An Outcomes-Based Framework for Integrating Academics With Student Life to Promote the Development of Undergraduate Students' Non-cognitive Skills

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Non-cognitive skills are essential for success in a variety of settings but are not commonly taught and assessed in undergraduate curricula. The challenge for curricular integration of non-cognitive skills stems from varying interpretations of what it means to apply a specific skill effectively. In addition, teaching these skills requires going beyond the foregrounded academic content in traditional coursework. At Minerva University, we articulate core non-cognitive skills precisely and transparently as learning outcomes to guide the design of courses and assessments. We integrate these skills into the academic curriculum and student life alongside traditional learning outcomes. Students are introduced to these outcomes in their first year and continue to apply them throughout their 4 years, receiving feedback and scores across academic, disciplinary, and real-world, experiential learning contexts. We provide examples of the Learning Outcomes, detailing their introduction and application in various contexts across the 4-year arc Students' college experience. We identify aspects of our approach that can be generalized and implemented in different settings, from individual courses to programs, departments, or entire institutions.

Keywords: non-cognitive, skill development, collaborative design, reform and innovation, Minerva University, undergraduate, transferable skill development

INTRODUCTION

Non-cognitive skills can be understood as the set of behaviors, skills, attitudes, and strategies that underlie Students' actions toward their academic, personal, and professional responsibilities and goals (Farrington et al., 2012; Gutman and Schoon, 2013). They are distinguished in the literature from skills such as numeracy and literacy that traditional cognitive tests have measured, although all of these skills require the development of cognitive processes (Smith, 2020). Unlike traditional cognitive skills, non-cognitive skills are more malleable and independent from context; they improve one's ability to learn, apply other skills, and adapt to changing needs (Hagel et al., 2019).

The importance of non-cognitive skills has been emphasized by developmental psychologists since the early twentieth century. Lev Vygotsky theorized that learning is a social process that requires interaction and is influenced by culture, resulting in the development of behaviors and attitudes that allow for more complex thinking (Blake and Pope, 2008). Further strengthening

the importance of non-cognitive skills, Bruner (1961) argued that education aims not to impart knowledge but to facilitate thinking and problem-solving skills that students can then transfer to a variety of situations. More recent studies show that the development of non-cognitive skills positively impacts Students' academic outcomes and future professional readiness (Kyllonen, 2012; Gutman and Schoon, 2013; Kautz et al., 2014). Indeed the most in-demand competencies across the labor market include communication, teamwork, leadership, problem-solving, and complex thinking (Carnevale et al., 2020).

Higher education institutions are uniquely situated to equip students with non-cognitive skills and competencies. Still, despite the increasing evidence of the importance of such skills in the workplace (Mercer et al., 2019), many institutions have not prioritized teaching them, where they remain part of the hidden curriculum. Skills such as leadership and teamwork are meant to be gained as students participate in extracurricular clubs and athletics. Students may voluntarily participate in skill-building workshops and seminars at college learning centers or be compelled to join due to significant issues in academic standing or high school preparation (Truschel and Reedy, 2009). In either case, participation in these programs is seen as co-curricular and is neither assessed nor reported on transcripts. This results in students not fully appreciating the value of these skills and services (Gutman and Schoon, 2013; Mintz, 2019). There is an assumption that students will somehow learn these skills as they progress through college. In reality, many students who excel at applying non-cognitive skills learned them before college through attending well-resourced or elite high schools and extracurricular learning programs (Tyson, 2014; Paul, 2015).

The challenge of promoting non-cognitive skill development starts with defining what is to be taught. There is no universal agreement on what skills constitute this set (Humphries and Kosse, 2016). Non-cognitive skills are multidimensional and interdisciplinary, integrating aspects of the social and psychological spheres (Farrington et al., 2012) that apply to processes of learning and working across disciplines. Furthermore, teaching these skills necessarily requires going beyond the foregrounded academic content. Finally, assessing Students' non-cognitive skills in typical academic courses remains unsystematic, subjective, and *ad hoc*. Without a formal curriculum, it cannot be ensured that these skills are taught, learned, and practiced effectively and consistently.

At Minerva University, we explicitly teach non-cognitive skills, revealing much of the traditionally hidden curriculum. Here we describe our highly structured approach to integrating the learning and assessment of non-cognitive skills throughout our curriculum, both inside and outside the classroom.

PEDAGOGICAL FRAMEWORK AND PRINCIPLES

Minerva University is a primarily undergraduate institution where all classes are taught in small seminars using active learning pedagogy *via* a sophisticated digital learning platform. Students

participate in a global rotation program, living together in different global cities during their studies (more details on these aspects of Minerva's model are in **Supplementary Material 1**). Minerva's framework for integrating academic coursework with student life and career development programming to foster the development of non-cognitive skills is defined by three principles:

Defining Core Skills as Learning Outcomes

Minerva has identified a set of broadly applicable skills and concepts that are paramount for the next generation of leaders, innovators, and engaged global citizens. For each concept or skill, we have articulated a measurable Learning Outcome (LO), a statement of what students should know and be able to do as a result of applying that concept or skill. The LO statement ensures that all stakeholders use the same definition. All LOs also have hashtag handles, a shorthand that makes them easier to discuss and remember across teams. For example, the learning outcome, "*identify and correct logical fallacies,*" is shorthanded to #fallacies. While many LOs are knowledge-based, several LOs are directly relevant to non-cognitive skills. For example, two non-cognitive LOs are "*follow through on commitments, be proactive, and take responsibility*" (#responsibility) and "*use emotional intelligence to interact effectively*" (#emotionaliq).

In the context of academic coursework, the LOs are derived from and organized under four competencies: Thinking Critically, Thinking Creatively, Interacting Effectively, and Communicating Effectively. The Foundational, cross-contextual LOs span all dimensions of these competencies without significant redundancy. They each capture specific aspects of the core competencies while remaining broadly applicable across a wide range of disciplines and domains of inquiry. The full list of nearly eighty learning outcomes, organized into sub-competencies under the four core competencies, is provided in **Supplementary Material 2**.

Similarly, staff and deans responsible for student experience, career services, and student wellbeing at Minerva identified five competencies called Integrated Learning Outcomes (ILOs) that are pertinent to personal and character development. These are Self-Management and Wellness, Interpersonal Engagement, Intercultural Competency, Professional Development, and Civic Responsibility. They identified a subset of Foundational LOs relevant to each ILO, as indicated in **Supplementary Material 3**. Students are expected to engage in and improve upon these ILOs throughout their Minerva journey.

Integration Between Academics and Real-World Settings

While introducing students to the Foundational LOs associated with core skills in the classroom, we provide opportunities to apply and practice these in real-world contexts. This is founded on the belief that learning is truly successful when learners use concepts and skills across diverse settings. For instance, the Integrated Learning Course is a four-semester-credit course delivered over 4 years that provides students with

tools to face the challenging process of personal and character growth and prepares students for effective citizenship in a diverse, multicultural society. Each semester, students participate in structured projects and community immersion experiences to orient themselves to the culture in their rotation cities. In this manner, students deepen their understanding of LOs, while earning course credit for engaging with relevant experiential learning opportunities. Another example is career coaching, where students set goals and reflect on their non-cognitive skill development, such as self-management, relating to others, and teamwork—critical to their employment and life success. Along

their 4-year journey, coaches continue to help students apply the LOs in professional contexts, including networking, developing application materials, and interviewing.

Multidimensional Channels for Reflection and Feedback

In addition to the statement and hashtag handle, each Foundational LO has a paragraph description and a 5-point rubric (**Supplementary Material 4**) that makes explicit the criteria for evaluating Students' work. **Table 1** displays this

TABLE 1 | This table presents in full the two the Learning Outcomes (LOs) shorthanded #selfawareness and #biasmitigation.

Learning outcome	#selfawareness Identify and monitor your strengths and weaknesses; mitigate behaviors and habits that impair effective performance.	#biasmitigation Identify how biases result, their potential effects, and methods to mitigate such effects.
Paragraph description Defines the LO and captures essential aspects.	Humans generally form overly optimistic assessments of their own characteristics and performance and ignore evidence to the contrary. Part of "knowing yourself" is to assess your abilities and characteristics accurately and to identify bad habits and bad behavior that prevent you from achieving goals. To do this, you must first determine your blind spots by learning to "know what you don't know" and form habits to avoid ignoring evidence regarding your behaviors and their effects. This requires objectivity, intellectual courage, and lack of arrogance so that you can form an accurate appraisal of your strengths and weaknesses as well as develop strategies for self-improvement. Being self-aware has the added benefit of making you more sensitive to the degree to which others have accurate self-assessments so that you can adjust your interactions with them accordingly.	Cognitive biases can prevent us from considering important information when making decisions and drawing accurate conclusions. In particular, we tend to seek out information that confirms or is consistent with our prior beliefs, disregard information that is contrary to them and interpret equivocal information as supporting our beliefs. The key to minimizing the effects of bias is first to become aware of them and then determine how to reduce or eliminate their influence in a particular context. Heuristics—simple, efficient rules that can make problem-solving faster and easier—can sometimes lead to biases and errors in judgment or reasoning and must be used with caution. On the other hand, there are classes of heuristics that, in certain circumstances, can provide useful bias mitigation strategies.
Rubric Describes the levels of mastery.	1 Does not recall or use strategies for engaging in metacognition when prompted, or does so mostly inaccurately; does not recall or use strategies for accurately assessing personal abilities and characteristics, or does so mostly or entirely ineffectively; presents a seriously flawed or inaccurate self-assessment.	1 Does not recall or recognize biases when prompted; identifies the existence or type of bias mostly or entirely inaccurately; proposes or implements strategies to avoid, reduce, or correct for biases that are mostly or entirely ineffective.
	2 Identifies strategies for engaging in metacognition or accurate self-appraisal that are not relevant to the context or would be of limited effectiveness; presents a somewhat accurate yet biased or incomplete self-assessment; does not elaborate on the role of self-awareness in shaping social dynamics in a specific context.	2 Identifies the existence or type of bias and its potential effects only somewhat accurately; proposes or implements strategies to avoid, reduce, or correct for biases that are only somewhat effective.
	3 Accurately identifies the causes or consequences of a lack of self-awareness or failure to engage in metacognition; accurately or effectively recalls or uses strategies for assessing personal abilities and characteristics; (when relevant) proposes an effective strategy for engaging in metacognition or unbiased self-assessment.	3 Accurately identifies the existence and type of bias and its potential effects; proposes or implements effective strategies to avoid, reduce, or correct for biases.
	4 Explains the underlying factors that promote or inhibit self-awareness in a given context; analyzes the impact of metacognition or self-awareness in a social system; (when relevant) explains why a particular strategy would effectively promote metacognition or self-awareness; (when relevant) generates a particularly unbiased and comprehensive self-assessment relevant to a specific context or goal.	4 Accurately identifies the existence and type of bias and clearly explains the potential effects; (when applicable) effectively analyzes the relationships among biases and their impact; explains the relationships and underlying mechanisms for how proposed or implemented strategies avoid, reduce, or correct for biases.
	5 Uses knowledge of strategies for accurately assessing personal abilities and characteristics in a creative and effective way, relying on a novel perspective; generates a novel strategy to promote metacognition or accurate self-assessment; generates a novel characterization of self-awareness that permits insightful analysis of a social system.	5 Proposes or implements a creative, novel way or substantial improvement on ways to analyze, avoid, reduce, or correct psychological biases.

These Learning Outcomes are examples of non-cognitive Foundational LOs that are introduced in the first year General Education curriculum and reinforced over the 4 year curriculum. Here we have the statement of the LO, the hashtag handle for easy reference, a paragraph description, and a LO-specific rubric to evaluate the mastery of that skill.

information for two LOs, #selfawareness and #biasmitigation, which we discuss in more detail in the next section. The information for each LO is readily accessible to faculty, staff, and students. To promote reflection, all assignments at Minerva require students to tag their LO applications with footnotes or provide explanatory analysis in **Supplementary Material**. Typically 2–3 sentences, the intention of these annotations is for students to reflect on their applications of the LOs and explain what makes these applications strong, drawing from the rubrics. Regularly tagging LOs in this fashion is an excellent way for students to engage in metacognition and evaluate the strength of their understanding and applications. Next, instructors apply the rubrics when grading coursework, supporting consistency, and making grading more objective (Allen and Tanner, 2006). Instructors typically provide a written comment explaining what the student had done well and what they could improve. Students receive this formative feedback for their work during class sessions and on assignments. Easy access to rubrics also allows students to better understand and implement instructor feedback.

In parallel, as Minerva's experiential programs incorporate 1:1 coaching, students receive actionable feedback on their application of non-cognitive skill associated LOs, in experiences such as job searches, networking, project-based learning, or formal professional experiences such as internships. Finally, each student completes a self-assessment to reflect on their current skills and abilities pertaining to specific ILOs at the end of each year, guided again by clearly defined rubrics (**Supplementary Material 5**). This self-assessment allows students to set goals, monitor, and reflect upon their progress.

LEARNING ENVIRONMENT AND PEDAGOGICAL FORMAT

Minerva's student body is extraordinarily international, relative to standard U.S. universities. More than 80% of Minerva's student population comes from outside the United States. Considering the 721 students in the five cohorts spanning the classes of 2020–2024, 36% of our students come from Asia; 23% from Europe; 22% from North America; 13% from Africa; and 6% from South America. English is not the first language for over 60% of our students, and about 30% of our students come from International Baccalaureate programs. Of all Minerva students who have matriculated, about 54% identify as female and about 46% as male. In addition to being highly international, the student body is also notable for its high economic diversity. Nearly 80% of Minerva students receive some sort of financial support in the form of loans, work-study, and/or scholarships.

Minerva incorporates the pedagogical framework described in the previous section through a hybrid model where classroom instruction is virtual while students live together and engage in real-world activities and events that supplement the curriculum. Academic instruction is remote, and Minerva's on-site Student Life staff supports students in residential life, career and professional development, integrated learning skills, and cultural and civic work in each city. These programs complement the

TABLE 2 | Key elements of the Minerva University learning experience.

	Year 1	Year 2	Year 3	Year 4
Academic coursework	**First-year General Education Courses**: During their first year, all students take the same four foundational courses. These courses are structured to introduce and practice the approximately eighty foundational LOs associated with core skills and concepts.	**Upper-level Disciplinary Courses**: From the second year onward, students complete coursework in their selected fields. Each course has a unique set of course objectives and learning outcomes tailored to the key skills and knowledge to be developed in their specific discipline. In addition to the disciplinary course objectives, the foundational LOs from their first-year courses are reiterated across upper-level courses.		**Senior Capstone Projects:** In their final year, each student completes an independent capstone project that incorporates research and creative problem-solving. In the third year, the Capstone Seminar course provides a testing ground for potential projects while reinforcing foundational LOs associated with project management skills. Courses in Students' majors prepare them for the academic components of their project. Students select, design, and execute the project with a faculty advisor who serves as mentor and primary grader during the fourth year.
Project-based work	**Civic Projects:** As a mandatory part of the first-year curriculum, all students complete a Civic Project where they apply LOs to real-world challenges hosted by local organizations. Students work in small groups, and each group is assigned to a mentor(s) from the organizations with whom they meet regularly for guidance. This is a unique opportunity for students to combine academic work with meaningful community engagement and interactions with professionals: Students produce agreed-upon deliverables for their partner organization, give an oral presentation, and submit an academic component outlining their usage of the LOs. Students also complete Civic Projects in rotation cities in subsequent years.			
Student life programming	Programming developed by the on-site student life staff in each rotation city allows students to apply LOs as they engage in **city experiences, student community events, and coaching and career advising**. Students utilize the rich resources in each city, participating in site visits, collaborating with civic organizations, and meeting prominent cultural figures. They get exposure to residential life programming, including self-management workshops and wellness campaigns. Beginning in their first semester, students gain access to Minerva's global team of coaches and professional development experts dedicated to empowering Minerva students to create and pursue meaningful lives and careers. Students engage in one-on-one and group coaching, including resume building, interviewing, internship and job searching, etc. and resources developed and curated specifically for students. At the end of each term, students complete assignments that allow them to explain and reflect upon their applications of LOs in the programming they engaged in during the semester.			

in-class curriculum and help students get the most of their experiences in their cities by developing real-life skills and connections needed to pursue their career and personal goals. All faculty and staff receive extensive training, including on the application and assessment of Foundational LOs.

To illustrate Minerva's model more extensively and demonstrate it in action, we further define some key elements and components of the learning environment that foster the model described above. As detailed in **Table 2**, we introduce students to the Foundational LOs during their first year of study when taking the same 4-year General Education courses. Beyond the first year, the LOs are scaffolded and incorporated throughout the entire curriculum, reinforced over time, and regularly practiced in coursework, projects, and extracurricular activities. For instance, as students take upper-level courses in their selected majors, they continue to apply Foundational LOs from their first year, practicing these skills in the context of their disciplines and receiving scores and feedback on their applications. LO scores are updated daily and shown to students on a dashboard in their Learning Management System. The dashboard shows all prior scores, associated feedback, and a running average. Therefore, students can track their growth in each LO to see how they progress in individual courses and overall over 4 years. **Tables 3**, **4** elaborate on the two non-cognitive skill LOs introduced earlier, #selfawareness and #biasmitigation, detailing their introduction and application in various contexts across the 4-year arc of their college experience and channels for feedback.

RESULTS TO DATE AND PLANNED DATA COLLECTION

When assessing non-cognitive skills, quantitative metrics, such as objective scores and tests, are informative but must be balanced with the depth and insights of more subjective and qualitative data, such as self-report, observation, and perception (Garcia, 2014). To evaluate how well our programs are meeting intended outcomes, we analyze various types of data, including student LO rubric scores, surveys of internal and external stakeholders (e.g., faculty and staff; civic project partners and internship managers), and student self-assessment and reflection.

Our scaffolded curriculum allows us to evaluate Students' growth by tracking student scores on Foundational LOs over 4 years. However, a few caveats make current LO data challenging to interpret meaningfully. Being such a new and small institution, sample sizes are limited. Additionally, there have been significant revisions to the course policies, curriculum, LO definitions and rubrics, and assessment practices, especially in the early years as Minerva created its curriculum for the first time. For instance, we do not currently have consistent 4-year data for #biasmitigation because this LO was introduced starting in 2018, resulting from

TABLE 3 | Integration of use and assessment of #selfawareness across Students' 4-year experience.

	Year 1	Year 2	Year 3	Year 4
Academic coursework	In their **first-year general education coursework** students explore metacognitive strategies such as self-questioning and reflective journaling. When first introducing this LO, class activities guide students to analyze the consequences of ineffective metacognition in various contexts, including those encountered in daily life and in government. Later, in assignments, students are prompted to apply the LO by reflecting on the strategies they used to assess their understanding of the class material and make progress.	In a **psychology course** on personal and social motivation, students are prompted to use this LO in a personal behavior modification project. After identifying a personal health behavior they wish to change, students must apply numerous behavior modification theories and strategies reviewed throughout the course. In particular, they must evaluate factors that could derail their behavior change program and develop a plan to face those challenges if they arise.	In a group project for a **finance course**, in which students are asked to produce a merger/acquisition case study, students must offer genuine reflections on their individual contributions to the group work. They are prompted to consider both positive aspects and elements to improve, and comment on ways to evaluate these strengths and weaknesses.	For their **Capstone Project** in the topic-selection phase (3rd year), students evaluate their current abilities against those needed to complete a potential project in the time available and with limited resources. This often leads to adjusting the scope, approach, or intended deliverables. When working on their project (3rd and 4th year), students are routinely prompted to reflect on their work habits and accountability mechanisms, identifying ways to improve through planning and practice.
Project-based work	For their **Civic Projects**, students must work productively as a group and work professionally with their civic partner. This requires understanding their own strengths, weaknesses, and working styles so that they can collaborate effectively as a team. This is especially important during the first-year Civic Projects in which students may not get to choose their group or partner. Near the beginning of the civic project process, students attend a workshop with their group to discuss their teamwork strategy. At the end of the year, students must provide feedback to the other group members about their work together. The feedback is then shared and compared with their own self-assessment.			
Student life programming	Throughout each term, students are offered **self-management and wellness workshops**. These can take the form of a 10 min meditation session within a City Experience or an experience in itself, like forest bathing in Muir Woods or walking silent meditations in San Francisco Botanical Gardens. These programs assist students in developing a nuanced understanding and mindset of wellness by promoting the practice of healthy habits as well as skills for self-efficacy, resilience, stress management, and the capacity to balance self-care with responsibilities. During their first year, students work with a coach to develop a **personal development plan** guided by a set of structured prompts. These prompts allow students to engage in metacognition as they become more aware of their interests, values, skills, and ways they want to be in the world to effectively explore careers that align. Over the course of their undergraduate journey, students regularly meet with their coaches and reflect on their personal development plan. They continually reevaluate the habits and mindsets that both positively and negatively affect them in the pursuit of their goals.			

TABLE 4 | Integration of use and assessment of #biasmitigation across Students' 4-year experience.

	Year 1	Year 2	Year 3	Year 4
Academic coursework	In their **first-year general education coursework**, students dig into psychology research that defines different types of cognitive biases such as confirmation bias and attentional bias. They identify techniques to mitigate the effects of biases on an individual as well as the organizational and institutional level, such as reframing, and considering the opposite. They apply this learning outcome in various contexts, such as analyzing the role of biases in forensic science and criminal justice systems.	In a **psychology course**, students evaluate the research on in-group/out-group bias and consider why customized, systemic training and integrated consideration of implicit bias in daily work is better for bias mitigation vs. one-off trainings. Students write a research proposal on how bias impacts cross-cultural interaction.	In a **biotechnology course**, students apply this LO in the context of experimental and clinical trial design. Blinding and randomization are among the strategies students learn about to mitigate biases such as confirmation bias.	For their **Capstone Project**, when vetting and later writing about a given project topic, students recognize the need to conduct research in a way that counters the tendency toward confirmation bias. In the context of project management, students first analyze examples of the planning fallacy (sometimes referred to as the optimism bias) and then apply estimation techniques to the time needed for their intended project. This commonly leads to a revision of the project's aims to better fit the available time.
Project-based work	A specific example of a **Civic Project** where students applied this LO is a project with BetterBrave, a San Francisco organization that addresses sexual harassment, discrimination, and retaliation in the workplace. A team of three students was tasked with creating an educational experience to teach men how to be better allies of women experiencing sexual harassment in the workplace. They developed a learning module that equips new graduates entering the tech workforce to stop sexual harassment and discrimination. One module component prompted participants to identify problematic aspects of their workplace culture and social attitudes that lead to biases that can power microaggressions. The module guides learners to be cognizant of microaggressions and what causes them, thus reducing their effects.			
Student life programming	As part of the **Integrated Learning Course**, students complete an ethnography interview assignment. Students interview a classmate from a cultural group previously unfamiliar to them. They use structured prompts to discuss various topics with their "cultural informant" at several points over the semester and write a reflection of what they learned about their informant's experiences, their cultural preferences, and the general notions of intercultural engagement and communication. Students use rubrics to self-assess their intercultural competence. Learning about different cultures and engaging with people from different social and cultural backgrounds reduces stereotype endorsement, symbolic racism, and discrimination. Students are encouraged to recognize unconscious bias through the experiences and programs in each rotation city and engage in ongoing conversations that build bridges of understanding. In Buenos Aires, students participate in a **city experience** about colonialism in Argentina. They meet with representatives from a collective called "Identidad Marron" (brown identity) advocates and descendants from indigenous people. They learn about various shapes racism has taken in Argentina, the biases that have driven it, and steps that have been taken to mitigate it. They also reflect on the presence of biased and racist practices in their home countries and engage in open discussions about how to continue to reduce them.			

a restructuring of other previous bias-related LOs that were merged. In **Figure 1** we present the scores on #selfawareness earned by two cohorts over 4 years. While no clear trend of change in mean or variation in LO scores over time emerges from these two cohorts, this nonetheless serves as an illustrative example of the type of data we are actively collecting and using to inform our approach. Refinements to our curriculum and policies are getting asymptotically smaller year after year, and we will have more comparable data from multiple cohorts, allowing us to identify patterns in student performance and mastery of these skills.

More generally, the assessment of non-cognitive skill development is challenging. These skills are, by nature, subjective to the perceptions of the observer. While we mitigate this using clearly defined LOs and rubrics, there is bound to be some variation. Additionally, some non-cognitive skills take considerable time and practice to develop. At the moment of project or program completion, it is difficult to know if students experienced growth and whether it is lasting. Finally, control groups are needed to determine whether any change resulted from our curriculum or our Students' typical growth and development.

We recently initiated the implementation of two additional tools to measure non-cognitive skill development (1) A self-assessment survey (**Supplementary Material 5**) which students complete at the start of their first year and then at the end of each academic year. Students use a rubric to reflect on their current skills and abilities within specific ILOs and develop an action plan to help them grow within those LOs. (2) The Intercultural Effectiveness Scale (IES) (Kozai Group, 2009), a psychometric instrument designed for the assessment of intercultural competencies, which students complete at the start of their first year and upon graduation. The IES report provides students feedback on their non-cognitive skills related to intercultural effectiveness such as cross-cultural communication, interpersonal engagement, and emotional resilience. We started administering both tools 2 years ago with the incoming class that will graduate in 2023. This means that these students will take the final post-graduation surveys in 2 years. We will then be positioned to compare pre- and post-program data. In conjunction with 4-year LO scores, these data will identify areas that may require improvement, informing our efforts to iterate and adjust our curriculum and programming to support non-cognitive skills development better.

Finally, surveys to assess perceptions of external stakeholders provide indirect evidence of student success and areas of strength in student non-cognitive skill development. Minerva's employer-facing team surveys internship managers of Minerva students at the end of each year, assessing their experience with the students and the quality of their work output. From 2018, 2019, and 2020 we gathered responses from 118 external employers. These employers include high-level executives from around the
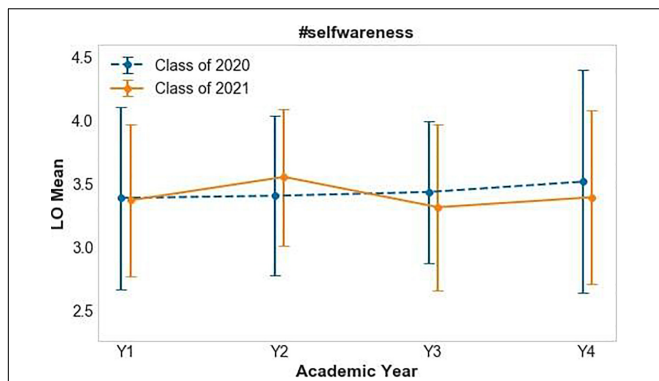
FIGURE 1 | Mean and standard deviation of scores on #selfawareness earned by two cohorts, the class of 2020 and the class of 2021 (who began in the fall of 2016 and 2017, respectively). Numbers of students in each year and score count are presented in **Supplementary Material 8**.

world including CEOs, MDs, CSOs. Of these, 62% responded that their Minerva intern was outstanding and ranked in the top 5% compared to previous interns. Testimonials from the respondents highlighted adaptability and cultural dexterity, "*What I was most impressed by is her ability to be flexible and work with a variety of student skill levels. It was also helpful that she has had travel and culture experience as we have students from many parts of the world and she is able to relate to them,*" and growth mindset, "*[Student] brought a positive attitude and a passion for giving and seeking strong feedback, aka an attitude steeped in growth and continuous improvement of himself and his peers.*"

Similarly, at the end of the Student's first academic year, we ask mentors from Students' Civic Projects (described in **Figure 1**) to evaluate the students in their teams. Our Spring 2020 survey received responses from 33 professionals working in the San Francisco area, in industries ranging from financial services to hospitals and non-profits. From a list of attributes, partners selected areas that their mentees excelled in **Table 5**. The most commonly chosen attributes were professionalism

TABLE 5 | Survey responses from 33 civic partners who mentored fist year students during their year long civic project.

Attributes	In what areas do the students you work with excel? Number respondents (percent)	In what areas did you find the students you worked with needed more support? Number respondents (percent)
Project management	17 (51.5%)	10 (30.3%)
Time management	14 (42.4%)	10 (30.3%)
Professionalism	28 (84.8%)	3 (9.1%)
Interpersonal Engagement/Teamwork	20 (60.6%)	11 (33.3%)
Communication and Responsiveness	21 (63.6%)	9 (27.3%)
Critical thinking	18 (54.5%)	2 (6.1%)
Creative problem solving	28 (78.8%)	5 (15.2%)
Technical skills	15 (45.5%)	4 (12.1%)
Other	4 (12.1%)	8 (24.2%)

(85%), creative problem solving (79%), and communication and responsiveness (63%). The attribute identified as needing the most support was time management (42%). So while, on average, our first-years impressed the partners with their professional behavior and creativity, they still have room for growth with respect to time management. This data will inform programmatic revisions, such as defining learning outcomes that specifically target this skill. Overall, Minerva students receive overwhelmingly positive feedback from external partners.

IMPLICATIONS AND LIMITATIONS

Minerva is a new and innovative institution, and evidence-based iteration is the cornerstone of our programmatic approach as we build and improve processes, learning outcomes, and programs each year. We collect various data, including student feedback (such as end-of-course surveys and focus groups), LO rubric scores, and information from internal and external stakeholders (e.g., faculty and staff; civic project partners and internship managers) to evaluate how well our programs are meeting intended outcomes. For instance, we use student outcome data and faculty feedback to continually re-evaluate the usefulness and relevance of Foundational LOs. As a result, the LOs have evolved from a list of over one hundred outcomes to the current, narrower, and more clearly defined list of fewer than eighty outcomes. The Integrated Learning Course provides another example. The course was originally designed to support students in acculturating to the different global rotation cities. Many additional elements have been added over time to broaden its scope and include more non-cognitive skills that students, staff, faculty, and external stakeholders identified as necessary for student success.

The small size of our institution makes implementing this integrated, scaffolded approach more tractable. Our faculty, staff, and students have joined Minerva, in part, because of its innovative nature, and they are open to and excited by change, making it easier for the institution to move coherently and quickly when change is desired. Minerva is also unique in that we are a highly selective, needs-blind, and majority international institution, accepting under 2% of applicants for the past several years from approximately 80 countries, resulting in a diverse, high-performing student body upon entry into the University. Therefore the scale of our approach is not necessarily replicable at other institutions. Nonetheless, the underlying principles remain the same. Other programs can adapt our framework to fit their particular situations, spanning as many or as few courses and co-curricular experiences as practical and potentially expanding over time. Importantly, the formative assessment needed to teach and assess non-cognitive skills effectively requires courses to move beyond traditional ways of measuring student learning. This might involve adding reflections at the end of exams, assessment of progress on assignments, and assignments that explicitly require the use of non-cognitive skills. Many skills related to communication and interaction can also be practiced and assessed during in-class activities, which requires courses to move away from the traditional lecture format. At most universities, teaching centers and career services departments are available as

a resource for faculty and departments interested in integrating non-cognitive skill development into their courses and curricula.

Minerva's newness and inclination toward iteration pose a challenge to the assessment of the effectiveness of programs. Changes in student experience over the years, making comparative data challenging to identify. Recently, as our curriculum and policies have stabilized, we anticipate that we will be able to make more year-over-year comparisons. More broadly, the assessment of non-cognitive skills remains challenging. These skills are, by nature, subjective to the reality and perceptions of the observer. We mitigate this using rubrics and learning outcomes, but we cannot be entirely objective. Additionally, some non-cognitive skills need to develop over time. At the moment of project or program completion, it is difficult to know if one experienced growth and whether it is lasting or transferred to other projects. At this time, we do not have a control group with which to compare our students, and we cannot say definitively if that growth was a result of our curriculum or a result of our Students' typical growth and development. We plan to further investigate how to best measure this growth and transfer going forward.

In sum, by integrating academics with community experience and professional development and coaching, higher education can promote non-cognitive skills that typically take years of experience to acquire. This approach relies on a clear set of goals, coordination and integration between faculty and student life staff, with ample feedback, reflection, and open dialogue.

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