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EDITED BY
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Mariana Buenestado Fernández,
University of Cantabria, Spain

*CORRESPONDENCE
Kiomi Matsumoto-Royo
✉ kiomi@matsumoto.cl

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# Feedback as an opportunity to promote lifelong learning in pre-service teachers: a mixed methods study

Kiomi Matsumoto-Royo[1]*, Paulette Conget[2] and Maria Soledad Ramírez-Montoya[3]

[1]Facultad de Ciencias Sociales, Jurídicas y Humanidades, Universidad Gabriela Mistral, Santiago, Chile, [2]Facultad de Medicina Clínica Alemana Universidad del Desarrollo, Santiago, Chile, [3]Institute for the Future of Education, Tecnologico de Monterrey, Monterrey, Mexico

The aim of this study was to investigate whether, within a practice-based curriculum, feedback on the assessment tasks provided during campus coursework offers opportunities to promote lifelong learning dispositions in pre-service teachers. For this, pre-service teachers ($n$ = 231) completed a validated questionnaire regarding lifelong learning dispositions. Then, feedback from assessment tasks ($n$ = 14) was analyzed to identify claims related to curiosity, motivation, perseverance, and self-regulation of learning. Finally, in-depth interviews were conducted with pre-service teachers ($n$ = 8) to explore their perspectives on feedback and lifelong learning dispositions. Data triangulation was used to confirm and add depth to the findings. Feedback on assessment tasks provided during campus course work promotes lifelong learning dispositions when: (i) tied to authentic tasks, (ii) is provide not only by teacher educators but also by peers, (iii) incorporates both positive and negative comments, along with practical advice. The implication of findings for teacher education is discussed.

KEYWORDS

**higher education, teacher education, feedback, assessment tasks, lifelong learning dispositions, educational innovation**

## 1. Introduction

Future teachers will face challenges in their profession, as they navigate the continuous evolution of knowledge (Himmetoglu et al., 2020) and guide scholars to thrive in a technological, dynamic and unpredictable world (Altan and Lane, 2018). Thus, pre-service teachers may be trained to teach effectively in uncertainty contexts (Ramírez-Montoya et al., 2021). To achieve this, teacher education programs must update their educational models, transitioning from content delivery to the development of relevant skills and attitudes (Goh and Abdul-Wahab, 2020), especially those that align with lifelong learning (Finsterwald et al., 2013; Bennet and Moriarty, 2016; Hahl and Mikulec, 2018; Nutov, 2019).

Lifelong learning dispositions encompass various traits such as curiosity, motivation, perseverance, and self-regulation of learning (Solmaz and Aydin, 2016). To foster these volitional elements, they need to be regularly addressed in the curriculum (Fonseca-Chacana, 2019). It is not merely about including some anecdotal activities or relying on extracurricular experiences; instead, they should be intentionally planned, implemented, and evaluated along formative programs (Ozen et al., 2016). Previously, it has been shown that lifelong learning dispositions are cultivated in practice-based curriculum (Murdoch-Eaton and Whittle, 2012). Furthermore, when practice takes a central role in teaching, such as in sport academy or medical school,

feedback enhances curiosity (Metcalfe et al., 2022), motivation (Gan and Liu, 2021), perseverance (De Meester et al., 2022), or self-regulation of learning (Murphy et al., 2015).

Over the past decade, teacher education programs have made efforts to transition toward practice-based curriculum (Grossman et al., 2009b; Windschitl et al., 2012; Muller et al., 2016; McCray et al., 2017; McLeskey et al., 2017; Grossman, 2018). Significant progress has been made in the implementing enactment pedagogy, which involves the decomposition, representation and approximation of educational practices (Grossman et al., 2009a; Danielson et al., 2018). Practice learning occurs both during fieldwork (practicum in schools) and campus coursework. Thus, practice-based curriculum provides pre-service teachers with multiple opportunities to gain insights into the exercise of teaching (Amador, 2017; Davis et al., 2017; Dotger et al., 2018; Wang et al., 2019). In practice-based curriculum, feedback is critical both for enhancing pre-service teachers' learning and for modeling what they will have to do as practicing teachers (Engin, 2013; Hattie and Clarke, 2018; Sayeski et al., 2019; Torres et al., 2020; Adalberon, 2021). To our knowledge, the impact of feedback on the development of lifelong learning dispositions in practice-based teacher education has not been explored.

The aim of this study was to investigate whether, within a practice-based curriculum, feedback on assessment tasks provided during campus coursework offers opportunities to promote lifelong learning dispositions in pre-service teachers. For this, the following research questions were formulated:

> Does practice-based curriculum provide opportunities for pre-service teachers to develop lifelong learning dispositions?
>
> Does feedback on assessment tasks performed during campus coursework within a practice-based curriculum promote lifelong learning dispositions in pre-service teachers?
>
> How should feedback on assessment tasks performed during campus coursework within a practice-based curriculum be delivered to promote lifelong learning dispositions in pre-service teachers?

# 2. Conceptual framework

## 2.1. Lifelong learning dispositions

Lifelong learning refers to any learning activity pursued throughout life to enhance knowledge, abilities, and attitudes from a personal, civic, social, or professional perspective (Euopean Commission, 2001). It is considered one of the 10 most critical skills of the 21st century, essential for adapting to an uncertain future (Binkley et al., 2012). According to Solmaz and Aydin (2016), curiosity, motivation, perseverance, and self-regulation of learning are crucial lifelong learning dispositions for effective teacher performance.

Curiosity is the active interest fin exploring and discovering new information, building on existing knowledge, and enjoying the process of investigation (Zion and Sadeh, 2007; Beytekin and Kadi, 2014; Akyol, 2016; Solmaz, 2017). For teachers, curiosity encourages them to venture beyond their comfort zones often generating new pedagogical questions (Faulkner and Latham, 2016).

Motivation is demonstrated through the initiative to engage in learning, continually seeking new and better methods and approaches of doing things (Costa and Kallick, 2008; Beytekin and Kadi, 2014; Jato Seijas et al., 2016; Belando-Montoro, 2017). It involves the humility to acknowledge when one does not know something and the courage to find out.

Perseverance entails a steadfast commitment to completing tasks or goals despite obstacles and difficulties (Caena, 2019). It also involves developing a range of alternative strategies or solutions to solve the problem (Costa and Kallick, 2008; Beytekin and Kadi, 2014; Swartz et al., 2014; Akyol, 2016; Solmaz, 2017).

Self-regulation of learning refers to the willingness to manage one's behavior, resist impulses, maintain concentration, and undertake tasks, even in the presence of more appealing alternatives (Boyd et al., 2005; Beytekin and Kadi, 2014; Akyol, 2016; Solmaz, 2017). It involves being aware of one's reasoning, being sensitivity to feedback, and evaluating the effectiveness of actions (Marzano and Kendall, 2006).

## 2.2. Feedback on assessment tasks within practice-based curriculum

The teaching profession demands the integration of knowledge, skills, and attitudes in complex, real-word scenarios (Matsumoto-Royo and Ramírez-Montoya, 2019). Therefore, initial teacher education programs, should prepare pre-service teachers to enact various practices that integrate theoretical and practical aspects (Ball and Forzani, 2009) for effective teaching in diverse and challenging contexts. In the last decade, several initial teacher education programs have adjusted their approach to provide practical preparation not only during practicum but also in campus coursework (Kearney, 2015; Dutro and Cartun, 2016; Peercy and Troyan, 2017; Kang and Windschitl, 2018).

Practice-based curriculum offers systematic and repetitive practice opportunities (Jenset, 2017; Jenset et al., 2018; Hammerness et al., 2020), and support the learning of core practices through a sequence that allows pre-service teachers to achieve mastery (Windschitl et al., 2012; Forzani, 2014; Grossman et al., 2018). These teaching sequences are referred to as learning cycles of practice (Bottoms et al., 2015; Ghousseini, 2015; Kazemi et al., 2016). Each cycle consists of different phases related to three practice pedagogy conditions: decomposition, representation, and approximation to practice. The cycle enables beginners to engage in authentic and ambitious instructional activities, progressing through four phases: introduction and learning about the activity, preparation and rehearsal for the activity, enactment of the activity with students, and analysis of the enactment and moving forward (McDonald et al., 2013; McGrew et al., 2018; Shutz et al., 2018). Much of the cycle take place during campus coursework. These phases should be structured and include learning assessments and feedback to help pre-service teachers recognize their progress and develop a deep understanding of teaching complexity (DeGraff et al., 2015).

Within the context of practice-based curriculum, various assessments offer opportunities for pre-service teachers to improve their practice. These assessments may involve instructional

material design, presentations, lesson plans, portfolios, practice performances (real or simulated context), analysis of enactment, and self-reflection, all associated with teaching enactment (Bien et al., 2018; Cartun et al., 2018). Some of these tasks can be integrated into practice cycles developed during campus coursework. Especially during teaching planning and teacher role simulation or rehearsal, practical skills that pre-service teachers acquire can be developed with direct preparation, supervised practice, and rigorous feedback (Arbaugh et al., 2015; Grossman et al., 2019; Sayeski et al., 2019).

Assessing performance in campus courses and linking it to a teacher's practical abilities provides an excellent opportunity for teacher educators to offer feedback on pre-service teachers' competencies, highlighting effective practices and areas for improvement (Allen and Wright, 2014). Inclusion of feedback on practical performance supports more accurate development of pedagogical skills (Sayeski et al., 2019). In such cases, the feedback must be specific and related to student performance in each assessment task, breaking down the practice into components for targeted feedback (Bien et al., 2018; Adalberon, 2021). The feedback provider needs to create an optimal classroom climate and have a deep understanding of the content being taught (Hattie and Timperley, 2007). Additionally, feedback should not only come from the teacher educator. Although, this type of feedback is predominant (Gan et al., 2018), promoting peer assessment and self-reflection on learning is also essential (Leko et al., 2015; Seroussi et al., 2019) as it allows learning from mistakes (Hattie and Timperley, 2007). For example, through performance observation in simulations or real enactments (in person or by video) (Anthony et al., 2015; DeMink-Carthew et al., 2017; Mitchell and Reid, 2017). These processes help the pre-service teachers deconstruct practice and reflect upon teaching strategies and scholar learning (Vartuli et al., 2016). However, there is a gap in pre-service teacher involvement in the assessment processes as they and teacher educators typically assume that do not need to be involved in the feedback process (Gallardo-Fuentes et al., 2017).

Furthermore, in a profession dedicated to teaching, the experience of receiving reliable, and appreciative feedback not only facilitates learning but also enhances engagement (Rodger et al., 2011). The emotional environment experienced by pre-service teachers when given feedback impacts the learning process (Matsumoto-Royo et al., 2021b). The value of peer feedback in teacher education lies in its ability to improved pre-service teacher performance and promote the understanding that the teaching profession is collaborative, not solitary (Matsumoto-Royo et al., 2021b).

## 2.3. Feedback and lifelong learning dispositions

In educational context other than teacher education, such as school education, sport academies, or medical schools, feedback has been associated with promoting curiosity, motivation, perseverance or self-regulation of learning.

Feedback that encourages curiosity should take into account that this tendency increases when individuals believe they are on the brink of understanding something (Metcalfe et al., 2022). Providing feedback with communication that fosters exploration and includes positive and negative aspects of performance enhances the likelihood of feedback acceptance and review by the recipient (Harrison and Dossinger, 2017).

Regarding motivation, several studies indicate a strong correlation with the feedback given to students. Teacher feedback can significantly impact scholar's motivation (Gan and Liu, 2021), and peer feedback also has a positive effect on motivation (Cui et al., 2021). The content of feedback, especially when focused on future professional development, can influence motivational processes based on how it is delivered (Gan et al., 2018). Positive feedback may increase the likelihood that students will persist with an activity, show greater interest, and return to it (Deci and Ryan, 2013). Teacher scaffolding and praise are associated with student motivation, regardless of gender (Guo and Wei, 2019). The effect of negative feedback is less demotivating when the task is enjoyable, as students remain potentially interested in the task (Fong et al., 2019). Furthermore, feedback that includes instructional details on how to improve, uses criteria-based standards, and is delivered in person can mitigate the impact or negative feedback (Agricola et al., 2020). The motivational effect of positive or negative feedback also depends on students´ engagement in the task; less engaged students are more likely to learn from negative feedback as they need to be pushed, although this effect may be short-lived. On the other hand, more engaged students, when given negative feedback, may feel more dissatisfied with their performance and set higher goals (Hattie and Timperley, 2007). Studies on feedback channels in higher education show no differences in motivational effect between oral or written (Agricola et al., 2020).

In promoting perseverance, feedback oriented toward the process (rather than the person) when facing complex tasks fosters the development of this disposition (De Meester et al., 2022). According to the study by Hattie and Timperley (2007), feedback appears to have the most impact when goals are specific and challenging while task complexity is low. Feedback allows students to set increasingly challenging goals as the achieve previous ones, thus creating conditions for ongoing learning. Additionally, feedback that promotes goal-directed action contributes to persistence in task performance and encourages resumption of interrupted tasks even in the presence of more attractive alternatives (Bargh et al., 2001). In studies on learning a sport, feedback with autonomy-supporting and informative comments (rather than controlling and evaluative) strengthen perseverance (De Muynck et al., 2017).

Feedback that promotes self-regulation of learning provides valuable information for students to improve their learning based on assessment results (Pastore et al., 2019; Richmond et al., 2019). Such feedback is powerful when it leads to increased engagement, enhanced self-efficacy, and the perception that the feedback is deserved and earned (Hattie and Timperley, 2007). Peer assessment and feedback can contribute to students' ability to learn independently and take responsibility for their learning (Malan and Stegmann, 2018). However, peer feedback becomes useful when students can understand and respond to it in a meaningful and purposeful way. Teachers should include explicit instruction on how to provide timely, relevant, and task-specific peer feedback (Hattie et al., 2011).

Consideration of student participation norms, classroom climate, and the learning environment is crucial when implementing peer

feedback (Gan and Hill, 2014). Additionally, feedback with highly metacognitive content enhances students' self-regulation (Lee, 2018). Self-regulatory feedback should focus largely on the use of learner goals. Objectives derived from success criteria direct learner's attention toward meeting or exceeding the learning intention, promoting effective self-regulation (Brooks et al., 2019). Lastly, continuous feedback helps reorient students to establish learning connections and supports self-regulation of learning (Mezek et al., 2022).

# 3. Methodology

## 3.1. Study design

The study used a mixed research method (Creswell and Clark, 2017), in which both quantitative and qualitative data were collected and integrated. The researchers drew interpretations based on the combined strengths of both data sets to gain a comprehensive understanding of the research problem and search for meanings. The design adopted a sequential explanatory approach in two phases (Onwuegbuzie and Leech, 2006).

## 3.2. Study context

This study was conducted in teacher education programs offered by the Universidad del Desarrollo in Chile. Chile underwent several educational reforms in the last decade, including the 2016 "Teaching career" law that established the Professional Teacher Development System. The law aimed to promote and ensure the quality of initial teacher education. It mandates that only universities can teach such programs with accreditation from the National Accreditation Commission. Early and progressive internships were also required (Ruffinelli, 2016). Chile has 509 teacher education programs in public or private universities, with 59% focused on secondary education, 18% for elementary education, 12% for early childhood, and 11% for special education (CNA, 2018). Most pre-service teachers are women (CNED, 2021).

Universidad del Desarrollo is a private institution, that implemented practice-based curricula across all its teacher education programs in 2016 (UDD, 2016). These programs provide explicit opportunities for learning pedagogical practice, not only as a set of courses of a formative line but also as a complete curriculum oriented and designed to prepare teachers in pedagogical practices. After a few years of implementation, evaluations were conducted to assess the progress and potential contributions of the practice-based approach, and this study was one of those conducted under this premise.

## 3.3. Participants and assessment tasks

The quantitative phase of the study used a single-stage census, including all 231 pre-service teaches enrolled in the teacher education programs at Universidad del Desarrollo (Table 1). In the qualitative phase, 14 assessment tasks, designed and administered by teacher educators, were randomly selected from previous data on the frequency of assessment tasks that represented opportunities for learning pedagogical practices (Matsumoto-Royo and Ramírez-Montoya, 2020), (Table 2). Additionally, eight participants from the quantitative phase were randomly selected for semi-structured interviews (Table 1).

TABLE 1 Socio-demographic characteristics of the participants.

| | | Quantitative | Qualitative |
|---|---|---|---|
| | | *n* = 231 | *n* = 8 |
| Program | Early childhood | 114 | 3 |
| | Elementary | 91 | 2 |
| | Secondary | 26 | 3 |
| Gender | Women | 223 | 7 |
| | Men | 7 | 1 |
| | Prefer not to answer | 1 | – |
| Semesters in program | 2 | 43 | 2 |
| | 4 | 41 | 2 |
| | 6 | 55 | 2 |
| | 8 or more | 92 | 2 |

The pre-service teachers involved in the study had no personal, academic or professional relationship with the authors of this study. None of the assessment tasks analyzed were designed or administered by the researchers.

## 3.4. Instruments

Quantitative data were collected using the *Metacognition and Lifelong Learning in the Teaching and Assessment of Future Teachers* (MLTA) questionnaire, previously validated, and shown to have high reliability (Cronbach's alpha = 0.93) (Matsumoto-Royo et al., 2021a). Semi-structured interviews were conducted using an interview guideline to gather information on feedback related to assessment tasks and lifelong learning dispositions.

## 3.5. Procedure and data analysis

The questionnaire was administered online through the Qualtrics application. Semi-structured interviews were conducted using the Zoom video platform, and audio recordings were transcribed and entered into ATLAS.ti9 software.

Quantitative and qualitative data were analyzed separately. Quantitative analysis included statistical measures (frequencies and percentages). For qualitative data analysis, content analysis and constant comparison were employed. Written and oral feedback from assessment tasks were transcribed, segmented into numbered lines, and categorized. Pre-service teachers' performance and scores on assessment tasks were not considered. In semi-structured interviews, segments related to lifelong learning dispositions and feedback on assessment tasks were identified and categorized. Qualitative analysis used previous categories derived

TABLE 2 Type of assessment tasks.

| Program | Type assessment tasks | | | | Total |
|---|---|---|---|---|---|
| | Lesson plan | Simulation | Exposition | Other | |
| Early childhood | 0 | 2 | 1 | 2 | 5 |
| Elementary | 1 | 1 | 0 | 3 | 5 |
| Secondary | 2 | 1 | 0 | 1 | 4 |
| Total | 3 | 4 | 1 | 6 | 14 |

TABLE 3 Decomposition of lifelong learning dispositions.

| | |
|---|---|
| Curiosity | Formulate questions to go beyond what has been taught |
| | Enjoy one's own discoveries |
| Motivation | Seek new or better alternatives to solve current challenge |
| | Recognize what one does not yet know or cannot do |
| Perseverance | Complete the task |
| | Attempt to do things that may not seem simple |
| Self-regulation of learning | Pause and review one's own thoughts |
| | Act based on feedback |

from the definitions of lifelong learning dispositions found in the literature (Corbin and Strauss, 2008) (Table 3) and emerging categories. Inter-rater reliability was established by two researchers who independently categorized the lines based on pre-harmonized criteria. Data were recorded in a double-entry table, and discrepancies were resolved through consensus building. Data triangulation is performed in the discussion, sequentially referencing quantitative findings explained by qualitative findings (sequential explanatory design), adding depth (Creswell and Creswell, 2017).

# 4. Results

## 4.1. Does practice-based curriculum provide opportunities for pre-service teachers to develop lifelong learning dispositions?

As seen in Figure 1, over 80% of the pre-service teachers recognized that during campus coursework they have frequent or very frequent opportunities to be curious, to feel motivated, to persevere and to self-regulate their learning.

## 4.2. Does feedback on assessment tasks performed during campus coursework within a practice-based curriculum promote lifelong learning dispositions in pre-service teachers?

The analysis of feedback on assessment tasks revealed messages that foster lifelong learning dispositions. For instance, invitations to pause and review their own thoughts, to act based on feedback and/or to seek new or better alternatives to solve the current challenge.

> "Based on the situation presented, what is the specific error? What do you mean by 'there are 20 numbers´?" (assessment task EBM116)
>
> ➔ self-regulation of learning
>
> "I believe the path to generalization should be planned more carefully. For instance, designing key questions for students to notice general regularities and express them would be very helpful." (assessment task PFE173)
>
> ➔ motivation and self-regulation of learning

Pre-service teachers interviewed stated that feedback during and after assessment tasks enables them to cultivate lifelong learning dispositions. In some cases, it is limited to a single disposition, i.e., pausing to review one's own thoughts and acting based on feedback.

> "*…after the simulation, I make corrections based on the feedback, I change the lesson plan, I improve it.*" (pre-service teacher 1)
>
> ➔ self-regulation of learning

But, in most of the instances, the received feedback simultaneously endorse two or more lifelong learning dispositions. For example, identifying what one does not yet know or cannot do, and act based on feedback.

> "The simulations we have done on campus have been very enriching for my preparation because they offer the freedom to make mistakes. The observing teacher will correct them and tell you how you could improve." (pre-service teacher 3)
>
> ➔ motivation and self-regulation of learning
>
> "…with the guideline and the feedback together, you realize much more and learn much more. Next time I do the work, I correct those mistakes. Likely, I will not make them again." (pre-service teacher 4)
>
> ➔ motivation and self-regulation of learning

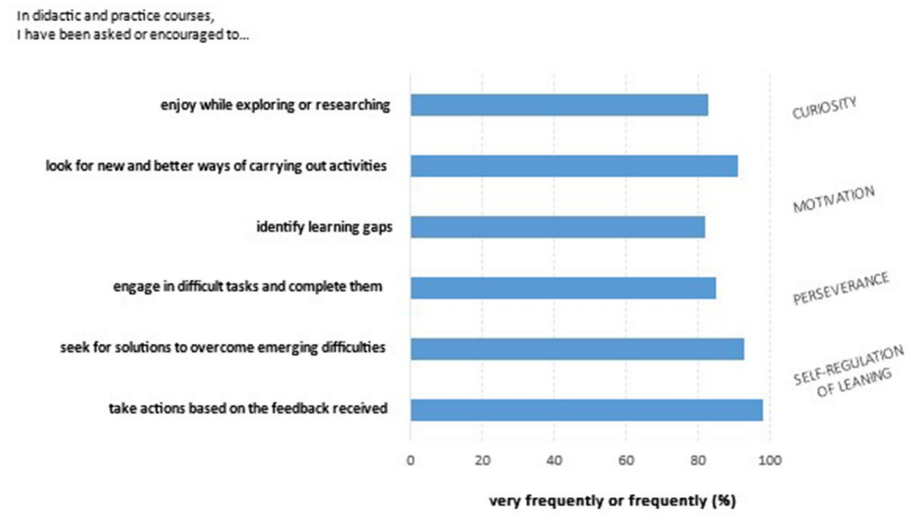


FIGURE 1
Opportunities to develop lifelong learning dispositions.

Additionally, pre-service teachers described feedback on assessment tasks that encompass nearly all lifelong learning dispositions, i.e., formulate questions to go beyond what has been taught, seek new or better alternatives to solve current challenge, attempt to do things that may not seem simple and pause and review one's own thought.

> "I tell myself: OK, considering what my classmates told me, what did I do well? I did this right. I'm going to keep it. Also, they told me what to improve… I' m going to include this. I' m not going to keep it as I was doing. I' m going to improve it using this." (pre-service teacher 5)
>
> ➔ curiosity, motivation and self-regulation of learning
>
> "For the assessment task, the didactic teacher said that if we wanted, we could use an innovative format such as a video or any other format of our choice. I chose to make a podcast where I spoke for 5 minutes on the selected subject. She told me to consider using it in my future lessons because it was very good." (pre-service teacher 2)
>
> ➔ curiosity, motivation and perseverance
>
> "…it was not an easy job. We often got a little angry because we had to make changes after the feedback. Once the moment of frustration passed, we said: Now let us think. What can we do? How do we continue? So, we really worry about that, and we spend a whole day working on the project and looking for new ideas." (pre-service teacher 4)
>
> ➔ curiosity, motivation, perseverance and self-regulation of learning

## 4.3. How should feedback on assessment tasks performed during campus coursework within a practice-based curriculum be delivered to promote lifelong learning dispositions in pre-service teachers?

The analysis of emerging categories has contributed to the identification of three key characteristics related to the delivery of feedback to promote lifelong learning dispositions. First, feedback should be tied to authentic assessment tasks, particularly simulating in-service duties.

> "You could take advantage on the fact that children engage with the characters and ask them more about the emotions they show…" (assessment task PVL224)
>
> ➔ motivation and self-regulation of learning
>
> "I want to emphasize that you tried several ´talk moves´. You did not stick to the typical ones. You made us add information, you asked us for examples and counterexamples. You were able to extend the conversation twice." (assessment task EBL312)
>
> ➔ motivation and perseverance
>
> "The first time I did the simulation, I was very nervous, I was shaking as I displayed the posters, I was not sure if my pronunciation would be correct. My teacher educator told me, "Calm down, relax. We all go through the same thing. Now think about what you want to say." Then I relaxed, and I was able to perform much better." (pre-service teacher 1)
>
> ➔ self-regulation of learning and perseverance

Second, to foster lifelong learning dispositions, feedback should be provided not only by teacher educators but also by peers.

> "… I believe that simulations are the most helpful in training us as teachers, you are in the setting with your classmates, who also support you. The best thing is that they give you both positive and negative feedback. You learn the most because you think: I have to improve this, I have to change this, this is good, I could do this better." (pre-service teacher 1)
>
> ➔ motivation and self-regulation of learning
>
> "You always learn from what your peers tell you. For instance, I always get nervous but when your classmate tells you what is no good, you take it as something positive, not as a criticism. It helps you realize that you could include those aspects next time." (pre-service teacher 7)
>
> ➔ motivation and self-regulation of learning
>
> "The reactions of your peers acting like children, disregarding the ideas that I present to them or not understanding what I explain, make you think. It's a process that happens in your mind, and very quickly, very quickly, you pick up that information. Nobody is telling you, but something happens within you during the simulation, and you start correcting yourself." (pre-service teacher 1)
>
> ➔ motivation and self-regulation of learning

Third, written or oral feedback on assessment task become an opportunity to promote lifelong learning dispositions when it incorporates both positive and negative comments, along with practical advice.

> "There were some language mistakes in your ppt, for example, ´fell sleep´, ´to played´, or ´to took´. It is a good idea to download a language corrector such as Grammarly to check your material before publishing it. I personally use it, and it is great." (assessment task PFE176)
>
> ➔ motivation and self-regulation of learning
>
> "I think the song doesn't help much because it's too monotonous. Perhaps you could look for a more dynamic one that encourages child to dance, move, and, as a result, smile more." (assessment task PVP215)
>
> ➔ motivation and self-regulation of learning
>
> "…what I love is that they always highlight the positives when they give you feedback, and also point out what you could improve." (pre-service teacher 2)
>
> ➔ motivation
>
> "They corrected me saying that I had to mime, change my voice and be more histrionic, otherwise I would not arouse the children's desire to learn. So, I had to make it more entertaining." (pre-service teacher 7)
>
> ➔ motivation and self-regulation of learning
>
> "…one has many ideas, and the feedback guides us to where we have to go because the teachers do not give us the answer, but rather they tell us where to improve or what to focus on." (pre-service teacher 8)
>
> ➔ motivation and self-regulation of learning

## 5. Discussion

Practice-based curriculum provide substantial opportunities for pre-service teachers to cultivate lifelong learning dispositions. Quantitative findings shown in Figure 1 revealed that pre-service teachers recognize frequent opportunities, facilitated by teacher educators in didactic and practice courses, to development curiosity, motivation, perseverance and self-regulation of learning. The significance of addressing lifelong learning dispositions within the curriculum has been emphasized in previous research (Fonseca-Chacana, 2019). The development of these dispositions is embedded within the framework of practice-based curricula (Murdoch-Eaton and Whittle, 2012). An interesting outcome of the present study is the near-unanimous recognition by pre-service teachers that they have been actively prompted by teacher educators to take actions based on the received feedback. Underscoring the role of practice-based teacher education curriculum in cultivating core teaching practices but also in facilitating the progression toward mastery (Windschitl et al., 2012; Forzani, 2014; Grossman, 2018; Grossman et al., 2018). Thus, the incorporation of feedback into learning cycles of practice contributes to the attaining of practices (Bottoms et al., 2015; Ghousseini et al., 2015; Kazemi et al., 2016) and aids pre-service teachers to understand the complexity of teaching (DeGraff et al., 2015). This research further underscores the comprehensive approach adopted by practice-based curricula in preparing pre-service teachers to not only grasp the fundamentals of teaching but also to internalize the spirit of lifelong learning during their educational journey.

Feedback on assessment tasks performed during campus coursework within a practice-based curriculum promotes lifelong learning dispositions in pre-service teachers. The analysis of the feedback messages provided during and after assessment tasks revealed that teacher educators foster those dispositions. Likewise, pre-service teachers interviewed stated that feedback on assessment tasks enable them to cultivate curiosity, motivation, perseverance and self-regulation of learning, either one at a time or simultaneously. This agrees with previous reports where the interplay between feedback and lifelong learning dispositions has been demonstrated in context different than teacher education (Pastore et al., 2019; Gan and Liu, 2021; De Meester et al., 2022; Metcalfe et al., 2022). The fact that single feedback might promote simultaneously curiosity, motivation, perseverance and/or self-regulation prompts a reflection on the holistic nature of lifelong learning dispositions. They form an interconnected and dynamic tapestry, wherein each disposition can interact synergistically, either concurrently or sequentially (Sadler, 2002). Thus, a comprehensive approach that acknowledges and

nurtures the interconnectedness of dispositions could be pivotal in fostering a true culture of lifelong learning.

To promote lifelong learning dispositions in pre-service teachers, feedback on assessment tasks performed during campus coursework within a practice-based curriculum must be tied to authentic tasks. Pre-service teachers interviewed referred that the performance of practical tasks are opportunities to fail and the received feedback guides them in making necessary adjustments and improvements. This process fosters motivation, perseverance, and self-regulation of learning. Previous research suggests that practical tasks offer chances for teacher educators to provide feedback on pre-service teachers' practical competencies, resulting in greater learning (Allen and Wright, 2014; Sayeski et al., 2019). In higher education, it has been shown that simulations and its feedback have a motivational impact (Agricola et al., 2020). Gan et al. (2018) indicated that feedback geared toward professional tasks triggers positive motivational processes. On another hand, Bargh et al. (2001) highlighted the role of feedback in promoting goal-directed actions and task persistence. Therefore, feedback concerning future professional performance, such as simulating the roles of teachers, enables pre-service teachers to put in action and foresee the lifelong learning dispositions.

To foster lifelong learning dispositions in pre-service teachers, the provision of feedback on assessment tasks undertaken during campus coursework within a practice-based curriculum should encompass input not only from teacher educators but also from peers. The value attributed to peer feedback by pre-service teachers is noteworthy. Also, they recognized that peer feedback enhanced their motivation and self-regulation of learning. The practice learning cycle give multiple opportunities for peer feedback (Matsumoto-Royo and Ramírez-Montoya, 2021). To facilitate this exchange, teacher educators should create a supportive environment and provide explicit guidance for the effective integration of peer feedback (Gan and Hill, 2014). As emphasized by Hattie et al. (2011), this involves instructors offering precise directives on delivering feedback that is timely, contextually relevant, and tailored to the specific task at hand. When peer feedback includes achieved aspects and areas for improvement, it enhances self-regulation of learning (Allen and Wright, 2014; Wisniewski et al., 2020). Other studies underscore the substantial positive impact of peer feedback on student motivation (Cui et al., 2021). The facilitation of peer feedback will be an effective strategy to foster lifelong learning dispositions.

To promote lifelong learning dispositions in pre-service teachers, feedback on assessment tasks performed during campus coursework within a practice-based curriculum should incorporate both positive and negative comments, along with practical advice. Messages provided by teacher educators included suggestions for future undertakings. These suggestions were precise, supplemented with examples or innovative ideas, and were communicated as invitations (e.g., "Perhaps you could…," "It is a good idea") rather than mandates. Pre-service teachers interviewed not only value positive feedback but also discern the worth of both affirmative and constructive comments, comprehending their import. Previous research has demonstrated that individuals tend to be more receptive to feedback when it encompasses a balanced combination of positive and negative messages, increasing the likelihood of embracing novel ideas and input (Harrison and Dossinger, 2017). The findings by Guo and Wei (2019) align with this perspective, indicating a correlation between congratulations and increased motivation. It is pertinent to acknowledge that feedback pertaining to areas of improvement can serve as motivation when perceived by pre-service teachers as a valuable contribution to their learning. Customizing feedback to cater to individual students is widely acknowledged as an effective practice (Grainger, 2015), and our study underscores the significance of pre-service teachers feeling well-supported by feedback to bolster their motivation. Drawing on the groundwork laid by Harrison and Dossinger (2017), effective communication strategies employed by teacher educators can foster a spirit of exploration through a combination of constructive and positive performance messages. This approach augments the probability of feedback being embraced and thoughtfully considered by its recipients. In the pursuit of cultivating lifelong learning dispositions, encompassing motivation and self-regulation of learning, it is imperative to factor in the "tone" within which feedback is delivered. These traits flourish in an atmosphere devoid of threats, one that upholds respect for students. Such an environment not only nurtures growth but also reinforces the commitment with lifelong learning.

The role of feedback extends beyond its immediate impact, encompassing the preparation of teaching skills and the acquisition of classroom data collection techniques through insights from future students (Snead and Freiberg, 2019). Consequently, as teacher educators integrate and deepen the principles of feedback for lifelong learning within teacher education programs, pre-service teachers not only glean insights from the feedback they receive but also undergo a transformation into educators committed to lifelong learning. This transformation equips them not only to draw lessons from feedback but also to proficiently deliver feedback to their future students. The reciprocal relationship between effective feedback and the cultivation of lifelong learning dispositions thus becomes a cornerstone of the teacher education process. By nurturing this synergy, we empower pre-service teachers to become facilitators of continuous learning in their classrooms, thereby perpetuating a cycle of growth and development for generations to come.

## 6. Limitations

The study's composition of pre-service teachers was primarily composed of women, reflecting a prevalent trend in the country where the research was conducted. However, it is important to acknowledge that this composition might not accurately mirror the demographic diversity present in teacher education programs across other countries. Furthermore, the selection of assessment tasks, while randomly chosen and centered on common practice-promoting formats, may not fully encapsulate the range of prevalent tasks within different programs. Another limitation pertains to the MLTA instrument, which addresses dimensions of lifelong learning specifically within the context of teaching and assessment activities. This specialization might constrain the instrument's applicability to other contexts where the emphasis on teaching and evaluation differs. Moreover, it's important to note that the qualitative insights delving into the relationship between feedback and lifelong learning dispositions were derived from a relatively smaller pool of interviews and assessment tasks. While these qualitative findings provide valuable depth, the sample size might influence the generalizability of the conclusions drawn. Lastly, the data collection methods, including questionnaire administration and interviews, were conducted through digital platforms. Additionally, the recording of "unwritten" assessment tasks

on the Zoom platform might inadvertently omit certain nuances and interactions that are not readily apparent in this digital format.

In sum, these limitations provide contextual boundaries to the study's findings and highlight the necessity for future research to explore these facets across broader demographics, diverse assessment task formats, and varied instructional contexts, employing a range of data collection methods to ensure a comprehensive understanding of the interplay between feedback and lifelong learning dispositions.

## 7. Conclusion

This research was undertaken to address the following key questions: (i) Does practice-based curriculum provide opportunities for pre-service teachers to develop lifelong learning dispositions?, (ii) Does feedback on assessment tasks performed during campus coursework within a practice-based curriculum promote lifelong learning dispositions in pre-service teachers?, (iii) How should feedback on assessment tasks performed during campus coursework within a practice-based curriculum be delivered to promote lifelong learning dispositions in pre-service teachers? To address these inquiries, a mixed-methods approach was employed, incorporating quantitative data on pre-service teachers' perceptions of opportunities for fostering lifelong learning dispositions during campus coursework. This quantitative analysis was subsequently enriched through qualitative exploration, involving an examination of feedback provided on assessment tasks and in-depth interviews with pre-service teachers.

The joint analysis of the quantitative and qualitative data unveiled interesting found. Firstly, it established that practice-based curricula indeed offer avenues for pre-service teachers to nurture lifelong learning dispositions. Secondly, it underscored the role of feedback on assessment tasks during campus coursework in promoting one or more lifelong learning dispositions among pre-service teachers. Additionally, the analysis elucidated the qualities and conditions associated with effective feedback that facilitate the cultivation of these dispositions. Notably, feedback that is linked to authentic tasks, furnished by both teacher educators and peers, and incorporates a blend of positive and negative comments alongside practical guidance emerges as a key contributor.

This research significantly enriches the scholarly discourse by furnishing detailed empirical evidence on the potential of lifelong learning dispositions within the context of practice-based teacher education. It deepens our comprehension of the feedback mechanisms that operate for pre-service teachers within assessment tasks during campus coursework, along with identifying the specific qualities and conditions of such feedback that foster lifelong learning dispositions.

Moreover, the findings of this research hold practical implications. They advance the progress of teacher educators by offering guidance on optimizing their learning assessment processes. Adhering to the guidelines concerning feedback and its application in teacher education programs can effectively contribute to the development of educators who are adept at nurturing and supporting lifelong learning through feedback within their future students.

As we peer into the future, it is imperative for forthcoming research endeavors to delve deeper into the continuous evolution of lifelong learning dispositions among pre-service teachers. This exploration should encompass a comprehensive examination of how these dispositions are intricately intertwined with the nature and quality of feedback they receive. The interplay between the feedback's content, delivery, and the conditions under which it is provided merits thorough investigation.

Furthermore, a holistic understanding of this dynamic process necessitates the inclusion of diverse perspectives from various stakeholders who contribute to the formative development of teachers. This deeper comprehension can potentially guide the refinement of educational programs, instructional strategies, and feedback frameworks, fostering an educational ecosystem that is optimally conducive to the sustained growth of these critical dispositions.

Ultimately, as the educational landscape continues to evolve, this comprehensive exploration promises to illuminate pathways for both practitioners and policymakers to foster a generation of educators who embody and transmit the spirit of lifelong learning, thereby enriching the future of education and its impact on learners around the globe.

## Data availability statement

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

## Ethics statement

The studies involving humans were approved by Comité de ética Universidad del Desarrollo. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

## Author contributions

KM-R, MR-M, and PC contributed to conception and design of the study, and wrote sections of the manuscript. KM-R organized the database. KM-R and PC performed the statistical analysis and wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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## Conflict of interest

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note



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