rosa, one of the ways to provide optimum conditions for the resonance relationship to arise is that I can let myself be called on by being present, by focusing on exactly this moment in which I am present, and that I keep my attention focused on this moment instead of focusing on what will happen in an hour.

The German educational philosopher Wolfgang Klafki influences Rosa's thinking on pedagogy, which expresses itself in his thoughts on pedagogical dialectics of the subject (the student) and the object (the academic content or the world at large). Rosa, like Klafki, talks about opening the student to the academic material and opening the academic material to the student, which according to Rosa can happen in a resonant relationship between the student and the academic material (Rosa and Endres, 2017). Rosa continues Klafki's idea of a pedagogical dialectic by pointing out that this state of letting the material call out is related to our embodied situatedness in the world, and to being able to experience the world through the body. The body is thus the instrument allowing us to enter a resonant relationship with the world through the body's senses and movements. In an educational organisational context, this means that teachers and students are not merely social participants in an educational culture, they are also embodied participants. In the following, we draw on this point in a understanding of the cultural (organisational) body.

2.2 Lennon's social body in the fleshiness of our existence

Rosa may point to the body's connection to the world as a condition of possibility for the resonant relationship to arise and be maintained, but at the same time it is constructive to give it more 'flesh' (Gilbert and Lennon, 1988: 32) drawing inspiration especially from Lennon. British philosopher Kathleen Lennon finds the flesh, the corporeal and the social imaginative practices to be fundamental to our connection to the world—that is, that the corporeal is what enables a resonant relationship. As Lennon puts it: "The imaginaries in terms of which we encounter the world are anchored in our bodily presence within but also on the social context in which we are placed" (Lennon, 2015: 32). According to Lennon, it is through the body's temporal and social presence in relation to the bodies of others that our sensuous interpretation of the connections to our surroundings is realised and translated into notions and bodily expressions (Lennon, 2015: 120). This means that our physical bodies (the flesh) may be understood as a sensory system of interpretation. Depending on how expressions are influenced by and influence others, we are always and already in 'the fleshiness of our existence', in Sartre's words, which Lennon borrows (Lennon, 2015: 132). It is through this *practice as a physical, corporeal phenomenon*, that we can become and remain open to new interpretations which we can allow to call on us: "My body takes responsive shape during my interactions with others, and the shape it takes, reveals the expressive context the body I am encountering has for me" (Lennon, 2015: 127). Rosa describes the responsiveness through the metaphor of the tuning fork and the sensuous oscillations, but with Lennon it does not remain a metaphor. Lennon insists on the body as being a body of flesh and blood *interacting* with other bodies of flesh and blood as the condition of possibility for a resonant relationship to occur. A further aspect of this interaction is the cultural, shaping layer of interpretation that is added to the individual's sensory experiences in the form of other bodies' reactions to one's own body and its external appearance and expression (Lennon, 2015: 131–132). In an organisational context, this means that the individual's body interacts with other bodies and together they constitute a sensory cultural, organisational system of interpretation.

As mentioned at the beginning, despite many inspiring metaphors to aid the understanding of the resonance relationship, Rosa is sparse when it comes to providing concrete *instructions* on how resonant relationships arise, develop, and are maintained. According to Lennon, the body of flesh and blood is a basic prerequisite for both sensuousness and interpretations and notions of the (social and organisational) world, without, however, giving instructions or applying the concept of resonance.

In the following, we will show how the concept of play practices offer applications for forms of organisation in an educational context where bodies of flesh and blood in sensory interaction can create and maintain the resonance relationship. This does not mean that we see play practices as recipes for how students can achieve the resonance relationship. Instead, we show how play can be viewed, the resonance relationship can be enabled, exercised, concretely, socially, temporally and with bodies of flesh and blood.

2.3 Play practices as a realisation opportunity

The concept of play practices comes from Skovbjerg (2021a), who defines the concept as "what is done in play". This means that play practices are all the actions performed sensuously and bodily when playing. When playing with LEGO bricks, you build, assemble, and fiddle with, in rag ball, you kick, run, and pass the ball, in role-play you imagine, rehearse, and practice. Skovbjerg (2021a: 65) continues: "Practices are thus ways of being in the flesh, ways of thinking, ways of using things, ways of feeling and becoming motivated". Basically, several activities are carried out, and we are not able to say that the practices 'belong' to anyone. These play practices are practiced in a rhythm that takes place between repetition and distance. This means that some play practices are characterised by strong repetition with minor changes from one action to another, while others are characterised by the opposite, i.e., that there is great disruption from one action to another. For all actions, this rhythm is the "what if" of play, and Skovbjerg typologises 4 basic types of play practices, i.e., four archetypal ways in which play takes place. The rhythm and the relationship between repetition and disruption can be varied in four ways.

The first play practice is called SLIDING and is characterised by being repeatable, rhythmic, and with few changes from one action to another. This play practice is characterised by being predictable, soft and quiet, without fluctuations and surprises. The body is often still, movements calm, and voices soft.

The second play practice is called SHIFTING and is characterised by being repeatable with clear and distinct repetitions that are interrupted at unpredictable times of change and disruption. For example, trampoline play that starts in the middle and where large jumps deep into the mat are replaced by unpredictable jumps to the side or bumping into each other, or a ride on a wild roller coaster that often starts out softly, building up when we are pulled to the highest point of the track, and then suddenly there is a change in direction, height, and pace. These play practices are often linked to play that revolve around large movements of the body, and often it is in this type of play that the world really strikes back and shows you where the body's limits are "in flesh and blood".

The third play practice is called DISPLAYING and is characterised by having a stronger focus on disruption than the previous two. It could, for example, be when playing circus, X-Factor or other types of play revolving around performances. They are characterised by the participants reenacting the social norms that characterise the play scenarios while expecting the individual to chime in with special ideas. A clown is practiced in one way, and so is the X-Factor play scenario, but at the same time, play participants keep bringing ideas that constantly reinvent how the clown is practiced, depending on who the play participants are. DISPLAYING play practices that are solely based on imitation without any new ideas will lose momentum, become sluggish, and eventually appear meaningless. This variability between the situational preferences for certain play practices and the ideas are what characterise the rhythm of this play practice and reveal the boundaries of a particular play; which rules do and do not apply.

The fourth and last play practice is EXCEEDING, which is characterised by primarily focusing on disruption. This means that this play practice is primarily concerned with exceeding everything that is in the process of establishing itself as clear and continuous. This play practice is therefore the opposite of SLIDING, and disruptions become wilder and wilder. When someone throws water, tells a joke, makes fun of something, changes their voice, swears, bursts into a fit of laughter, or teases someone else, it is about exceeding the social and cultural codes of what can be done within the contexts in which it takes place. And if the exceeding is to continue, you need a sense of what came before—i.e. what you are exceeding and how much, depending on what you can imagine. These play practices involve a creative force in every single play action. As Skovbjerg (2021b) puts it: "Play requires situational awareness to strike the tone of play—if you are tactless, you will miss the tone entirely" (75).

Above, we have described the theoretical framework which we will employ to reach a deeper understanding of how meaningful empirical experiences in educational contexts can be understood and described, but also to examine how we can create access to resonant experiences in the educational organisational context, making it possible to both live out and live. The three perspectives combined enable us to examine how specific resonant connections are created and maintained between students and teachers at the schoolteacher and pre-school teacher educational programme.

3 Research context, methodology, and analysis strategy

The empirical material is a sample of extensive material derived from the research project *Playful Learning Research Extension* (2018–2024). The project researches and develops playful teaching practices at the schoolteacher and pre-school teacher educational programmes at the six Danish university colleges. The material included in this paper consists of excerpts from transcripts of dialogues between a group of teachers from two study programmes. The dialogues took place at five three-hour meetings, which were held as reflection workshops (see also Jensen, 2019, 2022). The research purpose of the workshops was to examine the organisational change brought about by a project like Playful Learning when a group of teachers began experimenting with their teaching practices together. At the workshops, teachers could theme different aspects of their development work which they considered important and essential for the playful approach to learning becoming valuable for themselves, the students, and their colleagues (i.e., the entire organisation). In this context, the researchers (1) facilitated the teachers' sharing of concrete stories from their own teaching practice with each other, and (2) based on the stories, supported the teachers' reflections on what play consists of and how play affected the students' learning. The design of the workshops was a design experiment in a design-based research framework (Barab and Squire, 2004; Ma and Harnon, 2009; Ejsing-Duun and Skovbjerg, 2018). The design experiment is based on an extensive, iterative process investigating whether and how such a type of workshop can be used as an organisational change tool. The design experiment rested on the following design principles: *(1) description* of the teachers' own, playful teaching practices, *(2) joint reflection on* playful teaching practices, and *(3) joint learning* in playful teaching practices (Ma and Harnon, 2009). The design principles are inspired by Dewey's (1933) learning theories. The researchers translated the three design principles into action during the workshops by giving the teachers different questions and assignments, which were designed specifically for each principle.

We have interpreted the transcribed texts from a hermeneutic approach, where the empirical material was put into play together with our theoretical preconception (Mason, 2002) of the concepts of resonance, physicality, and play practices. The purpose of this first analysis of the collected material was to discover any patterns in the teachers' narratives and reflections that could influence our theoretical preconceptions of the concepts of resonance, physicality, and play practices, thereby creating new understandings (Whiting, 2002). We then grouped the patterns into three overarching themes (new understandings), which in this paper contributes to understanding resonance in teaching in an educational organisation (Ryan and Bernard, 2003). The analysis is therefore presented in a framework consisting of these themes. This means that each theme begins with an example taken from the empirical material, demonstrating the empirical anchoring of the theme, its nuances, and qualities. The empirical material is then put into play with theoretical concepts that will help us spot new empirical nuances and understand the empirical evidence in new ways. In this way, the link between the teachers' experiences and our interpretations creates a wider practical meaning with the theoretical concepts of resonance, physicality, and play practices.

4 Analysis

In the analysis, we are particularly interested in material where teachers describe the students *doing something playful* together. Furthermore, we look at the connections between the students' play practices and the social arena they are part of when they enter an organised educational context. In our understanding, it is precisely this type of experiential space that enables resonance. We have interpreted (Mason, 2002) these play practice contexts through an understanding of resonance, social corporeal interpretations, and play practices to gain insight into how teachers' experiences and our readings together can create a further, practical and organisational meaning with the theoretical concepts of resonance, physicality, and play practices. Our hermeneutic analysis has led us to three main themes: (1) Social, repeatable play practices; (2) material play practices, and (3) physical play practices in the flesh—all considered as possible paths to resonance.

4.1 Analysis I: social, repeatable play practices as a path to resonance

The first part of the analysis examines how social play practices can be a path to resonance. We meet a visual arts teacher who often finds student teachers to be bashful about their work in visual arts. This becomes particularly evident when they are asked to draw or paint portraits. The students believe that the likeness of the person portrayed should be like that of a photograph. According to the teacher, this inhibits their zest for experimenting and their desire to explore resonant connections between themselves, the creative process, and the person and the situation portrayed. Therefore, the teacher has developed a playful activity in which the students are divided into two teams (see Figure 1).

The two teams are asked to sit on the floor in two circles: the persons in the inner circle facing outwards and the persons in the outer circle facing inwards. The participants in the inner circle are models, and those sitting in the outer circle are the artists. Those in the outer circle are given crayons in either a dark or a light colour and a clipboard with a piece of paper. After one minute, the students in the outer circle put down their clipboards and papers, keep their crayons, and move one place to the right. They now sit in front of a new model (i.e., a new student whose face is now in focus) with a piece of paper already drawn on by the previous student. This continues until all students in the outer circle have come full circle and are now again facing the student they started drawing. The teacher reflects on this way of organising the class with the following words:

FIGURE 1
Students drawing each other.

> *"It becomes a social portrait, does not it? And when the students come full circle, I assess whether the portraits are close to being finished. If not, we do another round. What happens is that no one has ownership of the portrait, so there's no one to scold if it's not mimesis [photographic likeness]. Using this playful approach, the students discover that the social interaction they have had – because they laugh and joke with each other when they leave the classroom – actually ends up – regardless of the fact that ten people have been involved in this portrait painting – looking like the person who was portrayed. Not a photographic likeness – and that's what I want them to realise with this activity – that it's these characteristics of a person: dark hair, brown eyes, small nose, big mouth, happy person, whatever, that are still conveyed even if there is no photographic likeness. And so, it becomes a shared learning community where we can talk about what is happening here. But this shyness about their own expression disappears, and this is just a way to scaffold it."*

The teacher goes on to say:

> *"It is, of course, the scaffolding and the community dialogue. Because there's a [silent] dialogue every time they move from one portrait to another on their uncertainty about 'how it will turn out'. There's this other person who made a portrait, which they enter into a dialogue with, because okay, now I have this colour, and how do I enter into a dialogue with what the person before me did? And then they say 'Oh well, now the shadows have been made with this dark colour, which my fellow student used, and now I have a light colour, so I'll just start where the shape comes out, will not I?' So, there's a dialogue both in a physical sense with the student, but also with the material that comes from the other student. So you could say that there are more dialogues going on. Does that make sense?"*

In the context of the play practice which Skovbjerg (2021a) calls SLIDING, the students participate in a process characterised by a steady, continuous rhythm with the aim of finding common ground around something meaningful. The play takes place according to a predefined structure: The rhythm can be described as the students sitting on the floor, picking up a crayon, drawing for one minute, putting down the paper, moving to the right still holding the crayon, drawing on the next piece of paper for one minute, putting down the paper, moving to the right, the crayon still in their hand, drawing for one minute, moving to the right. These repetitive practices performed in a rhythm without anyone speaking, without disrupting the silence, the continuity, the socialising, is not solely an empirical expression of the SLIDING play practice but also of Lennon's concept of the body of flesh and blood. Thus, the faces as a form are the focus, along with the craft of reproducing the form through a series of obstacles and rhythms. The SLIDING nature of the playful activity and the portrait's

focus on bodies of flesh and blood does not call on the students to judge the product, and their flesh and blood are also not exposed to the scrutiny of others. The students are absorbed in the task and the process without considering whether it could be done differently. In other words, they participate in the social practice without setting boundaries in relation to whether something is too much or too little.

Considering the concept of resonance, this SLIDING rhythm along with the emphasis on the body being of flesh and blood are understood as being resonance-inducing in that the students' eyes and hands take part in the process itself and that they are socially connected at the end of the process. They are smiling and laughing when they leave the classroom, and this is interpreted by the teacher as meaning that they have had an experience which has strengthened their relationships. The involvement of the bodies in the rhythm of the play practice can be seen as a kind of developer liquid for resonance. When following Rosa's metaphor of the tuning forks and adding the points from the playful activity, if the tuning forks are to keep oscillating, they need to be repeatedly impacted by something or someone, and there must be room for other tuning forks to respond to impact from and provide impact to others by oscillating. The rhythm of the playful activity (categorised as SLIDING by Skovbjerg) is characterised by 'initiating' and 'responding to impact'.

4.2 Analysis II: material play practices as a path to resonance

In the first example, we saw that participation in the SLIDING play practice enabled the emergence of resonance, and that it was precisely the social repeatable rhythm and continuity that created a space for this to take place. In the next example, we will focus on the use of materials. The topic is a philosophy of science class at the pre-school teacher educational programme, and the teacher is explaining how she divided the students into three groups. Each of the three groups would focus on a specific philosophy of science paradigm: natural science, humanities, and social sciences. One member of each group is blindfolded and handed a fruit or a vegetable. The other group members must then ask the blindfolded member questions in line with the group's paradigm. For example, in the natural science paradigm group, one would ask about the temperature, colour, or weight of the vegetable, while the humanistic paradigm group would ask questions that concern people's experiences, relationships, and cultural connections with the vegetable, such as taste, smell, and associations. Finally, based on the questions which the blindfolded students are asked and the answers they give based on what they can feel with their hands, the other students in each group must guess which fruit or vegetable it is.

This process consists of initial step-by-step instructions from the teacher, dividing the students into groups, then blindfolds are distributed, and a selected student is blindfolded, fruits and vegetables are handed out and finally, philosophy of science paradigms are assigned to the groups. All steps were introduced without the students knowing what would happen next. The only thing they did know was that the topic was philosophy of science.

Finally, the three groups presented which 'truths' about the fruit or vegetable the different paradigms allowed the blindfolded students to deduce. The student's sensory experience of holding the fruit or vegetable and having to explore it with their hands guided by their fellow students' questions thus becomes the starting point for the students to discuss with the other science paradigm groups, which questions are typically asked within the philosophy of science paradigms, which results can thus be obtained, and which subject areas are interesting for the individual paradigms (see Figure 2).

FIGURE 2
Students discuss theory of science using vegetables.

The teacher talks about this way of organising the class and the students:

> *"I then say: 'You have identified different elements of a truth by asking different questions.' So it could be an experience I then build on, I initiate a dialogue. In this way, students begin to add some concepts to the [specific] experiences. Stories as well as specific activities. But they actually have to get into this activity first."*

The teacher provides a framework for the students' actions by initially setting the rhythm through simple repetitions that all students are invited to participate in without any advance knowledge: Receive fruit, blindfold, paradigm, question, answer, question, answer. In this context, the fruit is the anchor of the SLIDING practice and thus becomes a common third for the students. With their hands put forward, touching the materials, they set the direction of the repetitions. In this way, the teacher facilitates a sensory experience for the students through the SLIDING practice that links thinking and sensing. This connection is established between (1) the questions that the students are asked, (2) the material (vegetables), and (3) the students themselves, interacting with vegetables through the questions. When the teacher says that this optimises the students' understanding of the philosophy of science, the SLIDING practice can explain the realisation as a combination of sensing and thinking.

4.3 Analysis III: physical play practices in the flesh as a path to resonance

Whereas the first two analyses deal with the organisation of the social and material aspects of teaching and the organisation's potential for evoking resonant experiences, the last part deals specifically with

the physical, corporeal dimension, i.e., where specific bodies of flesh and blood are involved in play practices in specific situations characterised by social community (see Figure 3).

In the following, the teacher describes a teaching situation which answers our reflection questions about when teaching is truly playful and makes a difference for specific students, in this case a student teacher. The teaching revolves around the concept of 21st century skills, which among other things deals with the education programmes of the future meeting society's need for students to develop communicative, creative, and critical thinking skills. The teacher wanted to make the lessons more engaging ('less boring' as she put it) and decided to reorganise everything with the help of a colleague. The teacher says:

> *"… in this class, I started a four-hour teaching session by entering the classroom and clearing the whole room of tables and chairs. I was a bit surprised at how unnerving this actually was for the students, because they were like: 'Oh no! What's going on? What should we do, what do we do? What am I supposed to do? Where should I sit?' It was quite crazy."*

Thereby, the teacher explains how the empty classroom's disruption of expectations and habits made the students nervous. The teacher goes on to say that she then facilitated a series of exercises where the students were asked to mingle while asking and answering questions from a set of printed question cards. She wanted everyone in the class to speak to each other. The cards were also divided into colours, which meant that the students ended up being divided into groups of four. The teacher then facilitated an exercise in which groups were positioned in pairs in a double circle while discussing four questions which ultimately led to the question: 'What will the world look like in 20 years, and what should the school be able to do to prepare students for this world?' This was a way to facilitate a process that would help participants gain an understanding of what 21st century skills could be.

On this facilitated organisation of the class, the teacher says:

> *"And the comments the students made were: 'Oh wow, those four hours just flew by.' They could not understand how time had passed so quickly. Several students also said that it might make sense to include 21st century skills in their teaching careers."*

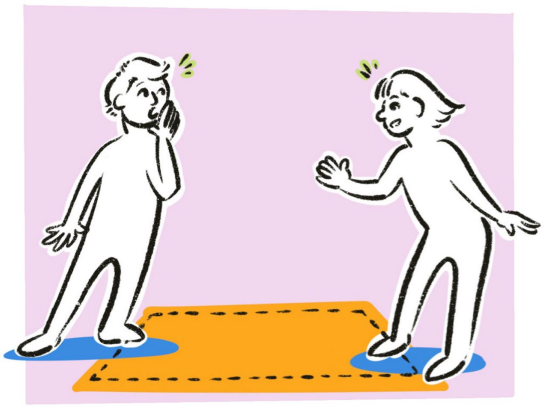

FIGURE 3
Students entering a classroom without tables and chairs.

If we interpret this story in the context of resonance, play practices, and corporeal connections, we can point to several interesting points: Firstly, the students' expectations of what 'a classroom' looks like are disrupted. In the words of Rosa, it causes a dissonance in the room, which the teacher describes as "nervousness" and illustrates by reproducing the students' immediate verbal response ("oh no!"). The teacher describes the missing tables as becoming an impulse, an input that evokes a clear awareness among the students of their way of being a body of flesh and blood in a classroom. This apparent body of flesh and blood in the empty room is, however, soon organised by the teacher in relation to the bodies of others through the SLIDING and SHIFTING *play practices*. This can be identified by the question cards, by the students moving among each other, alternating between moving and being stationary, speed and change of direction, by groups forming through the question cards, and by the students imagining the school of the future. If we interpret this in the light of the EXCEEDING play practice, the students experience that time flies by, which to us suggests that there is a resonance among the students and between the students and the academic material—all parts "oscillate" together with regular impacts creating sustained oscillations. This seems to be related to the fact that the students' bodies and actions are organised in an entirely new way, which creates an opportunity for them to act openly and with their body of flesh and blood in the presence of other bodies of flesh and blood. The experience of time flying by (which can be associated with the concept of resonance) may also indicate that this activity has given the students the opportunity to encounter an academically relevant topic that they would otherwise have found difficult to engage with.

5 Recapitulation and conclusion

The examination of the above empirical examples in the context of Rosa's concept of resonance in synthesis with Lennon's social body in the flesh and Skovbjerg's play practices generally reveal several opportunities to further develop the concept of resonance in relation to social interaction in the classroom, which again points to a wider, educational organisational context.

We analysed the playful practices in the examples as a way of insisting on the fleshiness of our existence in interaction with other bodies "in the flesh". In the analysis of the examples, we see how the organisational dynamics of play practices create resonant connections among the students and resonance in their encounter with the academic material. However, the analysis also indicates that Rosa's metaphorical image of resonance as oscillations between tuning forks needs further development for it to become relevant in an organisational context, e.g., in a teaching context. As the example of the portrait-painting students or the empty classroom shows, the concept of resonance may need a physical corporeal dimension. A physical corporeal dimension to the concept of resonance would enable the development of intentional, organising principles that sharpen the framework and opportunities for students' bodies to enter relationships with other bodies. In this way, the metaphor of the tuning forks can create organisational meaning and value in a bodily sense. Intentional, organisational principles could, as demonstrated,

be the different play practices, where, for example, the use of the SLIDING practice in the portrait painting activity both organises the movement of bodies in a social context and creates the rhythmic impulse and pulse that sustains the resonance.

The empirical examples in combination with the SLIDING play practice also indicate that the metaphor of resonance as the oscillations of a tuning fork implies a need for an impact—an initiating sound—to create resonance in the first place. The logical consequence is that in the absence of a new impulse, a new impact, the oscillations die out. In the examples, the intentional organisation of impulses to put the students' bodies into oscillations through the rhythmic repetition of SLIDING seems to precisely create this continuous impulse to sustain resonance, first by the teachers, then by the students' active involvement in the processes where they create impulses for each other. This means that the rhythm invites the students to respond and keep repeating as in the play practice SLIDING or offering new impact as in the play practice SHIFTING. The students must therefore listen and respond, and it is only possible for them to listen if they are sometimes quiet and do not just provide impact without listening and engaging with the impacts of others.

Here are two further considerations of resonance as an organisational phenomenon: firstly, resonance also provides the potential to investigate or make visible something else or someone else's boundaries and otherness. This happens if something or someone "strikes back" in a dissonant way, as in the example of the empty classroom. Secondly, the examples, when analysed in the context of the tuning fork metaphor, may give rise to consider whether the organisational context allows participants to "oscillate freely" (for one tuning fork to resonate with another tuning fork, it must be held so that nothing touches the prongs of the tuning fork preventing oscillations while the stem is what holds the two prongs together). Translating the metaphor of oscillating freely into human resonance relationships means that circumstances (such as the "stem") must allow people in social contexts to oscillate freely not only in a psychological/emotional sense, but also in a bodily sense ("the prongs"). The bodily, free oscillation means, among other things, that both students and teachers are comfortable in their own bodies and recognise that their bodies move in a social context inside the classroom ("the stem")—to become part of what we call "the social body". Meaning that individual bodies become part of a greater social organism ("the prongs" oscillate freely). When the organisational context allows the individuals present to feel comfortable in the social body, they can oscillate with other bodies and at the same time feel enabled to act. We saw this in the example of social portrait painting—the rhythm of the SLIDING practice seemed to allow the students' bodies to oscillate freely, losing themselves. Similarly, in the example of the philosophy of science activity, blindfolding provided new bodily possibilities for oscillating with the bodies of others.

Based on the empirical examples, we thus argue that the concepts of play practices with a focus on the fleshiness of our existence can provide potential for further developing the concept of resonance in a social and organisational context, as in Rosa's current opinion, the concept of resonance is an individual phenomenon. However, in this paper, we have shown empirical examples of how resonance is very much anchored in social processes. To allow resonance to occur in social processes, we rely on organising principles of action and relationships. Here, the paper offers play practices with an explicit bodily focus to increase the likelihood of creating organisational resonance—in this instance in a teaching space. With this thinking it might also be possible to create resonance in other organisational contexts.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Copenhagen University College and the Playful Learning Programme. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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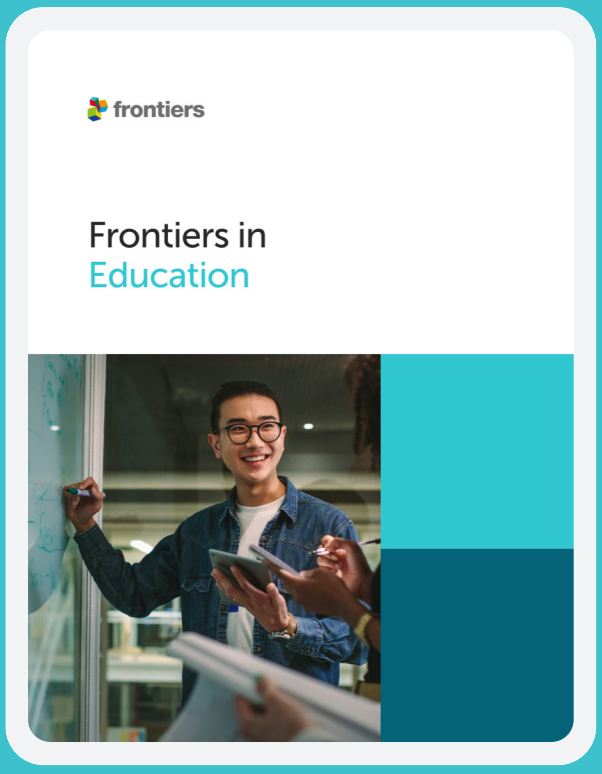

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