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Examining culturally diverse learners' motivation and engagement processes as situated in the context of a complex task

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Student learning processes, including motivation and engagement, have been identified as malleable and situated in context. We have limited understanding about how to enhance motivation and engagement processes for culturally diverse learners in today's multicultural classrooms. To support thinking about that challenge, this work built on research on both culturally responsive teaching (CRT) and self-regulated learning (SRL), each of which identifies pedagogical practices that enhance student engagement and motivation. This study examined how students at a culturally diverse independent elementary school in the West Coast of Canada participated in classroom context that integrated CRT and SRL-promoting practices. Specifically, this study examined culturally diverse learners' engagement and motivation during a complex learning task. Data collected included classroom observations, practice records and documents, students' work samples, and student interviews and student surveys. The results demonstrated: (1) above medium levels of engagement and motivation, among participants, that varied across specific contexts; and (2) associations between culturally diverse learners' engagement and motivation; and complex learning context such as CRT and SRL-promoting practices. Implications for future research on culturally diverse students' engagement as well as designing a complex task that integrated a culturally responsive teaching and self-regulated learning pedagogical practices to support engagement and motivation are discussed.

KEYWORDS

engagement, culturally responsive teaching, self-regulated learning, complex task, motivation

Introduction

Today's classrooms, especially in the western societies, are populated by students from diverse linguistic and cultural backgrounds. These students bring into the classroom their individual differences (e.g., interests), expectations (e.g., aspirations), social and cultural heritages (e.g., ways of knowing and being), and lived experiences (e.g., of learning in other contexts in their cultural backgrounds). Research has identified how a dynamic interaction between what individual student bring and the learning contexts shapes their achievement, learning experiences including motivational and engagement processes (Okoye and Anyichie, 2008; Järvenoja et al., 2015; Graham, 2018; Gray et al., 2020). In culturally diverse classrooms, students from historically unrepresented groups experience a higher lack of engagement and motivation in classroom activities that are disconnected from their cultural backgrounds, interests, prior knowledge and experiences. Giving the increase in classroom student diversities and their learning needs, many educators who are not trained on how to design a learning context that support motivation for students of colour struggle with creating an empowering context to support culturally diverse students' motivation (Gay, 2018).

Based on these challenges, we need research that will advance our understanding of how educators can support culturally diverse learners' learning processes such as motivation and

engagement by designing activities that are relevant to *all* learners' cultural background and empower learning and foster agency (Anyichie, 2018). Culturally informed pedagogies such as culturally responsive teaching, culturally relevant pedagogy and culturally sustaining pedagogy is beneficial due to its emphasis on how culture influences and shapes students learning (e.g., Ladson-Billings, 1995, 2001; Villegas and Lucas, 2002; Gay, 2018), and the need to sustain students' linguistic and cultural backgrounds in schools (Paris, 2021). For instance, culturally responsive teaching (CRT) demonstrates how students are motivated to participate in classroom contexts that are relevant and personally meaningful to their cultural backgrounds and lived experiences (Gay, 2018). Nevertheless, most research in this area tend to focus on teacher instructional activities with less investigation into the impact on students' experience of motivation and engagement.

On the other hand, self-regulated learning (SRL) research has directly documented the relationship between practices that foster SRL and diverse learners' motivation and engagement. SRL describes students' exercise of control over their thoughts, emotions and behaviours in order to achieve a goal (Zimmerman, 2015). Self-regulating learners are active and successful learners who deploy diverse cognitive strategies to sustain their motivation and engagement during learning. SRL research has examined how educators can empower students' motivation by weaving practices that promote SRL into regular class activities (Butler et al., 2017; Dignath and Veenman, 2021). SRL-promoting practices (SRLPPs) such as choice provision and formative assessment practices (e.g., teacher and peer feedback, self-assessment) have the potential to foster student motivation and engagement (Perry, 2013), if deliberately designed to support students' understanding of the relevance of their learning activities. Lately, research in this area is beginning to pay a closer attention to sociocultural influences on learners' experiences (Hadwin and Oshige, 2011; Järvenoja et al., 2015; Anyichie, et al., 2016; Perry et al., 2017; Anyichie, 2018; Mclnerney and King, 2018). However, we need more research to understand how educators can embed SRL-promoting practices to design a culturally inclusive classroom contexts to support culturally diverse students' motivation and engagement.

Based on the complementarity between self-regulated learning (SRL) and culturally responsive teaching (CRT), it may be beneficial to integrate their practices to support culturally diverse students (Anyichie and Butler, 2017; Anyichie, 2018). Integrating these pedagogical practices can support culturally diverse students' motivation and learning engagement when deliberately woven into activity design to connect with students' backgrounds, interests and lived experiences; and empower learners' active participation (Gay, 2013; Anyichie, 2018; Anyichie and Butler, 2018, 2019; Kumar et al., 2018; Gray et al., 2020; Anyichie et al., 2023). Therefore, this research focused on examining the motivation and learning engagement of *all* students from diverse linguistic and cultural backgrounds in a classroom context (e.g., complex task) that embedded self-regulated learning and culturally responsive teaching practices.

Designing classroom contexts for culturally diverse students' motivation and engagement: CRT and SRL pedagogical practices

Like research on SRL, literature on CRT also identifies qualities of classroom contexts including pedagogical practices that relate to students' motivation and engagement. Although culturally informed frameworks such as culturally responsive teaching (e.g., Villegas and Lucas, 2002; Gay, 2010); culturally relevant pedagogy (e.g., Ladson-Billings, 1995); and culturally sustaining pedagogy (e.g., Paris, 2012) emerged from diverse perspectives, they all highlight the role of sociocultural contexts in the individual learning processes. Based on the knowledge that learners are motivated to participate in classroom contexts they perceive to be personally meaningful to their social and cultural backgrounds, interests, values and lived experiences, these frameworks suggest some instructional practices. Specifically, this study was stirred by culturally responsive teaching (CRT) due to how it emphasises the need to create classroom teaching practices to support the learning of minority and racialized students of colour (Gay, 2018). Examples of culturally responsive pedagogical practices (CRPPs) include adjusting curriculum content to connect with students' cultural backgrounds and lived experiences such as introducing multicultural textbooks; designing opportunities for diverse students' interactions about personal or cultural issues to establish cross-cultural communications; developing teachers and students' cultural competence through support for their knowledge of their cultural heritages and that of other students; and utilising students' socio-cultural backgrounds, prior knowledge and lived experiences as resources for instruction in order to establish cultural congruity (Gay, 2013, 2018; Ladson-Billings, 2021). Research suggests connection between these pedagogical practices and student motivation (e.g., Ginsberg and Wlodkowski, 2015), and learning engagement (e.g., Villegas and Lucas, 2002; Aceves and Orosco, 2014; Howard and Rodriguez-Minkoff, 2017; Gay, 2018; Ladson-Billings, 2021).

SRL literature complements CRT research by showing pedagogical practices that also foster student motivation and engagement and context. Self-regulating learners are successful in regulating their participation in learning processes including motivation and engagement (Zimmerman, 2002; Perry, 2013). SRL-Promoting Practices (SRLPPs) include offering students opportunities to make choices and decisions about their learning, engage in self and peer assessment, evaluate their work and engage in cycles of strategic action. SRLPPs are linked to student motivation and quality of engagement (McCann and Turner, 2004; Anyichie and Onyedike, 2012; Perry, 2013; Anyichie and Butler, 2015, 2019; Schmidt et al., 2018; Anyichie et al., 2023).

In line with culturally inspired frameworks, SRL models (e.g., Winne and Hadwin, 1998; Pintrich, 2000; Zimmerman, 2000; Efklides, 2011) also emphasise individual and social processes of learning. For example, Butler and Cartier's situated model of SRL (Cartier and Butler, 2016; Butler and Cartier, 2017) highlights the role of dynamic interactions between individuals and contexts in shaping their motivation and learning engagement. This situated model provided a practical guide for the development of the integrated framework drawn on in this study. For example, a deliberate integration of culturally responsive and relevant pedagogy and SRL-Promoting practices has the potential to boast culturally diverse students' motivation and engagement especially when explicitly designed to support both sociocultural and individual processes of learning (Anyichie et al., 2016, 2018, 2023; Anyichie, 2018; Anyichie and Butler, 2019). Learning contexts that foster SRL, such as building meaningful complex tasks that involve students in choice making, collaboration, self-evaluation, monitoring, and strategic action (e.g., task interpretation, planning, monitoring) increase students' engagement (Wigfield et al., 2008; Perry, 2013). Such contexts have the potential to foster culturally diverse learners' regulation of their motivation and learning engagement especially if they are deliberately designed to attend to both individual and

sociocultural processes of learners (Anyichie et al., 2016, 2018, 2023; Anyichie and Butler, 2017).

An integrated pedagogy: A CR-SRL framework

We have briefly described above how CRT and SRL principles can be applied in creating classroom learning contexts including pedagogical practices that are associated with student motivation and the quality of their engagement including their SRL. In this section, we introduce an integrated framework that draws SRL and CRT practices together (see Figure 1; for more specific information about this framework and its development, see Anyichie and Butler, 2017; Anyichie, 2018). The integrated pedagogies in this framework are consistently related to increase in students' motivation, engagement, SRL and achievement (Brayboy and Castagno, 2009; Elaine and Randall, 2010; Wolters and Taylor, 2012; Aceves and Orosco, 2014; Anyichie, 2018; Anyichie and Butler, 2018; Kumar et al., 2018; Perry et al., 2020; Anyichie et al., 2023). This framework was developed as a guide for educators in designing an inclusive classroom context that are connected to students' cultural background, interests, lived experiences in order to motivate them to engage in new knowledge construction (e.g., learning a new topic). This framework includes three interdependent and continuous dimensions including: (1) classroom foundational practices; (2) designed instructional practices; and (3) dynamic supportive practices (see Figure 1). Each of these dimensions demonstrates how CRPPs and SRLPPs could be combined to design culturally empowering learning environments.

Classroom foundational practices describe teacher's proactive preparatory activities in setting up a classroom context that is ripe for implementation of effective teaching and learning practices (e.g., creating a culturally responsive/relevant, safe, empowering and supportive learning environment). Both CRT and SRL literatures identify foundational practices such as supporting knowledge of learners and designing culturally inclusive and supportive contexts. For example, as a strategy, "knowledge of learners" refers to those instructional practices teachers can use to gain a better understanding of their students' background, histories and support metacognitive knowledge of themselves (e.g., ice breakers, a know yourself game, background surveys, etc.). In addition, educators can foster their own cultural competence, activate their prior knowledge by questioning their cultural bias and facilitating conversations about issues of racism, cultural diversity, and inequity (Ginsberg and Wlodkowski, 2015; Gay, 2018; Ladson-Billings, 2021). The knowledge base from these instructional practices will help educators in creating culturally relevant classrooms (e.g., by connecting class learning activities to students' cultural backgrounds and lived experiences, *CRPP*), activating students' prior knowledge and empowering their interests to participate in new learning, *SRLPP* that sustains their ways of being. These kinds of classrooms increases students cultural competence, sense of belonging, engagement and motivation (Ginsberg and Wlodkowski, 2015; Gay, 2018).

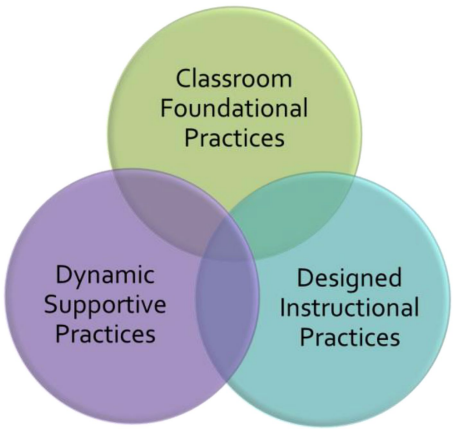

FIGURE 1
A culturally responsive self-regulated learning framework. Source: Adapted from Anyichie (2018).

Designed Instructional practices form the epicentre of this framework. These instructional practices describe a blend or a combined CRPPS and SRLPPs within a learning context. For example, SRLPPs such as choice provision and prior knowledge activation could be embedded into a task to promote the relevance and meaningfulness of that task to learners' lived experiences and cultural background (CRPPs). Research shows how students' motivation and engagement increases in context they feel sense of autonomy over their learning experiences (Jang et al., 2016; Butler et al., 2017). Learning tasks that are "complex" in design create opportunities to weave in CRPPs and SRLPPs. A "complex" task defines the learning activity that encompasses many features such as integrating different subject areas, addressing many instructional goals, focusing on different chunks of learning content, involving students in making meaningful decisions, and with opportunities to demonstrate their learning in multiple ways (Perry, 2013). For example, a complex task (e.g., a science project) can be designed to connect with students' cultural background and lived experiences (CRPPs); and empower their agency towards cultural competence (SRLPP, CRPP) by providing opportunities for decision and choice making, exercising control over the level of learning challenge, self-evaluation, and strategic action (SRLPPs). The integration of CRPPs and SRLPPs creates opportunities for educators to design empowering culturally relevant classroom context. For instance, fusing culturally relevant choices into a complex task (i.e., CRPP & SRLPP in tandem, such as asking students to choose a topic for their science project with cultural relevance and that will address a need of their community), as well as weaving a sequence of CRPPs and SRLPPs within the sample task has benefits in supporting student motivation and engagement in culturally diverse classrooms (Anyichie, 2018).

Dynamic supportive practices refer to all the supports that are offered to students as their learning unfolds. These instructional practices can embed SRLPPs and CRPPs together in a learning context. Dynamic supportive practices include multidimensional feedback from peers, teachers and parents (e.g., highlighting examples of what could be done to improve an on-going project); formative assessments e.g., completing self and peer assessment forms based on rubrics; (Nicol and Macfarlane-Dick, 2006) that are relevant to student cultural backgrounds and lived experiences (Montenegro and Jankowski, 2017; Egbo, 2019; Ladson-Billings, 2021).

Research-based pedagogical practices integrated in this framework have been associated with student SRL, engagement, motivation and success (Anyichie, 2018; Anyichie and Butler, 2018; Kumar et al., 2018; Anyichie et al., 2023). Researchers have identified the significance of situating SRL and motivation research within learners' social and cultural contexts (e.g., McInerney, 2011; Zusho and Clayton, 2011; Järvenoja et al., 2015; King and McInerney, 2016; Perry et al., 2017).

Building on this opportunity, the current study examined students' experiences of a complex task an elementary school teacher designed based on CRT and SRL principles and instructional practices to support motivation and engagement for *all* learners in his multicultural classroom.

Defining engagement and motivation

In this study, we investigated engagement as a multidimensional construct in a more integrative way. Still, to ground our research and inform our development of our measures, it was important to delineate the dimensions of engagement that are intertwined in the context of any given learning activity. Engagement describes the quality of a student's active participation in a learning activity (Christenson et al., 2012). Student engagement including behavioural, emotional, cognitive and agentic dimensions involves a range of actions taken up to advance learning and make academic progress (Fredricks et al., 2004; Reeve and Tseng, 2011; Reeve, 2013). *Behavioural engagement* describes students' overt behaviour and involvement in learning activities (e.g., asking and answering questions, concentration, help seeking and participation). *Emotional engagement* refers to students' feelings, attitude, and reactions about classroom tasks (e.g., expressions of anxiety, frustration). *Cognitive engagement* defines students' deliberate investment of needed effort in their learning activities, e.g., use of cognitive strategies, self-regulation, engagement in cycles of strategic action, persistence in challenging tasks (Fredricks et al., 2004; Cleary and Zimmerman, 2012; Pekrun and Linnenbrink-Garcia, 2012; Schunk et al., 2013; Sinatra et al., 2015). Recently, Reeve and Tseng (2011) introduced *agentic engagement* that is defined as a "student-initiated pathway to a more motivationally supportive learning environment" such as active contribution to the flow of a learning activity including making suggestions and offering input (Reeve, 2013, p: 581). Although, there are research on these dimensions of engagement based on self-report approach (e.g., Jang et al., 2016), it can be challenging to distinctively capture them in context because of their interconnections and overlap within a given learning activity (Bingham and Okagaki, 2012). For instance, student behavioural engagement is linked to emotional engagement such as enjoyment (Pietarinen et al., 2014); and there is a relationship between behavioural and cognitive engagement (Wang et al., 2011; Martin, 2012). Thus, the current study looks at all these dimensions together without trying to tease them apart. Research findings have associated engagement with positive learning outcomes including student motivation, achievement and success (Fredricks et al., 2004; Appleton et al., 2008; Reeve and Tseng, 2011; Reschly and Christenson, 2012; Kahu, 2013). Similarly, scholars tend to agree that there is a relationship between engagement and motivation while at the same time identifying them as distinct constructs (Martin, 2012; Reeve, 2012).

Motivation defines the rationale and driving force for a learning behaviour. Student motivational processes (e.g., perception of learning context as valuable, interesting, relevant, enjoyable, important) predicts their engagement (e.g., concentration; Anyichie, 2018; Jones et al., 2021; Anyichie et al., 2023). For instance, students have increased motivation to engage in learning activity they feel the sense of autonomy (Evans and Boucher, 2015; Jang et al., 2016), and perceive as relevant and useful in attaining their goals (Wigfield and Eccles, 2000).The different dimensions of engagement are also connected with motivational and/or self-regulation constructs (Sinatra et al., 2015). On the one hand, researchers in the field of engagement include self-regulatory behaviours as part of engagement (e.g., cognitive, and agentic engagement). On the other hand, researchers in the field of SRL have identified a reciprocal relationship between SRL and cognitive engagement (Cleary and Zimmerman, 2012; Wolters and Taylor, 2012). However, less research has considered student engagement in self-regulation of learning.

Engagement in self-regulation of learning

Engaging in self-regulation of learning entails exercising control over one's involvement and participation in a learning activity. Models of self-regulation advance our understanding about how students' engagement in learning activities involves cognition and metacognition, motivation and emotion, and strategic action (Butler et al., 2017). Therefore, SRL cuts across all the dimensions of engagement. For instance, agentic engagement implies proactive exercise of control and ownership of learning (i.e., SRL). All the other identified dimensions of engagement are within the terrain of self-regulatory processes during learning engagement. That is, self-regulated students proactively participate in learning activities, and manifest the type of overt behaviours and emotions that are connected with engagement in effective forms of learning (Wolters and Taylor, 2012). Based on the interconnectivity among the different dimensions of engagement, and overlap between SRL and engagement, this study focused also specifically on engagement in SRL.

Association between classroom contexts and students' engagement and motivation

Research demonstrates how teachers can create classroom contexts including tasks and instructional practices that foster students' development and engagement in SRL (Perry and Vande Kamp, 2000; Butler et al., 2013). Tasks that allow opportunities for students to make choices, exercise control over the level of their learning challenges, evaluate their learning progress, and participate in cycles of strategic action (e.g., planning, enacting and adjusting strategies, and monitoring) have been associated with motivation and engagement in SRL (Perry, 2013; Butler et al., 2017). Further, meaningful tasks that are "complex" in design allow opportunities to weave in SRL-promoting practices.

Research in the fields of CRT and SRL has independently examined student motivation and engagement. For instance, SRL research shows how embedding SRLPPs such as offering students choices support their motivation and engagement due to how it empowers student autonomy in their learning process (Jarvela et al., 2012; Jang et al., 2016; Patall et al., 2016; Montenegro, 2017; Perry et al., 2020). Also, literature is suggesting that culturally diverse students could be motivated to actively engage in classroom activities that are relevant to their cultural backgrounds, lived experiences and prior knowledge (i.e., CRPPs; Kumar et al., 2018; Gray et al., 2020). Nevertheless, there is a dearth of research about how the integration of SRLPPs and CRPPs can support motivation and engagement for students in culturally diverse classroom.

Student learning processes including motivation and engagement in SRL are dependent on the contextual features of a learning environment (Järvenoja et al., 2015; Nolen et al., 2015). For instance, the interaction between students and their classroom context impacts the quality of their engagement and motivational processes including enjoyment, importance and interest (Järvenoja et al., 2015; Nolen et al., 2015; Shernoff et al., 2016; Butler and Cartier, 2017; Anyichie, 2018; Anyichie et al., 2023). Furthermore, utility-value intervention research (e.g., Yeager et al., 2014; Harackiewicz and Priniski, 2018; Hecht et al., 2021) that built on expectancy-value-theory (Wigfield and Eccles, 2000) document how students' motivation (i.e., perceived usefulness or value

of a learning tasks) shape their engagement (i.e., effort, concentration, self-regulation, and persistence). Therefore, the current student focused on examining culturally diverse students' engagement and motivation in the context of a complex task that integrated both CRPPs and SRLPPs in tandem.

Study context

This study investigated the use of a CR-SRL framework in fostering student engagement and motivation in a culturally diverse classroom. The full study was conducted with two volunteer teachers and students in their upper elementary school classes (grades 4 and 5, respectively) in schools located at a multicultural urban centre in a western province in Canada. For the purposes of this report, we focus on just an in-depth case study of one of those teacher's classrooms (Joseph who volunteered and consented to participate). The choice of upper elementary classes was to include students with the maturity to articulate their cultural backgrounds and learning experiences. Prior to this study, the lead author was already collaborating with Joseph in supporting culturally diverse learners in his classrooms. He had separate conversations with Joseph about his goals and research interests for his students. While serving as a collaborator, the lead author facilitated independent meetings with Joseph about the content and implementation of the CR-SRL framework to support engagement and motivation for students from diverse cultural backgrounds. Their meetings were guided by the collaborative inquiry framework that focuses on identification of goal, planning and implementing instructional practices, reflection on learning progress and refining strategies (Butler et al., 2013; Timperley et al., 2014).

Further, the lead author collaborated with Joseph and discussed possible ways of design learning activities that combined across CRPPs and SRLPPs. The lead author, a researcher of an African descent had experiences of studying and working in culturally diverse contexts. His experience in these contexts were influential on how he was assisting Joseph's implementation of the framework. Nevertheless, Joseph made the decisions about how to integrate the SRLPPs and CRPPs within his chosen learning activity as he considered appropriate for his students.

As well, before the data collection in Fall 2017, the lead author explained all the data collection measures and processes to Joseph and formally invited him to participate. He provided Joseph with consent/assent forms for himself, his students' parents/guardians, and the students. He explained to the students that the study was to investigate with their teachers on how best to support their learning. Joseph as well as the students that submitted signed parental/assent forms to participate were invited to be part of the studies. Ultimately, all the appropriate ethics approvals were received for this study. The researcher then worked with the Joseph across the year to plan and enact CRPPs and SRLPPs in the context of a complex task.

Purpose and research questions

This study examined culturally diverse learners' engagement in a complex task that integrated SRLPPs and CRPPs within one elementary classroom; and how their motivation-related perception of the contextual features shaped their learning engagement. It asked the question: (1) How did student engage in the complex task? and (2) How were contextual features related to students' motivation and engagement in the complex task?

Materials and methods

Design

We conducted an in-depth, case study of a complex learning task that involved grade 4 and 5 classrooms. Case study designs are effective in examining a complex, dynamic and multidimensional phenomenon as it manifests *in situ* (Merriam, 2009; Butler, 2011; Yin, 2014; Butler and Cartier, 2017). Such designs provide a framework for understanding students' learning processes and the connections between pedagogical practices (e.g., CRPPs and SRLPPs) and associated outcomes (e.g., SRL, engagement, and motivation). Also, a case study design is helpful in gathering multiple sources of data to investigate student learning processes as they unfold in context.

Participants

Joseph's classroom

This paper focuses on Joseph and his Grade 4 classroom that is situated in St. Mary's Elementary School (i.e., an independent school) identified as having multicultural and multilingual student populations in British Columbia, Canada. Joseph, a 5th generation male Canadian with Western European background, had bachelor's in Education (BEd). He had 25 years of teaching experience and had taught grades 4–12. He has been teaching in his current school (St. Mary's elementary) for 19 years and grade 4 for 9 years. Although Joseph had knowledge of designing complex tasks in his class, he had no knowledge of SRLPPs and CRPPs.

Table 1 shows that Joseph's 31 grade 4 classroom students were between the ages of 8 and 9 and came from linguistically and culturally diverse backgrounds. In this classroom, while 8% of the students had English as their first language, 16% had first languages other than English; and 29% had a home language other than English. Fifty-four percent (54%) of the class had both parents as born in Canada and 45% had at least one parent who was not born in Canada. Table 2 shows the diversity of student identified first and home languages, countries and ethnicities, and that of their parents.

Student participants in Joseph's classroom

All students in Joseph's classroom ($n = 31$) were invited to participate in this study. Joseph distributed parent consent and student assent forms to the students approximately 2 weeks prior to data collection. Ultimately 18 students participated in the study. Tables 1, 2 show that these participants reflected the linguistic and cultural diversity in the whole class.

Selected students in Joseph's classroom

To gain an in-depth understanding of the students' learning processes and experiences in the context of a complex task, we also selected 12 students for deeper study, from among the 18 participants, through purposeful sampling. Purposeful sampling involves the deliberate selection of participants from whom one can learn the most (Creswell and Plano Clark, 2010; Palinkas et al., 2015). This subset of students was identified through their teacher's professional judgement as experiencing different levels of engagement (i.e., low, medium and high-level). The teacher's judgement might be limited by bias and lack of full knowledge of students' levels of engagement at the beginning of the academic year. The selection of students at different levels of

TABLE 1 Student demographics.

Grade 4 students	Total # of students	M	F	Ages Years (Months)	First language as English # (%)	First language other than English # (%)	Home language other than English # (%)	Both parents are born in Canada # (%)	Either or both parents are not born in Canada # (%)	Special needs designation # (%)
Whole class	31	18	13	8 (9) – 9 (8)	26 (83.9%)	5 (16.1%)	9 (29%)	17 (54.8%)	14 (45.2%)	3 (9.7%)
Participants	18	11	7	8 (10) – 9 (8)	15 (83.3%)	3 (16.7%)	5 (27.8%)	10 (55.6%)	8 (44.4%)	1 (5.6%)
Selected	12	8	4	8 (10) – 9 (7)	10 (83.3%)	2 (16.7%)	4 (33.3%)	6 (50%)	6 (50%)	1 (7.7%)

TABLE 2 Students' linguistic and cultural diversity.

Grade 4 students	First language other than English	Home language other than English	Countries of parent(s) born outside of Canada	Ethnicity/or countries of origin
Whole class	Spanish, Croatian, Portuguese, and Greek.	Italian, Portuguese, Croatian, Greek, and Spanish.	Philippines, Croatian, Italy, Yugoslavia, Greece, Germany, Portuguese, El Salvador, Mexico, Guatemala, and Columbia.	Caucasian, African, Latino, Italian, Southeast Asian, Australian, Scottish, and Trinidad.
Participants	Portuguese, Greek, and Spanish.	Italian, Portuguese, Greek, and Columbian.	Philippines, Italy, Greece, Germany, Portugal, and El Salvador.	Caucasian/ Canadian, southeast Asian, Italian, African, Latino, and Trinidad.
Selected	Portuguese and Greek.	Italian, Portuguese, and Greek.	Philippines, Italy, Greece, Germany, and Portugal.	Caucasian, African, Italian, and Southeast Asian.

engagement gave a rough sense of how the teacher perceived students to be engaged and motivated in the class prior to the start of the complex task. Again, Tables 1, 2 show that these selected students reflected the linguistic and cultural diversity of the class as a whole and the full set of participants.

Procedure

Co-designed complex task

As part of this study, the lead researcher co-designed a complex task with Joseph based on "A Culturally Responsive Self-Regulated Learning Framework" (Anyichie and Butler, 2017; Anyichie, 2018), as described earlier. Joseph made a choice of the focus and structure of the learning task as it allowed him opportunities for the integration of CRPPs and SRLPPs. The complex task "*Understanding Animal and Human Adaptations to the Land*" co-designed for students in Joseph's class was divided into three major interconnected sections: (1) animal adaptations; (2) First Nations' adaptations to the land; and (3) my adaptation to school. The first section asked the students to research the senses and adaptation of any insect of their choice from the "Bug Wars Playlist" posted on the class website designed by the teacher for this complex task. Instructions for this section included: (i) make a best copy of a scientific drawing after viewing "Austin's Butterfly"[1]; (ii) create a multimedia book using the "Book Creator" app; and (iii) share and present your project online. Building on what the students were learning on the first section, the second section focused on human adaptation with attention on the First Nations peoples. Section two required the students to each research one of the Aboriginal peoples in Canada (e.g., Inuit, Metes and First Nations). This section also asked the students to compare their findings with their own daily lives by responding to questions, including: "What is the biggest difference? What is most surprising when I think of my life? If I was a First Nation person my age, what would I enjoy the most?" and in groups to record their thoughts and impressions of a field trip to Museum of Anthropology in a podcast. The third section asked the students to build on what they were learning about animal adaptations, First Nations' challenges and adaptation, and research on their personal challenges in school and generate possible strategies for their own adaptations. As part of the third section, the complex task ended by asking the students to gather in their small groups, discuss their common challenges and adaption strategies, and present their ideas through a role play.

Data collection

To gather evidence in relation to the research questions, we used mixed methods embedded into a case study design (Yin, 2014). A case study design allowed us to study the SRL engagement of selected students in considerable depth by coordinating multiple sources of data including: (1) classroom observations and associated field notes; (2) documents (e.g., learning task instructions); (3) student work samples; (4) students' self-reports about their engagement and motivation using an Experience Sampling and Reflection Form (ESRF); and (5) interviews with the participating students.

Observations

Overall, the lead researcher conducted 9 days observations (515 min) with 12 learning episodes while the students were working on their complex task in Joseph's classroom. Observations focused on the instructional practices Joseph enacted to support culturally diverse

1 Austin Butterfly if a video of models, critique and constructive feedback. (https://www.youtube.com/watch?v=E_6PskE3zfQ).

students both in the task and as their participation in it unfolded; and how the students were participating in those practices. Each observation lasted between 40 and 70 min. Observing the same students across different sections of the complex task provided an opportunity to understand their engagement and motivation processes as related to the specific features of the context in which they were working.

During each classroom observation, the lead researcher created a running record of what he observed (see Anyichie, 2018), including teacher and student talk. In those records, he tried to capture all actions "verbatim" as much as he could during individual and small group activities. Some of the observations were video-taped when it was possible to capture only students who consented to participate. Those video-taped observations supported us in gathering contextual information, and better understanding and interpreting behaviour including non-verbal cues. Occasionally, the lead researcher debriefed with the students as he circulated during an observation; and, with the teachers after each observation to clarify how what was happening related to engagement and observed practices, respectively.

Teacher document review

The lead researcher accessed the complex task instructions and plans to help identify instructional practices Joseph embedded in the task to support his students. The review of those documents helped to focus attention during observations on how students were engaging in relation to their motivation-related perception of the specific contextual features (e.g., SRLPPs, such as opportunities for choice and self-evaluation; and CRPPs including opportunities for students to bring ideas from cultural backgrounds and lived experiences).

Student work samples

During the observations, as students worked on their complex task, the lead researcher photographed samples of their work. He, sometimes, took pictures of draft copies in students' work folders. These pictures aided us in seeing how students were engaging in the complex task in relation to their motivational processes based on their perception of the contextual features of each different section.

Experience sampling and reflection form (ESRF)

To gather students' self-reports of their motivational processes and engagement in the complex task, we used the ESRF (adapted from Larson and Csikszentmihalyi, 2014). This form asked questions about students': (1) *feelings* (i.e., how did you feel about working on this activity today?); (2) *concentration* (i.e., how well did you concentrate while working on this activity/project today?); (3) *perceptions of challenge* (i.e., was this activity challenging for you? If so, what made it challenging? What did you do about the challenge?); (4) *perceptions of importance* (i.e., how important is this activity?); (5) *perceptions of enjoyment* (i.e., did you enjoy what you worked on today?); and (6) *interest* (i.e., was this activity interesting?). Students rated their responses from: *not at all = 0, slightly = 1, somewhat = 2, much = 3; to very much = 4*; and explained the reason for their rating by responding to a follow-up "why"? Students were asked to fill in this form each time they worked on their complex task. Asking them to report their experiences immediately reduces retrospective bias. These repeated reports ($n = 77$) helped us to examine and understand students' real-time experiences of motivation and engagement over time.

Interviews

To gather information from the students, the lead researcher conducted individual in-depth semi-structured interviews at the end of the study. Participating students were asked about their perceptions of classroom activities (i.e., their motivational processes) and their engagement within them. For example, they were asked questions such as: Can you tell me how you felt about the project (i.e., complex task)? Was it interesting? What was helpful? Why was that helpful? What was challenging? Why was that challenging? What would you recommend if your teacher were to do that again?

Data analysis

Our interpretative strategies included a combination of qualitative (e.g., of classroom observations, documents, student interviews and student work samples) and, quantitative (e.g., of student self-reports on the ESRF) analyses.

Coding of teacher practices

We started by transcribing video-taped classroom observations, debriefings and semi-structured student interviews. We also reviewed the instructions for different sections of the complex task and student work samples. *A priori* categories derived from CR-SRL framework (see Anyichie and Butler, 2017; Anyichie, 2018 for detailed review) were used for coding while being open to new instructional practices. Two levels of coding were employed to enable capture a wide range of teacher pedagogical practices.

At the first level, we developed a sequential list of all the instructional practices enacted in each section of the complex task. Next, we started our coding by looking at each of the listed practices from an SRL point of view, identifying any practice consistent with SRLPPs. Next, we reviewed the full list of teaching practices from a CRT lens, flagging any practice clearly associated with CRT principles. The result was a sequential list of instructional practices identified as SRLPPs, CRPPs, neither or both. This coding approach empowered us to interpret whether and how SRLPPs and CRPPs were interwoven within each section of the task (Larson and Csikszentmihalyi, 2014).

At a second level, once all sections and activities were coded, we categorised the instructional practices in relation to the three main categories of instructional practices identified in the CR-SRL framework (i.e., foundational, designed instructional and supportive practices). This lens facilitated our interpretation of how the teaching practices Joseph enacted were either consistent or not with the major recognised instructional practices within the SRL and CRT literatures. Lastly, we mined fieldnotes and teacher documents for confirming or disconfirming evidence.

Coding of SRL-promoting practices (SRLPPs)

Teacher instructional practices were coded as supportive of SRL if there were evidence of the teacher: (a) providing opportunities for choice and control over challenge (e.g., allowing students' choice and decision making, scaffolding students' meaningful choices, and supporting control over learning); (b) fostering self-assessment (e.g., by creating opportunities for students' self-reflection, self-monitoring, and adjusting of learning); (c) offering teacher support [e.g., by providing resources and instrumental supports, and co-regulatory opportunities between the teacher and student(s)]; (d) providing opportunities for peer support (e.g., offering opportunities for peer-to-peer support group activities, co-regulation of learning, and assessment); and/or (e) providing opportunities for students to engage in cycles of strategic action.

Coding of CRT pedagogical practices (CRPPs)

Teacher instructional practices were coded as CRT when there was evidence of the teacher: (a) establishing cross-cultural communication (e.g., creating opportunities for social interactions about personal or cultural issues); (b) designing cultural diversity in curriculum content (e.g., adjusting and situating curriculum content to connect with students' prior knowledge and lived experiences by using multicultural textbooks); and/or (c) establishing cultural congruity in classroom teaching and learning (e.g., matching class instruction with students' prior experiences and cultural background).

Note that each instructional practice was reviewed twice, once from an SRL lens and once from a CRT perspective. The result was that some practices were coded under both SRL and CRT (see findings).

Coding of students' engagement and motivation

We analysed and interpreted students' engagement based on three sources of data: (1) students' reflections through the complex task (using the ESRF), (2) students' work samples and (3) observations of students' engagement over time. We analysed the ESRF by creating a display of each student's ratings on concentration (as an indicator of engagement), perception of challenge, and the two motivationally-related self-reports (i.e., perceptions of importance, and interest)[2]. Then, we calculated descriptive statistics, and constructed displays to help us see how students' motivation (i.e., their perceptions about the contextual features of the complex task in terms of being important and interesting) shifted across days and were related to their engagement (i.e., self-reported concentration). Furthermore, to gain more understanding of the possible relationships between students' motivational perceptions of, and engagement in the complex task, we conducted correlational analyses. To support identifying patterns, we roughly interpreted quantitative data from the ESRF (<2.5) as below midpoint and (>2.5) as above midpoint.

To code observational data on students' engagement in the complex task, we reviewed all the field notes from observations and transcripts of debriefs to describe student activities and identify examples of their engagement in specific contexts of the task. Student activities were coded as engagement when there was evidence of students' participation and direct involvement in learning activities including asking and answering questions, listening, note taking, help-seeking, making suggestions, offering input in class, and reacting about the task. Behaviours that do not directly reflect engagement in a learning activity (e.g., arranging seats and gathering textbooks in preparation for lessons) were not coded as engagement in learning.

Whenever we identified an association between students' motivational processes (e.g., perception of Joseph's instructional practices in terms of being interesting, important) and student engagement in our displays, we then examined other forms of data (e.g., student work sample and complex task instruction) to look for patterns to examine and understand how specific instructional practices such as CRPPs and SRLPPs may have facilitated individual students' engagement in specific contexts.

Identifying associations between student engagement and motivation, and the contextual features of the complex task

To see patterns between enacted integrated instructional practices such as CRPPs and SRPPs, students' motivation-related perception and students' engagement in them, we created data displays cross-referencing teachers' instructional practices and students' interactions in specific contexts (Miles et al., 2013) using Nvivo 11 software. Students' profiles across different data sources were cross-analysed for recurring patterns. We also created displays that showed teachers' instructional practices in relation to selected students' self-reported engagement on different days, based on both observations and their narrative descriptions on the ESRF.

Results

Our major goal for this paper was to examine and understand how culturally diverse students' engagement and motivation were related to the contextual features of a complex task that integrated CRPPs and SRLPPs. In this section, we start by presenting the quantitative findings of student engagement and motivation as situated in the context of a complex task, and the link between their engagement and motivation, and teacher instructional practices in that context. Then, we present case study results with mixed evidence of both quantitative and qualitative findings of associations between students' engagement and teacher's integrated CRPPs and SRLPPs.

Students' motivation and engagement in the complex task

To gain understanding of students' motivation (i.e., their in-the-moment perceptions in the complex task), as it unfolded across days, we examined ESRF reports of both (1) students' self-reported concentration (as an indicator of engagement); and (2) whether they perceived the complex task on each day as challenging, interesting, important, and/or enjoyable (as an indicator of situated motivation). Table 3 shows that students who participated in the CR-SRL complex task across the 5 days experienced high-levels of engagement (concentration, $M = 3.20$, $SD = 0.74$). They also perceived the complex task to be highly important ($M = 3.53$, $SD = 0.87$), interesting ($M = 3.36$, $SD = 1.18$), and not very challenging ($M = 0.74$, $SD = 0.90$). Their perceptions of the task as highly important and interesting reflected high-levels of motivation ($M = 3.50$, $SD = 0.80$).

Selected students' motivation and engagement in the complex task

Similar to the ESRF results for all participants, Table 4 shows that selected students who participated in the complex task across the 5 days experienced high-levels of engagement. Across days, like all the participants, the selected students perceived the complex task to be highly important, and interesting; and not very challenging.

2 Ratings of enjoyment were not available. Joseph decided to redesign the ESRF to make it more appealing to his students and mistakenly excluded the question on enjoyment. By the time the lead author realised it, it was too late to include it in their reflection form.

TABLE 3 ESRF: Mean values and standard deviation for students' experiences of engagement, perceptions of challenge, and motivation during the complex task across days.

				Engagement	Perceptions of challenge	Motivation		
	Day*	# of participants	# of ESRF	Concentration *M* (SD)	*M* (*SD*)	Important *M* (*SD*)	Interesting *M* (*SD*)	Overall Motivation *M* (*SD*)
	5	18	16	3.19 (0.63)	0.94 (0.75)	3.77 (0.42)	3.83 (0.55)	3.81 (0.31)
	8	18	15	2.87 (0.96)	0.87 (1.09)	3.33 (0.94)	3.00 (1.57)	3.10 (1.07)
	9	18	17	3.44 (0.60)	0.50 (0.76)	3.63 (0.70)	3.88 (0.48)	3.81 (0.34)
	10	18	16	3.19 (0.73)	0.88 (0.93)	3.19 (1.24)	2.40 (1.25)	2.84 (1.03)
	11	18	13	3.33 (0.62)	0.58 (0.86)	3.83 (0.37)	4.00 (0.00)	3.92 (0.19)
Total	5	18	77	3.20 (0.74)	0.74 (0.90)	3.53 (0.87)	3.36 (1.18)	3.50 (0.80)

* = Day with self-report on ESRF. The rating and coding schemes are based on data from the ESRF: Scale: 0 = Not at all, 1 = slightly, 2 = somewhat, 3 = much, 4 = Very Much. There are 5 days of data instead of 6 because many students did not complete the ESRF on one of the days. ESRF of that day is excluded.

TABLE 4 ESRF: Selected students' engagement, perceptions of challenge, and motivation during the complex task across days.

				Engagement	Perception of challenge	Motivation		
	Day	# of selected	# of ESM	Concentration *M* (SD)	*M* (*SD*)	Important *M* (*SD*)	Interesting *M* (*SD*)	Overall *M* (*SD*)
	5	12	12	3.19 (0.63)	0.94 (0.75)	3.77(0.42)	3.83 (0.55)	3.81 (0.31)
	8	12	12	2.87 (0.96)	0.87 (1.09)	3.33 (0.94)	3.00 (1.57)	3.10 (1.07)
	9	12	12	3.44 (0.60)	0.50 (0.76)	3.63 (0.70)	3.88 (0.48)	3.81 (0.34)
	10	12	12	3.19 (0.73)	0.88 (0.93)	3.19 (1.24)	2.40 (1.25)	2.84 (1.03)
	11	12	6	3.33 (0.62)	0.58 (0.86)	3.83 (0.37)	4.00 (0.00)	3.92 (0.19)
Total	5	12	54	3.24 (0.79)	0.81 (0.84)	3.67 (0.83)	3.37 (1.22)	3.53 (0.88)

TABLE 5 Bi-variate and partial correlations among concentration, interest, and importance.

Control	Variables	Concentration	Interest	Importance	M	SD	N+
none	Concentration	1			3.18	0.78	62
	Interest	0.491*	1		3.34	1.2	62
	Importance	0.321*	0.399*	1	3.56	0.86	62
Importance	Concentration		0.418*				
Interest	Concentration			0.157			

+Total valid number (listwise) of responses from the participants. *Correlation is significant at the 0.05 level (2-tailed).

Links between student motivation, engagement and teacher instructional practices

To trace the links between students' motivation and engagement, and teacher instructional practices in the complex task, this section presents: (1) the association between student motivation (i.e., students' self-reported perceived interest and importance) and engagement (i.e., self-reported concentration); (2) Joseph's perception of students' typical level of engagement as related to engagement in the complex task; and (3) a case study analysis of overall engagement as linked to contextual features (e.g., the integrated CRPPs and SRLPPs) of activities on specific days.

Associations between student motivation and engagement in the complex task

To better understand how students' motivational perceptions (i.e., interest and importance) in the context of the complex task could be associated with their engagement (i.e., concentration), we conducted a correlational analysis among the three variables of concentration, interest, and importance (see Table 5). Results indicated that all three variables were positively inter-correlated, suggesting a positive relationship between students' engagement and their motivational perceptions of the context.

Entering engagement as related to engagement in complex task

When choosing participants to focus on more closely (i.e., the selected students), Joseph identified students he perceived to be engaging at different levels across different kinds of classroom activities [i.e., high (HE), medium (ME), and low (LE) levels of engagement]. To examine how students with different entering levels of engagement perceived and participated in the complex task each day, ratings for selected students are presented in Table 6.

TABLE 6 Selected students' engagement, perceived challenge, and motivation profiles on ESRF during the complex task across days.

		Engagement Concentration					Perception of Challenge					Motivation									
												Importance					Interest				
Engagement levels	Students/ Days	5	8	9	10	11	5	8	9	10	11	5	8	9	10	11	5	8	9	10	11
HE	S1	4	3	4	4	3	1	1	1	1	1	4	4	4	4	4	4	2	4	0	X
	S2	3	3	4	4	3	1	1	0	0	X	4	4	4	4	X	4	4	4	4	X
	S3	3	3	3	3	X	2	2	1	2	X	4	4	4	4	X	4	4	4	4	X
ME	S1	3	3	3	4	4	1	1	1	1	0	4	3	3	4	X	2	1	4	3	4
	S2	2	1	4	3	X	0	0	0	2	X	4	4	4	4	X	4	0	4	2	X
	S3	4	3	4	4	4	2	0	1	0	1	4	4	4	4	3	4	4	4	4	4
LE	S1	4	1	3	3	X	1	0	0	0	X	X	1	4	0	X	X	0	4	2	X
	S2	2	2	3	3	3	1	3	0	0	3	4	3	4	4	4	4	4	4	3	X
	S3	3	3	3	2	2	0	0	0	0	2	3	4	3	1	3	4	4	4	1	X
	S4	3	4	4	4	X	2	2	1	2	X	4	4	X	4	X	4	4	X	4	X
	S5	4	3	4	4	4	2	0	1	0	1	4	4	4	4	4	4	4	4	4	4
	S6	4	4	4	2	X	1	0	0	0	X	4	4	4	3	X	4	4	4	1	X

HE = High-Engaged; ME = Medium-Engaged; LE = Low-Engaged. The shaded columns are the days on which the students reported concentration, interest, or importance at least three. X = Days particular student did not submit ESRF. The shaded columns are the days on which the students reported concentration, interest, or importance at least (3).

Overall, findings suggest that, while there were variations in self-reported concentration for all but one student across days, all of the pre-selected students, whatever their "entering" engagement, reported relatively high-level engagement in the complex task, at least on some days. For example, the shaded columns in Table 6 show that all students rated their concentration at 3 or above on at least 2, and most typically 3–4 out of 5 days.

Table 6 shows that, consistent with teacher's reports prior to the study, HE students ($N = 3$) all reported high-levels of concentration during the complex task each day. Two of the three students who the teacher had judged at the start to be somewhat engaged (ME students; $N = 3$) also reported high-levels of concentration across all days. The exception was S2, whose concentration varied from low (1 or 2 on Days 5 and 8) to high (3 or 4 on Days 9 and 10). Interestingly, contrary to teacher's prior experiences with the LE students ($N = 6$), these students were very often engaged during the complex task. All LE students were highly engaged on at least 3 of the 4 or 5 days on which they reported their concentration. While four of the LE's engagement varied across days, two LE students (S4 and S5) reported high levels of engagement throughout the complex task.

To better understand why these students' engagement might have varied across days, we looked at the context in which they were participating. As with the larger group, it did seem there were connections between students' perceptions of the context, especially in terms of whether it is interesting and important, and their engagement (see highlighted cells in Table 6). First, parallel to their relatively high-levels of engagement, most students reported high interest, importance, and concentration across days, including HE, ME, and LE students. Second, the days with the least concentration did seem to be somewhat (if not perfectly) associated with lower ratings of interest or importance (e.g., see LE S3 on Day 10 and ME S2 on Day 8). Still there were exceptions. For example, one of the ME students (S2) perceived the complex task to be highly interesting and important on Day 5 but reported relatively low concentration.

It is worth noting that all the pre-selected students perceived the complex task to be highly important and interesting on Day 9, suggesting that there were contextual qualities that all students perceived similarly on that day. Further, all students perceived the complex task to be interesting and important overall, at least at some point, whatever their "entry" engagement, suggesting some common benefits across students in task. But then some students' perceptions on some days (e.g., 8) were low, suggesting that not all students responded to the context in the same way. This finding suggests that it might be students' perceptions of the context that are key in predicting engagement, and also that individual students may experience the same contexts differently (individual and context interactions).

Associations between students' engagements and teacher instructional practices in the complex task: A case study of days 8 and 9

To gain more insight into the links between students' engagement during the complex task that integrated CRPPs and SRLPPs, as it unfolded across days, we looked at reflective written justifications for students' ratings on the ESRF and linked self-reported and observed engagement to observed teacher instructional practices including CRPPs and SRLPPs in specific contexts (i.e., days and sections of the complex task). In addition, we cross-checked these findings against other data, such as complex task instructions and student work samples. In this section, we chose Days 8 (i.e., when some students were less engaged) and 9 (i.e., when all the students were highly engaged) for an in-depth case study of those connections.

Case study of day 8

Selected students' self-reported engagement and motivational perceptions varied most on Day 8 (see Table 6). Prior to Day 8, Joseph had asked the students to conduct independent research on the First Nations' ways of life and share their findings in small groups. On Day 8,

TABLE 7 Classroom learning contexts (Days 8 and 9), teacher instructional practices (code), and samples of students' comments.

Days	Learning context	Teacher instructional practices (Code)	Sample of students' comments (ESRF)
8	Lesson Activity One: Teacher and students were brainstorming and sharing students' research findings about Aboriginal groups	scaffolded student thinking through brainstorming and questioning (SRLPP); – offered support on making connections between class activities and personal lives (SRLPP & CRPP); and, instructional support (SRLPP).	HE S1: "I felt bored because we did not use the ipads"; HE S3: "I like the First Nations people"; ME S1: "because we compare our differences, I get to learn about First Nations"; ME S2: "I'm not a fan of First Nations"; ME S3: "It was fun writing about First Nations Life"; LE S1: "I did not feel like working"; LE S2: "Some human beings [peers] are a little mean"; LE S3: "I like knowing about First Nations"; LE S6: "You get to learn about people that came before us."
	Lesson Activity Two: Students were independently and in groups comparing independent research findings about aboriginal groups and their own personal lives	scaffolded how to compare the First Nations' life with the students' lives through metacognitive questions (SRLPP & CRPP), – provided opportunity for choice making (SRLPP); and offered emotional support.	
9	Lesson Activity One: Students were completing their independent reflection worksheets on their visit to UBC Museum of Anthropology. Lesson Activity Two: Students were in small groups prepping and recording podcasts	Provided: – conducive working environment, – scaffolds and modelling (SRLPP) – resources for self-evaluation and reflection (SRLPP & CRPP) – participation structure (SRLPP), – opportunity for social interaction (CRPP & SRLPP), and choice making (SRLPP). Offered: - instructional support and feedback (SRLPP), – support on making connections between class activities and personal lives (SRLPP & CRPP), – emotional support, and – facilitate student learning activities	HE S3: "I've never been to the museum; There is old stuff in the museum"; ME S3: "The First Nation people made all that clothing and all the things; It is about the First Nation people"; ME S1: "We went on a field trip and learned more about first nation people"; ME S2: "The art was outstanding"; LE S1: "We saw beautiful carvings"; LE S2: "Because we learn about the First Nations."

On each of Day 8 and Day 9, the students reported their experiences of both lesson activities in one ESRF.

they focused on comparing their research findings about the First Nations' life and their individual lives. Joseph had two connected activities in his lesson: brainstorming and completing a worksheet (see Table 7).

Teacher instructional practices on day 8

During the complex task on Day 8, building on the CR-SRL framework, Joseph enacted both SRLPPs and CRPPs (see Table 7, Row 2, Column 3). For example, he spent the first 10 min of this lesson facilitating a brainstorming activity about how the First Nations lived and adapted to their land, and how that might be similar or different from today's way of life (CRPP). He supported students' thinking about the First Nations' ways of life through guided questions (CRPP, SRLPP), and retention of generated ideas by writing all their responses on the white board.

The second activity asked the students to compare their own life experiences with that of the First Nations by generating at least 3 similarities and differences (CRPP). Joseph supported students' completion of this activity through a structured worksheet.

Also, while scaffolding students' strategic thinking about this activity, he instructed them to: "…think about the most dramatic differences you come up with, most important to the least important" [Running Record]. He, further gave them choices about how and where to work saying: "It's lot more of individual work, but, you can work with your partner to get at least 3 similarities and differences," and at any corner of the class or at the Resource room (a room adjacent to their class) [Running Record] (SRLPP).

As the students completed their worksheets, Joseph circulated from group to group and answered questions. Occasionally, he scanned through their worksheets and offered emotional support by saying "good, good." At one point, after visiting a group, he shared an idea from S5: "he says that the First Nations people hunted for food; but we hunt for sport. Yet, we get food from it, but have it for sport." In this way, he offered instructional support by sharing an idea from a student and by facilitating conversations around it (SRLPP).

Linking student engagement to teacher instructional practices on day 8

Overall, the reported findings show that student engagement was related to the CRPPs and SRLPPs Joseph enacted. For example, we observed that most of the students were actively engaged during the lesson activities. For example, at the beginning of the lesson, the students asked and answered questions, and updated their notes. This finding could be linked to the open-ended questions Joseph posed to them during the brainstorming exercise, as well as recording their responses on the board. During the group activity, students in one group were observed taking turns in comparing their lives with that of the First Nations, as well as negotiating ideas that will be written in their main worksheet. We observed this kind of negotiation among other groups as well. This involvement in co-construction of ideas could be associated with the opportunity Joseph created for collaborating in an activity; and completing a structured worksheet he designed for the activity.

Although the students were engaged during this lesson, examination of their reflections on ESRF showed mixed and contradictory perceptions about their interest in the learning context (see Table 7, Row 2, Column 4). Their comments, that can be associated with the wide variations in their engagement, could be attributed to individual differences and preferences in relation to the activities assigned (e.g., not liking the content or lack of access to technology, feeling disengaged).

Case study of day 9

Whatever their "prior" history of engagement according to their teacher (HE, ME, or LE), all the selected students reported high levels of motivation and engagement on Day 9. Prior to Day 9, the students had attended a field trip to the University of British Columbia Museum of Anthropology. This Museum, among other things, contains many artefacts of the Aboriginal groups especially First Nations' peoples, and other cultural communities in BC, Canada.

Teacher instructional practices on day 9

Joseph started the lesson by reminding the students about their deadline to finish the podcast[3] of their learning experiences about the museum. Then, the students participated in two interdependent activities: (1) independent completion of a booklet; and (2) group prepping and recording of a podcast (see Table 7).

Joseph instructed the students to use the first 10 min to individually complete the "Museum Booklet" he had designed as a resource for this activity (SRLPP). This 6-paged booklet had 3 sections (i.e., Totem Poles in the Great Hall, First Nation Fact Finding, and Museum Podcast Planning). He provided opportunities for the students to make connections between what they were learning in the class (e.g., research about the First Nations) with life experiences including the field trip to the Museum (CRPP) through the guiding open-ended questions in each section of the booklet. For example, in the section on "Museum Podcast Planning" he asked students to reflect and record: (1) "Something that surprized you"; (2) Something that makes you respect the First Nations people"; and (3) How is my life changed after I have seen these exhibits." Through the CRPPs and SRLPPs woven into this booklet, Joseph offered instrumental support for his students' learning.

Second, after the independent activity, Joseph communicated the learning expectations of the group activities: to share ideas, group thoughts and record their impressions about the Museum of Anthropology. Next, he announced the members and leaders of the small groups he created for this activity (i.e., 5 groups of 6 students). Before the students assembled in their groups, he asked them to highlight their top two main ideas on the section "Museum Podcast Planning" (SRLPP). In addition, he offered emotional support by appreciating the students' efforts and knowledge about recording a formal podcast. Then, he invited and encouraged his students to demonstrate their learning through a podcast. Again, he scaffolded their participation in developing an informal and conversational podcast by asking the students to generate transitional phrases: "What I like about the First Nations was…" and, to acknowledge the previous speaker's ideas before adding new idea. For example: "I thought that was a good idea S1"; "Waooh, that was interesting S3." Finally, Joseph and his students generated some transitional phrases that he recorded on the board.

During the group activities, Joseph circulated among the groups, answered questions, offered feedback, checked on them, and maintained a good working environment (e.g., through classroom management; SRLPP). For example, during the prepping stage, he provided feedback to a group about using transitional phrases: "…it has to sound supper natural. I want that done smoothly and very informal." Similarly, during the recording practice, he offered both group and individual feedback. For example, the lead author observed him in the recording room telling a group to keep the conversation going when they make mistakes in live recording instead of stopping. He informed S5 that: "you have a little bit of soft voice… if you do not say it loud enough it [ipad record volume is] sets at automatic. Ok, this is a good experience. You gonna try it once again." Through these means, especially the feedback, Joseph offered dynamic supportive practices.

In sum, evidence showed how Joseph created opportunities for choice, self-reflection, teacher and peer support, and cultural congruity. Taken together, these findings show that Joseph embedded CRPPs and SRLPPs to facilitate students' learning on the Day 9.

Linking students' engagement in SRL to teacher instructional practices on day 9

On Day 9, when everyone reported high levels of engagement, which we also observed, we focused instead, more specifically, on a more detailed analysis of how students were self-regulating their learning. Analysis of the observational data, student work samples, and responses on the ESRF showed that the students were engaged in behaviours associated with SRL, such as choice making, self-evaluation, offering and receiving peer support, and cycles of strategic action. As described in the upcoming sections, students' active engagement in regulatory processes could be linked to supportive instructional practices Joseph embedded into the activities of Day 9.

Choice making

Examination of work samples showed that students made decisions across the different sections of the "Museum Booklet" about what they were learning and sharing about the First Nations as well as themselves. For instance, in the section "Totem Poles in the Great Hall," they made choices of the Totem Poles they were interested in knowing more about: "Dlidlam Interior House Post" (LE S3); "Memorial Pole of Skim" (LE S4).

In addition, while prepping and recording their Podcasts, the students in their small groups made decisions about the structure of their recording, such as how to introduce and end their conversation; soundtracks to add; and how many rounds they would do of practice recording. For example, the transcribed recording of one of the groups showed that they decided on who and how they introduced their podcast recording: "S6. This is grade four worldwide radio. Did you miss us? Well, if you did well, we have another podcast today. Its about our [all the members shouted excitedly] 'Museum of Anthropologyyyyyy'." They also made culturally relevant choices in the section "Museum Podcast Planning," while comparing their lives and the First Nations.

Students' choice making could be related to opportunities Joseph offered them in the different sections of the booklet and during the group activities to exercise control over what they were learning. To illustrate, the section "Totem Poles in the Great Hall" asked the students to "Look carefully at the poles in the Great Hall and choose three. Read the plaques below them and record the name of the First Nations community it came from…" [Instructions] (SRLPP). Through this instruction, Joseph offered both opportunities for, and support in, their choice making. Taking up this opportunity, the students exercised control and ownership over their learning through their choices.

Self-evaluation

Examination of student work samples showed evidence of students' engagement in self-reflection and assessment. In the section "Museum Podcast Planning" they reported what they were learning about the First Nations, and how those impacted their lives. For example, HE S3 noted that what makes him respect the First Nations people is that "they had to make all of their tools, boats and weapons by hand." Also, LE S3

3 This class records podcasts that are aired to the school almost every week. They have a small room "Grade 4 Worldwide Radio" in their class that function as their studio. So, most of the students have taken turn in recording a podcast before this complex task.

reported: "my life has changed by seeing a lot of Totem Poles, maybe I should start carving wood when I'm older."

Further, the students were assessing and reflecting on their participation (e.g., concentration, interest) on this and other days when they completed the ESRF (see Table 7, column 4). Though used as a tool for data collection, the ESRF was also an activity integrated into the complex task by their teacher in order to support students' reflection on their learning (see Table 7). A review of the ESRF data showed how Joseph engaged students in evaluating their learning progress and relating class activities to their own lives through self-reflection and self-assessment. Students' engagement in reflective processes could be associated with opportunities Joseph created for student thinking about their participation in the class activities (SRLPP) and connecting what they were learning with their personal lives (CRPP). Through guiding questions, together with those in the ESRF, Joseph provided scaffolds for his students' self-evaluation of their learning progress and engagement.

Peer support

The students supported their peers in group activities through task interpretation and understanding (e.g., explaining what happened and what was needed to students that did not attend the field trip); accommodating individual differences (e.g., allowing time for peers that were struggling with reading to practice their podcast session); and making sure that each person's reflection was recorded very well. Further, the students generated group feedback on how to improve their group work. For example, at the beginning of the podcast planning, the lead author observed a student (i.e., S1) offering feedback to his group members:

> S1. [says to the group members] read your Podcast planning [i.e., what they have under the "Museum Podcast Planning" section]. SS. [take turns reading]. S6. (Group Leader) We have to say our names first.

S1. says, we are [mentions their names] grade 4 students of St Mary's School.

SS. yes, and S1. says to S6 "do yours first." S6 [reads Museum podcast planning].

> S1. no, you have to start from [points to the "something that surprised you" in S6 booklet].
>
> S6. says something that surprised me was the totem pole because their totem pole was extremely hard to draw then….; S1. fantastic thought S6, something that surprised me was that they put special dead people in boxes, funeral boxes… S3. Something that surprised me was that the first nations was… [noise in the class].
>
> S1. [talks to S3] you have to say something like *fantastic thought S2* and then start talking, then we do that and start all over again [running record of observation].

The above running record shows that, although S1 was not the group leader, he supported his group members. He facilitated their participation, structuring the flow of their discussion for a successful podcast recording (i.e., co-regulation and socially shared regulation).

The support students offered to each other could be related to the opportunities Joseph provided for group activity, collaboration, and social interaction (SRLPP). For example, he created mixed groups of boys and girls with diverse abilities, achievement, and engagement levels [Debriefing], and communicated participation structures and expectations by appointing group leaders with the instructions that: "… You all are all leaders and responsible for one another, but the leader will come to me to collect your Ipad, direct the conversation etc." [Running Record] (SRLPP). Joseph's instruction may have inspired S1 (Group One) to exercise his agency by co-regulating his group members' participation.

Strategic action

Evidence combined to show how students were engaged in cycles of strategic action including planning, enacting strategies, monitoring, and adjusting their plans. For example, the students planned and enacted strategies for their podcast by generating ideas, highlighting their two most important things to report, and adding transitional phrases. In this context, the lead author observed a group that strategically engaged in three rounds of practice. First, they sequentially read their main ideas for the podcast. Second, they did a double round of acknowledging each others' ideas using transitional phrases, such as "Fantastic thoughts S6…" (S1); "Good ideas S1…" (S2); "Great thought S2…" (S3); "Waoh [high pitch] S3, Waoh S3 [low pitch] …" (S4); "Amazing idea… S4" (S5); "I did not think about that S5…" (S6). Third, they negotiated ideas about how to introduce and end their recording. During these rounds, the students generated feedback for each other, monitored their progress, and adjusted their plans about the sequence of their conversations. Similarly, during their voice recording, another group did multiple recordings. Occasionally, they stopped after each round, generated feedback and adjusted their presentation (see excerpts under peer support above).

These findings from observations and work samples show that the students were actively engaged in cycles of strategic action. Their involvement in strategic action could be related to the support Joseph built into the activities. For instance, he supported student planning with the guided questions in the section "Museum Podcast Planning." During the prepping and recording, he facilitated their self-monitoring by offering feedback on the use of transitional phrases and being audible. Also, he allowed time for the students to enact their strategies, monitor and adjust their learning engagement before the final version of their recordings. Through guided questions, feedback and instruction (SRLPP), Joseph supported his students' engagement in cycles of strategic action.

Discussion

The present investigation examined culturally diverse learners' motivation and engagement within the context of a complex task. Overall, findings from Joseph's class show that the students were generally very engaged in the CR-SRL complex task (see Table 4). This finding was true even for students the teacher had identified at different levels of engagement prior to the start of the study (see Table 6). Nevertheless, there were variations in students' engagement and motivation, related likely to a combination of activities (e.g., Day 9 activities were very engaging for all learners), and personal perceptions of the context and preferences (e.g., see variations on Day 8). The findings show that students' motivation (i.e., perceptions of interest and importance) were associated with their engagement (i.e., self-reported levels of concentration; see correlational data and see Table 6). Finally, student engagement levels on Day 8 and engagement in SRL on Day 9 could be linked to the kinds of CRPPs and SRLPPs Joseph built into his classroom.

These findings were consistent with prior research that student motivation and engagement processes are malleable and situated in context, and cannot be understood outside the context in which they occur (Fredricks and Mccolskey, 2012; Nolen et al., 2015; Salmela-Aro et al., 2016; Butler and Cartier, 2017; Anyichie and Butler, 2018, 2019; Anyichie et al., 2018, 2023). For example, culturally diverse students were highly engaged in the contexts (e.g., Day 9) with a rich integration of CRPPs and SRLPPs. Overall, we found that students' high level of engagement was associated with the combined CRPPs and SRLPPs practices Joseph integrated in the complex task. Multiple sources of evidence including observational data, documents (e.g., worksheets, work samples), and ESRF reports combined to show that students' learning engagement, motivation and SRL during the complex task could be linked to the way in which Joseph enacted SRLPPs and CRPPs in the task.

Also, our findings suggested a dynamic interaction between the learner and context (e.g., features of the complex task, peers' behaviour) that shaped their learning engagement. For example, findings showed that the pre-selected students in Joseph's classroom, regardless of their entry levels of engagement (i.e., HE, ME, LE), more consistently perceived the CR-SRL complex task to be motivating and were actively engaged in it. Furthermore, student reflective explanations of their experiences revealed wide variations within class engagement levels. These variations could be associated with individual differences and preferences in relation to the activities assigned (e.g., not liking the content, writing, or lack of access to technology, and feeling disengaged). Moreover, findings from the ESRF data and correlational analyses revealed tight connections between pre-selected students' motivational perceptions of, and their engagements in, the CR-SRL complex task in Joseph's classroom. Again, this finding suggest that learners' perceptions of contexts are influential in shaping their learning processes.

Taken together, these findings extend previous research showing how student motivational perceptions of their learning contexts such as task features and teacher dynamic support shape their learning engagement (Jang et al., 2016; Kelly and Zhang, 2016; Butler and Cartier, 2017; Parsons et al., 2018; Jones et al., 2021). For example, Jarvela et al. (2012) in their study found that elementary school students' situational motivation in a real science classroom context was associated with self-regulation of their cognitive engagement. Furthermore, this current research corroborates findings that students are highly engaged in learning tasks perceived to be interesting, important and enjoyable (Ainley, 2012; Patall et al., 2016; Harackiewicz and Priniski, 2018; Jones et al., 2021). It adds by showing how students' perceptions of CRPPs and SRLPPs shaped their increased level of motivation and engagement.

Finally, the findings of this study demonstrate how student engagement and motivation is shaped by a dynamic interaction between the learner and context (Yang et al., 2017; Anyichie and Butler, 2018; Anyichie et al., 2023) and draw attention to the importance of designing learning contexts (e.g., complex task) that integrated CRPPS and SRLPPs based on CR-SRL framework to support culturally diverse learners motivation and engagement.

Limitations and implications for future research

This study is limited in several ways. First, this study provided an in-depth study of a limited number of participants (i.e., one teacher and 18 students). Future studies can extend what we have done by involving more teachers and students to better investigate and understand how culturally diverse learners' engagement and motivational processes is situated in an integrated CR-SRL practices during a complex task. Second, the Grade 4 participants in this study may not have full cognizant of their cultural norms and values in ways that would have facilitated their effective connection of classroom activities to their cultural backgrounds and lived experiences. Involving middle school students (e.g., grades 6–9) or even high school students might be of help to examine more fully how student cultural backgrounds might be influencing their learning processes. Third, the selection of students with different levels of engagement prior to the studies was based on Joseph's professional judgement. The use of established criteria that are clear to both the teacher and students could enable a better comparison of pre, during, and post-levels of engagement in relation to pedagogical practices.

Contributions and conclusion

Our study adds to the body of research investigating students' motivation and engagement *in situ*. Specifically, it adds to the methodological approach in investigating and understanding culturally diverse learners' motivation, engagement and SRL processes as situated in the context of a complex task. Our use of a case study design was beneficial in examining and understanding how students' interaction with contextual features (e.g., CRPPs and SRLPPs) could be related with their SRL engagement processes (Butler, 2011; Butler and Cartier, 2017). A case study design allowed us to collect multiple sources of evidence (see data collection above). Also, this study contributes to teaching by showing how a complex learning context is a site for combination of CRPPs and SRLPPs. In conclusion, the findings of this study show that culturally diverse students were motivated to engage in the CR-SRL complex task when they perceived it to be personally relevant and interesting. There were variations in students' experiences based on contextual features with high level of engagement in contexts with rich combinations of CRPPs and SRLPPs. This study shows how teachers could support culturally diverse learners' engagement and motivational processes by designing CR-SRL complex tasks. We encourage researchers and educators to investigate more deeply how culturally diverse learners' engagement and motivation process is situated in a complex task that deliberately integrated CRPPs and SRLPPs.

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 Behavioural Research Ethics Board (BREB) of the University of British Columbia, Vancouver with the certificate number H16-03235. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

This study is an original intellectual work of AA and part of his dissertation. AA developed the research proposal including the culturally responsive self-regulated learning framework employed in this study, research design, recruitment of participants, data collection methods and analyses plan. He was responsible for the data collection, analyses and writing of this paper in collaboration with DB. 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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