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Opportunities to Develop Lifelong Learning Tendencies in Practice-Based Teacher Education: Getting Ready for Education 4.0

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

[1] Facultad de Educación, Universidad del Desarrollo, Santiago 7780272, Chile; pconget@udd.cl
[2] School of Humanities and Education, Institute for the Future of Education, Tecnologico de Monterrey, Monterrey 64700, Mexico; solramirez@tec.mx
[3] Facultad de Medicina Clínica Alemana, Universidad del Desarrollo, Santiago 7780272, Chile
* Correspondence: kiomimatsumoto@udd.cl; Tel.: +56-9-9845-4919

Abstract: Education 4.0 prepares new generations to develop the skills required to perform in a technological, dynamic, and unpredictable world. The main barrier to implementing Education 4.0 in schools is that teachers have not been trained for it. Given the advances and new resources of the technological field, teacher preparation will be insufficient if it focuses on technological skills but does not incorporate the necessary dispositions for lifelong learning. Universities have the ethical imperative to update teacher education so teachers can become lifelong learners. The objective of this study was to understand whether practice-based curricula offer opportunities to promote lifelong learning tendencies. We used a sequential explanatory method. Quantitative and qualitative instruments were applied to pre-service teachers (survey: n = 231, semi-structured interviews: n = 8), and causal and descriptive approaches were supported by a structural equation model and constant comparative method, respectively. Data triangulation confirmed and added depth to the relationship found. Practice opportunities provided by teacher educators in learning activities and assessment tasks promote curiosity, motivation, perseverance, and self-learning regulation, when they are (i) systematic; (ii) relevant to the classroom work; (iii) presented with clear instructions and effective rubrics; (iv) accompanied with feedback focused on the task, soliciting reflection, and performed by peers and teacher educators in a trustworthy environment. This research may be of value to universities looking to renew their Education 4.0 programs because it shows that practice-based curricula not only transform pre-service teachers into teaching experts but also into lifelong learners.

Keywords: higher education; teacher education; practice-based; educational innovation; education 4.0

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1. Introduction

Education 4.0 prepares that new generations to develop the skills required to perform in a technological, dynamic, and unpredictable world [1]. It focuses on problem-solving and incorporates emerging technologies and innovative teaching strategies [2]. Educational offerings are flexible under this new paradigm; digitalization is incorporated into educational environments, and teachers become coaches, mentors, or referral sources [3]. Education 4.0 is a revolution against longstanding educational models similar to or more significant than the models employed during the COVID-19 pandemic [4–7]. The main barrier to implementing Education 4.0 is that teachers have not been trained for it. Teachers are the primary impactor student learning achievement [8]. Their impact exceeds variables such as individual student characteristics, school-specific properties, and systemic circumstances. Therefore, to be adequately prepared for Education 4.0, educators should consider training of Teacher 4.0.

Teacher 4.0 must understand and value Education 4.0. They must be sensitive, engaged ethically infused with social intelligence, and capable to integrate the school and its students

into society [9]. Collaboratively, they must master technology and integrate it into their routine classwork, employ active learning strategies, and know and implement educational innovations [10]. Teachers play a role in transmitting information and teaching how to access it. One of the main characteristics of Education 4.0 is implementing a type of learning that emphasizes learning anywhere and anytime. In this sense, teachers must adapt to the changing dynamics and nature of knowledge [1]. It is also expected that Teacher 4.0 has the competencies to cope with job uncertainties and the ever-changing work landscape [11]. Currently, teacher education is not explicitly oriented to the formation of Teacher 4.0. Therefore, universities have the ethical imperative to update their educational models, migrating from emphasizing content almost exclusively to developing relevant skills and attitudes [11]. In addition, they must encourage and equip future teachers to become lifelong learners [12].

Pre-service teachers face several challenges during their formative process and subsequent professional practice. The innumerable challenges that the COVID-19 pandemic has imposed on teaching, especially the rush for new learning technologies and changes in schools' purpose, confront teachers with an ever-changing world. Therefore, the development of dispositions for lifelong learning is required in the profession [13]. Lifelong learning is defined by the European Commission (2001) as any learning activity undertaken throughout life to improve knowledge, abilities, and attitudes within a personal, civic, social, or working perspective. Intentional, continuous learning is recognized as one of the ten most critical skills of the 21st century crucial to coping with an uncertain future [14,15]. Research has shown that those training to be teachers need to experience learning and reflection deeply to understand themselves as lifelong learners and develop the professional competencies required of future teachers [16]. Lifelong learning for teachers means that they are open to learning and know how to learn [17]. Teacher education programs should be reviewed to increase lifelong learning tendencies [18] as they can shape future classroom practices by preparing teachers for new perspectives [19]. Lifelong learning has been systematized to develop openness to continuous improvement and the will to learn [20]. Solmazand and Aydin [21], building on Coşkun and Demirel [22], recognize four lifelong learning tendencies crucial for professional teacher performance: curiosity, motivation, perseverance, and the regulation of self-learning.

Curiosity is the focused interest on inquiring, building on existing knowledge, and enjoying investigation progress [23]. Teachers' pedagogical questions emerge as they gain insights into their practices [24]. Motivation manifests through taking the initiative, mobilizing learning, and continually seeking new or better ways to do things [25]. This process requires humility to accept the unknown and overcome the fear of researching. Perseverance is the pursuit of purpose or a task until it is completed, without giving up or abandoning it despite the obstacles and difficulties presented [26]. For this, the person has an inventory of strategies or alternative solutions to problems. Self-regulation of learning refers to the conscious control of the actions carried out to learn. It is achieved by awareness of one's reasoning, sensitivity to feedback, and assessing the effectiveness of actions undertaken [27].

Studies in which lifelong learning tendencies have been measured in pre-service teachers show that gender is not a significant factor [28]. The disciplinary area of expertise does not seem to be decisive either [29]. Studies have shown a positive and significant correlation between students' scores obtained from computer self-efficacy scales and motivation and perseverance [30]. Whether lifelong learning tendencies observed in pre-service teachers were developed in curricular or extracurricular activities is a question that has still not been resolved. Makarova et al. [31] found few initiatives related to lifelong learning in undergraduate education. Ozen and Ozturk [32] found a significant relationship between the quality of faculty life and lifelong learning tendencies of pre-service teachers, suggesting that teacher education and teacher educators might influence student achievement [33].

Explicit development of lifelong learning tendencies should be incorporated into university education programs to move forward with Education 4.0 [32]. Graduates of

pedagogical programs recognize at the end of their training that their path to teaching is not complete and that being a teacher requires permanent learning and updating one's skills and knowledge, especially technological skills [34]. The teacher educators consider that some teaching and research methodologies provide the necessary experience for lifelong learning [35]. According to Dunlap and Graviner [14], lifelong learning tendencies are promoted in teacher education when the program offers pre-service teachers opportunities to (i) set their own learning objectives and create plans to achieve them (i.e., planning time and resources); (ii) appraise what they know and do not know regarding each subject; (iii) accomplish learning activities that intrinsically motivate them because they have to solve real problems, create solutions, or perform authentic tasks; (iv) play the role of teachers, scholars, or other school members; (v) teach each other and perform peer review; and (vi) carry out self-assessments focused on their learning, thinking and decision-making processes. Interestingly, many of these activities are addressed in practice-based teacher education.

Practice-based teacher education is understood as professional training that attempts to focus novices' learning more directly on the work of teaching rather than on traditional academic or theoretical topics that may have only marginal relevance to the classroom [36]. Practice should be explicitly and systematically taught in campus coursework, mainly didactic and practice courses [37,38]. For this, teacher education programs have implemented courses on teaching practices [39]. Less than a decade ago, various teacher education programs focused on teaching through core practices [40,41]. These teaching practices have received different names. Davin and Heineke [42] referred to them as "basic pedagogical practices", Grossman and team [43] call them "core practices", and TeachingWorks [44] identified them as "high leverage practices". Regardless of the nomenclature, they consist of putting into action knowledge, beliefs, and dispositions through strategies, routines, and movements that pre-service teachers can learn. Teaching practices, together with practice opportunities, are central in practice-based teacher education.

The university courses are adjusted considering two critical aspects to improve teacher training: reorienting methods courses towards teaching practices and presenting ways to support conceptual understandings about daily classroom teaching. Both are critical aspects to improve teacher training [45]. The curriculum is designed to deliberately focus on core practices that constitute the content of the courses [46]. Tightly connecting theory and practice implies that teacher educators must offer pre-service teachers opportunities to perform professional duties in field placement and especially in campus coursework, learning how to use the practices when teaching [47–50]. In practice-based programs, the practice may be included both in learning activities should be designed considering decomposition and recomposition of teaching practices. Thus, teacher educators must offer pre-service teachers at least the following practice opportunities: analyze models of effective teaching, examine national curricula, examine actual teaching materials, analyze pupils' work, take pupils' perspectives, talk about fieldwork, plan for teaching, and simulate the teacher's role [51–54]. Together, these function as a bridge from campus coursework to fieldwork [55], allowing pre-service teachers to gradually approach the complexity of teaching. Grossman and her colleagues [56] identified three elements that make it possible to understand a pedagogy of practices: decomposition of the practice, representations of the practice, and approximations of practice. When these opportunities are offered systematically and repeatedly, following a sequence that enables the pre-service teachers to master teaching, they are called practice learning cycles. In this respect, McDonald, Kazemi, and Kavanagh [57] described a collective learning cycle to engage in an authentic and ambitious instructional activity with four phases: (i) introducing and learning about the activity, (ii) preparing for and rehearsing the activity, (iii) enacting the activity with students, (iv) analyzing the enactment and moving forward. In these cycles, pre-service teachers set the learning objectives; create plans to achieve them; recognize what they know and do not know regarding the subject or methodology; perform authentic teacher's tasks;

simulate the roles of teachers; give and receive feedback from peers and teachers, reflect on their performance, and perform self-assessments of their learning.

The assessment tasks in practice-based programs correspond to execution type procedures in the pre-service teachers' enactment experiences and reflective processes. These assessments include portfolios, questions during rehearsals, performance observations, and reflective texts written by them [58]. In this, pre-service teachers should address or rehearse what they will perform as professionals [59,60] to envisage the complexity of teaching in school settings [43,61]. The more authentic the context of the assessment tasks, the more likely it is that pre-service teachers will focus on meaningful tasks, connect new knowledge to previous knowledge, integrate knowledge from different courses, and link theory to everyday experiences [62]. Then, assessment tasks with practical components should be straightforward regarding the expected performance. The instructions and assessment criteria should be known in advance [63,64], contributing to pre-service teacher autonomy and correct practices [65,66]. The reception of feedback from peers and teacher educators during task performances is also a practice opportunity because it promotes reflection regarding the practice itself [58]. Thus, in practice-based teacher education, pre-service teachers learn through and from experience, become self-aware, engage in their professional development, and embrace the attitudes of lifelong learners [67].

2. Materials and Methods

2.1. Research Questions

This study aimed to understand, through the pre-service teachers' perception, whether practice-based curricula offer opportunities to promote lifelong learning tendencies to contribute to updating teacher education programs for Education 4.0. Hence, the research questions were:

Do practice opportunities provided by teacher educators in learning activities and assessment tasks performed through campus coursework promote curiosity, motivation, perseverance, and self-learning regulation?

What are the characteristics of practice opportunities provided by teacher educators in learning activities and assessment tasks performed through campus coursework that promote curiosity, motivation, perseverance, and learning regulation?

We applied quantitative and qualitative instruments to pre-service teachers, taking causal and descriptive approaches supported by a structural equation model (SEM) and constant comparative method (CCM), respectively. We used data triangulation to confirm and add depth to the correlation found.

2.2. Contextual Background

This study was performed in teacher education for early childhood, elementary, and secondary students offered by the Universidad del Desarrollo in Chile. During the last decade, a series of educational reforms were generated in Chile in various areas to ensure a quality education; a series of regulations and actions addressed deficiencies. One of the most relevant was the 2016 "teaching career" law that created the Professional Teacher Development System and introduced changes in the initial training and professional development of kindergarten educators and elementary and middle school teachers. The new law aimed to promote and guarantee the quality of initial teacher education, improve the quality of pedagogical programs, establish that only universities may teach pedagogical programs and that all disciplines with teacher training must be accredited by the National Accreditation Commission, requiring, among other things, early and progressive internships [68,69].

Currently, the country has 509 teaching programs in public or private universities. Fifty-nine per cent of these train teachers for secondary education, 18% for elementary education, 12% for early childhood, and 11% for special education [70]. According to the National Education Council [71], the careers that train teachers in Chile had an enrollment that was more than 10% of the total enrollment in Chilean universities. Those who study

these programs are primarily young people who have graduated from secondary education and have had to meet minimum score requirements in a national evaluation to apply. Most pre-service teachers are women, especially in early childhood, elementary and special education programs [72,73].

The teacher education programs offer undergraduate studies leading to a professional degree and a bachelor's degree. The duration of the programs is 4 to 5 years, and the curricula establish disciplinary subjects, pedagogical and methodological content, and field practice experiences. In this regard, one of the recommendations of the OECD [74] for education in Chile is that, in initial teacher training programs, practical training could be better integrated. However, in recent studies, there is little articulation about theory and practice and the absence of teaching essential pedagogical practices. The fragmented theoretical and practical training leaves the development of articulation and reflections on these fields of knowledge to the students [75].

The Universidad del Desarrollo is a private institution. In 2016, it implemented practice-based curricula in all its teacher education programs [76]. The programs provide explicit opportunities to learn the pedagogical practice, not only as a set of courses that comprise a line but also as a complete curriculum oriented and designed to prepare teachers to graduate with professional practice. In all the practice and didactic courses, the methodology incorporates a pedagogy of practices organized in a cycle that considers the decomposition of the practice, the representations of the practice from the analysis of real examples or videos, and approximations of the practice from frequent simulations in small groups in which peers and teacher educators provide feedback. Thus, teacher educators were trained and supervised in practice-based curricula. Before starting a course, they formulated a syllabus defining the expected learning results, learning activities, pedagogical resources, key questions to mobilize learning, assessment strategy, and bibliography. Teacher educators planned learning activities that offer practice opportunities to pre-service teachers. The practice opportunities most often found in syllabi were plans for teaching and rehearsing the teacher role.

Additionally, teacher educators designed the assessment tasks, of which institutional validation was optional. Assessment tasks constituted practice opportunities and corresponded mainly to teaching plans and group simulations that, until 2019, were carried out in person. In 2020 (the year of the study application), practice activities were conducted virtually, synchronously, on the Zoom platform. All these evaluative tasks provided detailed guidelines an evaluation grid, and feedback to the pre-service teachers. On lesson plans, teacher educators wrote the feedback. In simulations, the teacher educators gave oral feedback during and after the rehearsal. The peers also provide oral feedback after the rehearsal.

2.3. Participants

In the first phase of the study (QUAN), a single-stage census was used. It comprised all the pre-service teachers registered in the teacher education programs of Universidad del Desarrollo during the year 2020 (total 231). In the second phase of the study (Qual), eight participants from the first phase were randomly selected, invited to participate, and interviewed. Table 1 shows the participants' socio-demographic characteristics.

Table 1. Socio-demographic characteristics of the participants.

		QUAN **n = 231**	*Qual* **n = 8**
Gender	Woman	223	7
	Man	7	1
	Prefer not to answer	1	-
Age (years)	<20	14	2
	20–22	95	2
	23–25	90	2
	>25	32	2
Program	Early childhood	114	3
	Elementary	91	2
	Secondary	26	3
Years in program	1	43	2
	2	41	2
	3	55	2
	4	67	2
	Five or more	25	-

2.4. Method and Instruments

The study used a mixed research method [77], in which the researcher gathers quantitative and qualitative data and integrates them, then draws interpretations based on the combined strengths of both data sets to understand the research problem and search for meanings [78]. The design was sequential explanatory in two phases [79]. To collect quantitative data, we applied the questionnaire "Metacognition and Lifelong Learning in the Teaching and Assessment of Future Teachers". Its validity and reliability had been previously reported [80]. The survey was conducted online using the Qualtrics application. To collect qualitative data, we conducted 45–50 min-semi-structured interviews using an interview guideline. Because of the pandemic and suspension of face-to-face classes, we had to do semi-structured interviews using the Zoom video platform. Audio recordings of the interviews were transcribed and entered into the ATLAS.ti9 software. Qualitative information was used to deepen the quantitative results [79].

2.5. Data Analysis

Quantitative data were analyzed to determine the correlation of the questionnaire items and their factors: (i) display of responses to the item; (ii) reliability analysis; (iii) analysis of partial correlations between items; (iv) SEM with the variable practice opportunities as a predictor of opportunities to promote curiosity, motivation, perseverance, and regulation of self-learning. SEM allowed estimating the strength of the correlation and the degree to which the model fits the observed data [81]. Additionally, it allowed accounting for measurement error, gaining information on the variability explained by the latent construct and what cannot be explained by it. To fit and adjust the model, we used the total information maximum likelihood estimation to manage missing data [82].

Qualitative data analysis was performed using CCM since it is helpful to identify underlying and subjacent themes in interviews [83]. It was carried out deductively and inductively. The previous categories were derived from the definitions found in the literature regarding practice opportunities and lifelong learning tendencies. Other categories were deduced from empirical data collected throughout the interviews [84]. Therefore, categories were built partly theoretically (from the definition of each of the variables) and partly with empirical data (emerging categories). Using ATLAS.ti9, the texts were fragmented into smaller parts associated with codes. Each new segment was compared with previous codes, so similar segments were associated with the same category [85]. After this, the co-occurrences among codes were explored, and each was revisited, revising the original texts.

Triangulation between quantitative and qualitative data was done to confirm and add depth to the relationship found.

3. Results

3.1. Practice Opportunities Give Rise to Opportunities to Promote Lifelong Learning Tendencies

3.1.1. Visualization and Viewing of Item Responses

Data for the dimensions "practice opportunities" and "opportunities to promote lifelong learning tendencies" are shown in Figures 1 and 2, respectively. The pre-service teachers recognized that they have very frequent or frequent opportunities to practice teaching and to promote lifelong learning tendencies.

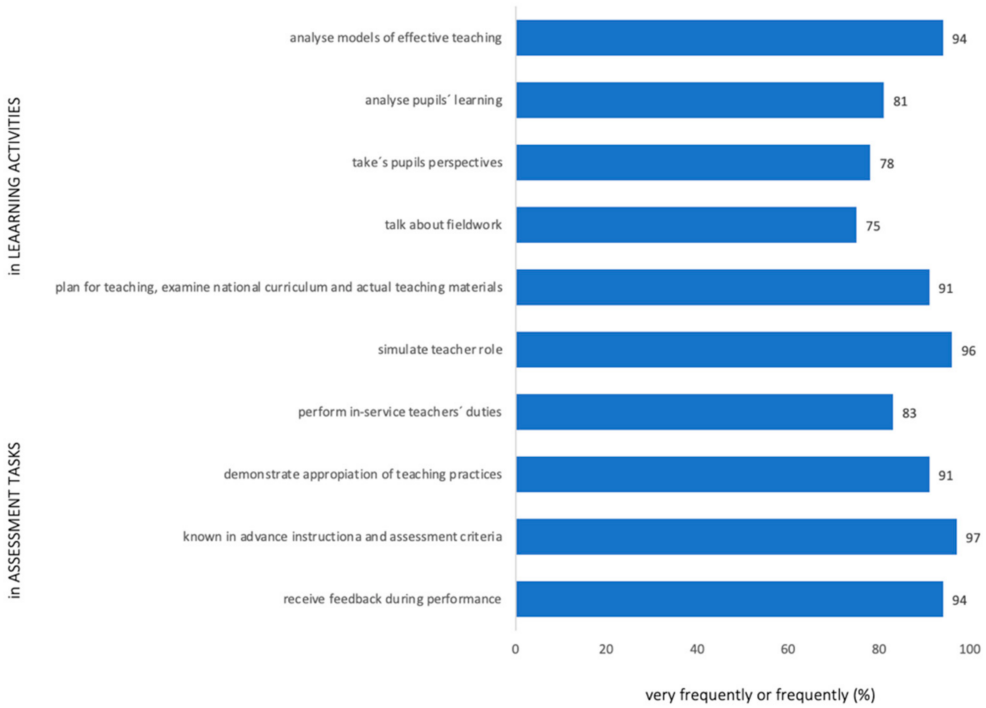

Figure 1. Practices opportunities recognized by pre-service teachers.

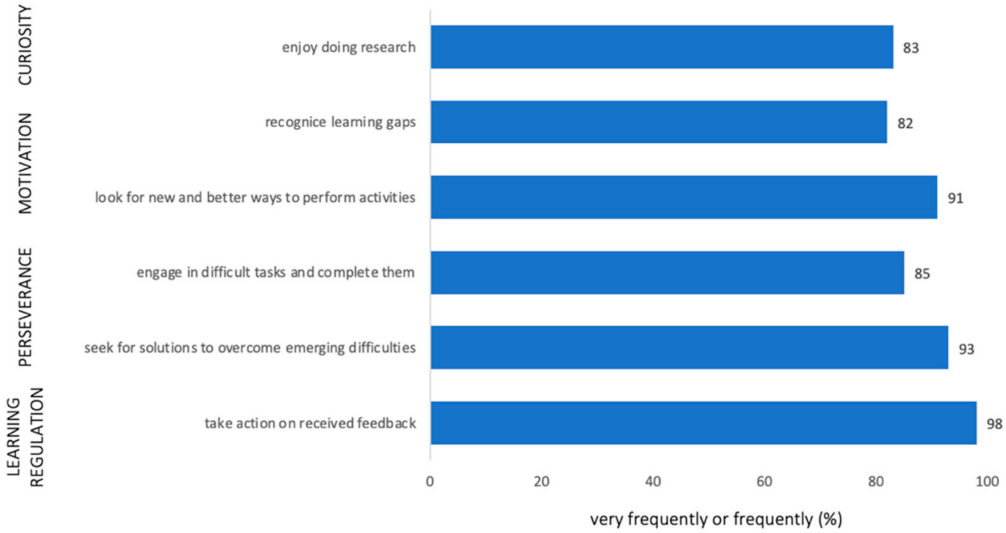

Figure 2. Opportunities to promote lifelong learning tendencies recognized by pre-service teachers.

3.1.2. Reliability and Partial Correlation Analysis

The reliability analysis yielded a total Cronbach's alpha of 0.8. The analysis of partial correlations among the items that make up the dimensions of the questionnaire showed that the items were not individually correlated with each other (see Supplementary Table S2).

3.1.3. Structured Equation Model (SEM)

Table 2 presents the indices obtained for the structural model in which practice opportunities explain the variability of opportunities to promote lifelong learning tendencies. The values obtained indicated that the model fits the empirical data.

Table 2. Model fits indices.

	RMSEA	90% CI RMSEA	CFI	TLI	GFI	SRMR	df	χ^2
Practice opportunities Opportunities to promote lifelong learning tendencies	0.048	0.032 0.063	0.949	0.938	0.995	0.049	99	151.444

As seen in Figure 3, the causal relationship between practice opportunities and opportunities to promote lifelong learning tendencies is indicated by the positive standard effect in explaining this relation, with a β = 0.59 (SE = 0.129, $p < 0.001$).

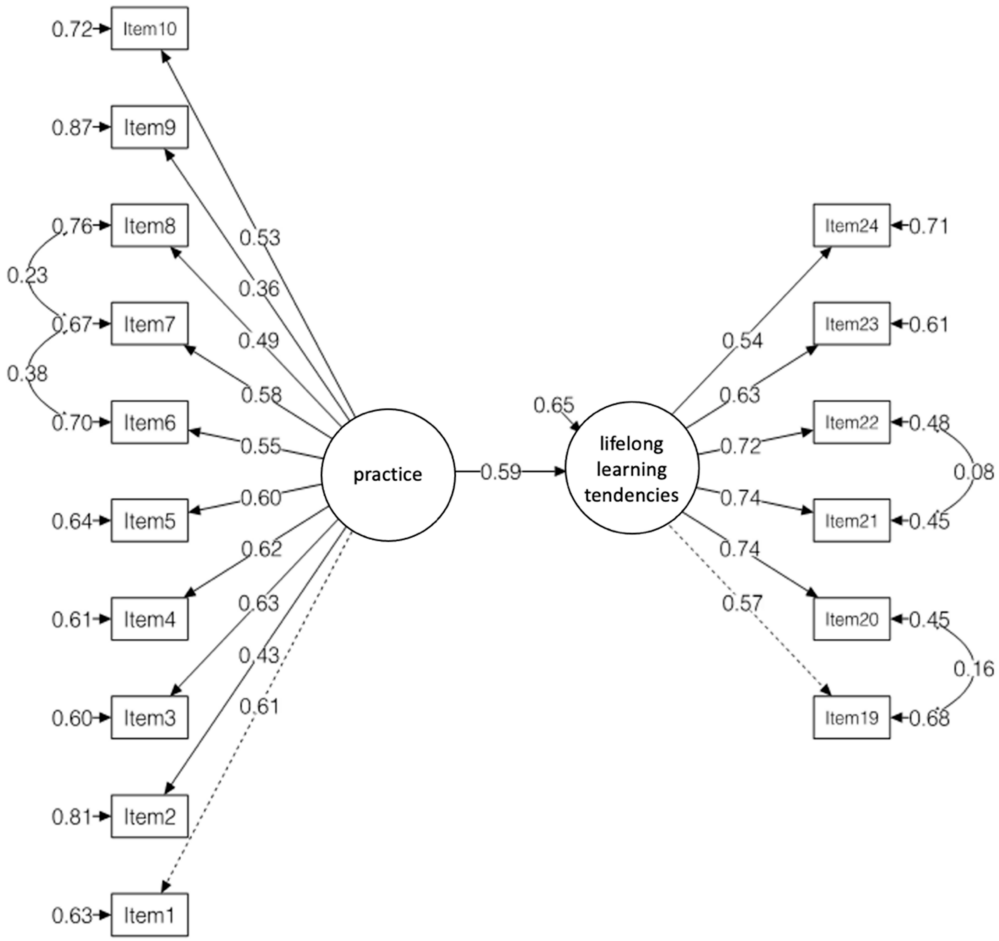

Figure 3. Practice opportunities give rise to opportunities to promote lifelong learning tendencies.

3.1.4. Semi-Structured Interviews

Pre-service teachers recognized plan for teaching, simulation of teacher's role, performance of in-service teachers' duties, and feedback during performance as practice

opportunities most frequently offered by teacher educators. Most of pre-service teachers mentioned them as a whole.

> *" . . . simulations that we have done on campus based on the lesson plans that we carried out have been very enriching for my education. You have the freedom to make mistakes, and the teacher who is observing you corrects them and tells you how you can improve. Also, in a certain way, it exposes us to a real context. Our classmates take the role as children. Sometimes, it happened to me that my teachers also acted as children, which made me feel like I was at school, like doing class. I think that has been the most enriching thing for my education because we practice and internalize ourselves as teachers."* (pre-service teacher 5)

Pre-service teachers identified opportunities to promote lifelong learning tendencies in the learning activities and the assessment tasks performed on campus.

> Curiosity: *"When we are planning our lessons, I look for more information than that given to us."* (pre-service teacher 1)

> Motivation: *"The teacher educator arrives with her photos and says this was my assessment, and that is how it worked, and that is how the children reacted, and this was wrong, and this is what I improved. That makes us feel like we are in the field. That is the way to motivate us."* (pre-service teacher 8)

> Perseverance: *"It was not an easy task. We got angry because, after the feedback, we had to modify what we did. When that moment of frustration passed, it was like, 'Now let us think, what can we do? How do we continue?' We really cared about it, and we spent the whole day working on the project."* (pre-service teacher 4)

> Learning regulation: *"Before starting the task, you read the rubric and try to understand it. If you did not understand something, you wrote it down to ask later or sent an email to ask. At least in my case, I took the rubric and began to look at it: 'Let me see . . . this part, I would have the full score if I had done so and so,' and I start to verify, 'Oh, I'm missing this part."* (pre-service teacher 6)

Pre-service teachers established spontaneous connections between some practice opportunities and some opportunities to promote lifelong learning tendencies. For instance, they mentioned that in the instructions, the teacher educators invited them to be curious, look for new ways of doing things, and go beyond what was known or what they had been taught.

> *"The teacher educator said, 'You don't must create a guide or a PowerPoint presentation.' We became anxious because we didn't know what to do. We talked it over with my partner and decided to design a game in which students roll some dice, run and answer questions. We came up with five different games. Since then, I always propose various things in the lessons that I plan."* (pre-service teacher 8)

> *"For a task, the didactic teacher said that if we wanted, we could use an innovative format, i.e., a video or whatever we wanted. I made a podcast. I spoke for 5 min on the selected subject. She told me to use it in my future lessons because it was very good."* (pre-service teacher 2)

Another relationship that pre-service teachers mentioned was that performing in-services duties generates motivation to learn and enthusiasm for the profession.

> *"In Geometry, the teacher educator gave us a two-part assessment: one was a quiz related to class contents, and the other was to plan a lesson or to develop an activity. She gave us the learning objective, and we had to create an activity, a game. This second part brought me closer to my teacher's role. I thought, 'How do I work this content? How do I make it entertaining for children? How do I get the children's attention?"* (pre-service teacher 1)

A third relationship mentioned by pre-service teachers was that demonstrating teaching practices was a challenge that sometimes frustrated and even paralyzed them. Nevertheless, they persevered, searching several sources, taking ideas from different actors, or using unique tools.

> *"We can manage the content, but putting it into practice is difficult. It takes a lot of creativity and imagination to bring it to the children. We searched for ideas on the internet and in the bibliography. The teacher educators always gave us practical examples. I also believe that something key is the contribution of the group. Classmates provide things that you do not have. Thus, we get a better result."* (pre-service teacher 4)

Pre-service teachers recognized that simulations and the feedback performed by peers and teacher educators during or at the end enhanced their learning regulation.

> *"Simulations are crucial for our development as teachers. Nobody interrupts you. You are in the context. Everybody supports you. The best is that, in the end, they give you both positive and negative feedback. I think that's where you learn the most: 'I have to improve this; I have to change this. This is fine. I could do this better."* (pre-service teacher 1)

3.2. Characteristics of Practice Opportunities That Become Opportunities to Promote Lifelong Learning Tendencies

Semi-Structured Interviews

Pre-service teachers identified practice opportunities systematically throughout their programs. Additionally, when faced with classroom work, they increased their commitment to continuous learning.

> *"We always simulate, plan lessons, participate in workshops . . . always, perhaps less in the first year. It is key to learn the contents and then put them into practice."* (pre-service teacher 1)

> *"The teacher educator told us that we had to think that we were going to teach the content. She said that we had to learn it well because we would need it tomorrow. The same thing happened for story reading with another teacher educator. Also, with the Sciences teacher educator, and with Math teacher educator and English teacher educator."* (pre-service teacher 1)

> *"Most of the teacher educators tell us to read the feedback. In our program, feedback is very internalized. They give us feedback in every activity: in interventions, simulations, and assessment tasks, and we have to give feedback to children."* (pre-service teacher 7)

Pre-service teachers stated that clear instructions and effective rubrics associated with practice opportunities were relevant to their education because they allowed them to autonomously anticipate and adjust their learning and practical performances.

> *"It's like our map, like our guide. Every time we must do a task, we look at the rubric, guideline, or something that tells us the expected performance. I paste the relevant part of the rubric; that way, I guide myself because you deviate from the subject when you write. We keep it in mind all the time."* (pre-service teacher 8)

Pre-service teachers highly valued the feedback received in the learning activities and assessment tasks that included practice opportunities focusing on performance, mobilizing them and eliciting reflection.

> *"My classmates told me, 'Good tone of voice, funny cards.' Also, they told me that I did it very well, that I selected the number of words to keep students attentive and not bore them. Also, the teacher educator tells me that my imitations of getting on a bike, making the truck look big, and all that stuff had been very good. What they said made a lot of sense to me, both good and bad things. I want to perform another simulation."* (pre-service teacher 1)

> *"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 I had 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)

Another feature declared by pre-service teachers that made them value feedback was that it came from their teacher educators *and* their peers. Thus, in a less prejudiced way, they can realize their learning gaps.

> *"You always learn from what your peers tell you. Like me, I always get nervous. When your classmate tells you what is good, it is taken as something positive, not as a criticism, but to make you realize that next time you could include it."* (pre-service teacher 7)

Last but not least, pre-service teachers commented that when feedback is made in a trustworthy environment, they give it higher consideration because they trust in their skills.

> *"The first time I did the simulation, I was very nervous; I shook as I displayed the posters. I didn't know if my pronunciation would be correct. English 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)

> *"In the program, they always see the positive, and I like that a lot. When they give you feedback, they always point out the positive. Also, they say, 'You could improve that.' They say it in a way that feels good because they recognized you. I know that I have to improve things. They emphasize that you are on the right track, so you end with a nice feeling."* (pre-service teacher 6)

4. Discussion

The knowledge and skills mastery of today's professionals could be irrelevant or wrong in the future. For teachers, this is doubly important because this condition their work and their students'. Today more than ever, a teacher must have the skills to keep pace with advances and innovations in their professional field and the areas of interest of their students [86]. Universities cannot anticipate or prepare new teachers for the multiplicity of challenges they will encounter when practicing the profession. However, they must offer them opportunities to promote lifelong learning tendencies.

Through the pre-service teachers' perceptions, this study aimed to understand whether practice-based curricula offer opportunities to promote lifelong learning tendencies. For this, two research questions were explored:

Research question 1: Do practice opportunities provided by teacher educators in learning activities and assessment tasks performed through campus coursework promote curiosity, motivation, perseverance, and learning regulation?

Pre-service teachers enrolled in the study recognized that, through campus coursework, they had opportunities to practice teaching. In the questionnaire, they affirmed that teacher educators incorporate practice opportunities very frequently or frequently in learning activities and assessment tasks (Figure 1). In the interviews, this high frequency was ratified, and pre-service teachers identified the plan for teaching, simulation of the teacher role, performance of in-service teachers' duties, and receiving feedback during the performance as the more offered practice opportunities. Those are fundamental practice opportunities in practice-based curricula [48,50]. Thus, effectively, the studied population was trained in a practice-based curriculum initially designed by the educational institution offering the programs.

Interestingly, the three programs in this research give pre-service teachers opportunities to promote lifelong learning tendencies, even though the curriculum does not explicitly state it. Pre-service teachers mentioned that very frequently or frequently, they had opportunities to promote it (Figure 2). In the interviews, they reported numerous and varied instances when the teacher educators provoked their curiosity, motivation, perseverance and learning regulation. This aligns with the proposal that teaching programs can potentiate lifelong learning when they offer pre-service teachers' the opportunities to think

as they practice, look for new interpretations, and take action [19,32]. So, in practice-based teacher education, the opportunities to promote lifelong learning tendencies seem to be implicit in the curriculum.

A causal relationship between practice opportunities and opportunities to promote lifelong learning tendencies was found. The former constitutes a significant predictor of the latter (see Table 2 and Figure 3). When exploring this causal relationship in-depth, one can find specific correlations. Pre-service teachers spontaneously commented that (i) when delivering instructions, teacher educators provoke curiosity; (ii) the performance of the learning activities and assessment tasks in the context of in-service teaching motivated them to learn and reinforced their vocation; (iii) the challenge of demonstrating theory learned by applying it forces them to persevere; (iv) simulations and feedback promoted regulation of learning. Previous studies showed neither the global nor the parity-specific associations found in our study. The most similar findings are from Dunlap and Graviner [14], who proposed that lifelong learning tendencies are favored when programs offer learning activities that place pre-service teachers in authentic roles, where they solve real problems or create applicable products. De Jong, Lane, and Sharp [87] concluded that simulations allow pre-service teachers to self-regulate their emotions but do not refer to the learning regulation. Thus, opportunities to practice planned, contextualized, and accompanied practice result in the engagement of pre-service teachers with continuous learning.

Research question 2: What are the characteristics of practice opportunities provided by teacher educators in learning activities and assessment tasks performed through campus coursework that promote curiosity, motivation, perseverance, and learning regulation?

Exploring the attributes that practice opportunities must have to become opportunities to promote lifelong learning tendencies indicates that systemization is essential. In the interviews, pre-service teachers reported opportunities to practice in different courses and throughout the educational program. It has been shown that incorporating practice opportunities in campus coursework helps pre-service teachers give meaning to what they are studying and understand that in-service teachers must keep learning throughout their careers [42]. Thus, practice opportunities give rise to opportunities to promote lifelong learning tendencies not when they are isolated initiatives of teacher educators but when they come from a systematic offering of the educational model.

Practice opportunities that mimic the activities of an in-service teacher are also opportunities to enact lifelong learning tendencies. Pre-service teachers interviewed mentioned that stories focusing on what happens to children and young people in the classroom made them realize the responsibility of being a teacher. Previously, it has been proven that the tasks' authenticity favors the pre-service teachers' professional immersion [59,62]. Hence, the performance of authentic tasks increases pre-service teacher professionalism and leads them to commit to continuous learning to fulfill their future jobs in the best possible way.

Another characteristic of practices that foster opportunities to promote lifelong learning tendencies is that explicit instruction and effective rubrics are presented. Pre-service teachers indicated that this guides their performance and helps them regulate their learning. These findings coincide with other studies in which the explicit evaluation criteria reinforce the practice opportunities because they facilitate the decomposition and recomposition of the practice, facilitating correct practice and contributing to the autonomy of the pre-service teacher [65]. Thus, knowing the assessment criteria in advance clarifies the expected performance and promotes lifelong learning tendencies.

This study's quantitative and qualitative data reveal that feedback is a central element in a practice-based curriculum. Pre-service teachers surveyed acknowledged that they received frequent feedback. Interviews explained that feedback impacted their performance and disposition to improve when it focused on the task, elicited reflection, and came from peers and teacher educators in a trustworthy environment. When feedback is focused on the task, it promotes the transfer of learning [55]. Additionally, feedback that invites reflection leads to comprehension and awareness of what is being performed [88]. Feedback from peers improves comprehension and engagement in the learning [89]. By sharing

their experiences and providing feedback, peer learners seem to improve slightly and gain a practical understanding of concepts such as using different learning methods and specific learning tools [90]. The value of peer feedback in teacher education is that it leads to improved pre-service teacher performance and contributes to their understanding that the teaching profession is a collaborative job, not solitary. Horizontal relationships with other teachers in a professional environment enrich each pedagogical practice because they present formal and informal learning opportunities.

The emotional environment experienced by teacher educators when given feedback impacts the learning process. In the interviews, pre-service teachers reported various instances when teacher educators made them feel calm and confident. When trustworthy and appreciative, feedback not only generates learning but also engagement in learning [91]. Thus, the teacher educator and the type of message he/she delivers (in content and manner) are relevant to improve and engage in learning.

In conclusion, practice opportunities provided by teacher educators in learning activities and assessment tasks performed through campus coursework give rise to opportunities to promote curiosity, motivation, perseverance, and learning regulation, particularly when they are (i) systematic; (ii) incorporated in the classroom work; (iii) presented with clear instructions and effective rubrics; (iv) accompanied with feedback focused on the task, eliciting reflection, and performed by peers and teacher educators in a trustworthy environment (Figure 4).

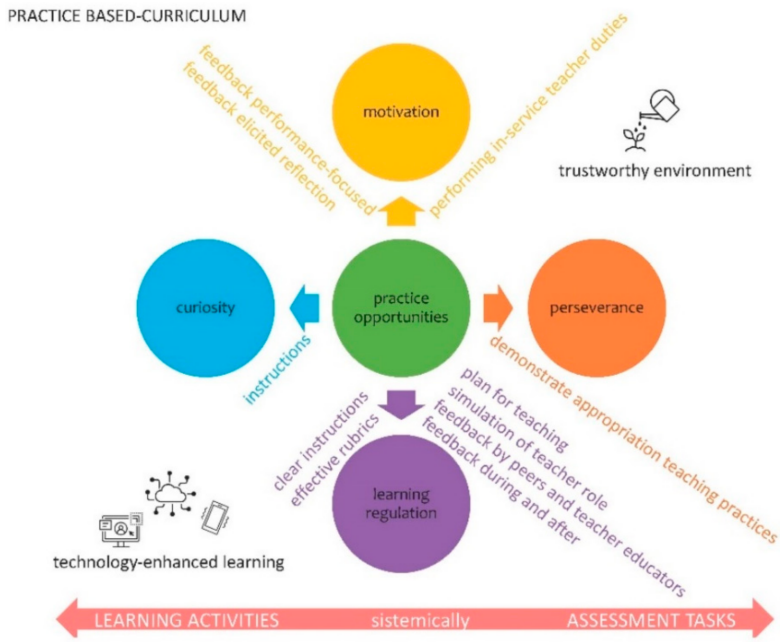

Figure 4. A practice-based curriculum offers opportunities to promote lifelong learning tendencies.

Future teachers will exercise their profession in the context of Education 4.0; thus, universities cannot avoid preparing them to teach effectively in changing and technologized contexts. Given the continual renewal of technology, teacher preparation must address not only technological skills but also the dispositions for continuous updating. The implementation of a practice-based curriculum in which technology is incorporated as a subject and as a tool for learning may be an effective approach for the formation of Teachers 4.0. Its implementation challenges lie precisely in safeguarding the conditions presented in Figure 4, which embodies the study's findings.

This study has some limitations. The three programs studied belong to the same institution; therefore, the findings cannot be generalized. Additionally, the proportion of pre-service teachers in each program differs, so there is an unequal representation of some of the programs. The same is true for the sex of the participants; the vast majority were female. Another limitation could be the effects of the COVID-19 pandemic on the participants'

responses. Pre-service teachers could be over or undervaluing their experiences in the face-to-face model. The confinement could have affected the results because the participants could be in socio-affective situations that may bias their historical memories. Neither pre-service teacher's technological skills nor their knowledge of Education 4.0 was explored in this study, despite this being valuable information for subgroup analysis.

This research may be of great value to all universities looking to update their teacher education programs regarding Education 4.0 since, when enriched with opportunities to develop technological skills and to comprehend the framework of Education 4.0, practice-based curriculum contributes to the transformation of pre-service teachers into teaching experts and lifelong learners prepared to cope with the challenges that Education 4.0 will impose on them when working at schools.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/fi13110292/s1. Table S1: Cronbach's Alpha values and average correlation between items by dimension. Table S2: Correlation matrix and significance of the correlation between items.

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References

1. Himmetoglu, B.; Aydug, D.; Bayrak, C. Education 4.0: Defining the teacher, the student, and the school manager aspects of the revolution. *Turk. Online J. Distance Educ.* **2020**, *21*, 12–28. [CrossRef]
2. López, H.; Ponce, P.; Molina, A.; Ramírez-Montoya, M.; Lopez-Caudana, E. Design framework based on TEC21 educational model and Education 4.0 implemented in a Capstone Project: A case study of an electric vehicle suspension system. *Sustainability* **2021**, *13*, 5768. [CrossRef]
3. Miranda, J.; Navarrete, C.; Noguez, J.; Molina-Espinosa, J.-M.; Ramírez-Montoya, M.-S.; Navarro-Tuch, S.A.; Bustamante-Bello, M.-R.; Rosas-Fernández, J.-B.; Molina, A. The core components of education 4.0 in higher education: Three case studies in engineering education. *Comput. Electr. Eng.* **2021**, *93*, 107278. [CrossRef]
4. Bonfield, C.A.; Salter, M.; Longmuir, A.; Benson, M.; Adachi, C. Transformation or evolution?: Education 4.0, teaching and learning in the digital age. *High. Educ. Pedagog.* **2020**, *5*, 223–246. [CrossRef]
5. Nandy, M.; Lodh, S.; Tang, A. Lessons from COVID-19 and a resilience model for higher education. *Ind. High. Educ.* **2021**, *35*, 3–9. [CrossRef]
6. Garcia-Penalvo, F.J.; Corell, A. The COVID-19: The enzyme of the digital transformation of teaching or the reflection of a methodological and competence crisis in higher education? *Campus Virtuales* **2020**, *9*, 83–98.
7. la Velle, L.; Newman, S.; Montgomery, C.; Hyatt, D. Initial teacher education in England and the Covid-19 pandemic: Challenges and opportunities. *J. Educ. Teach.* **2020**, *46*, 596–608. [CrossRef]
8. Barber, M.; Mourshed, M. *How the World's Best-Performing Schools Systems Come Out on Top*, 1st ed.; McKinsey Company: Washington DC, USA, 2007.
9. Ramírez-Montoya, M.S.; Loaiza-Aguirre, M.I.; Zúñiga-Ojeda, A.; Portuguez-Castro, M. Characterization of the Teaching Profile within the Framework of Education 4.0. *Future Internet* **2021**, *13*, 91. [CrossRef]

10. Ramírez-Montoya, M.S.; Andrade-Vargas, L.; Rivera-Rogel, D.; Portuguez-Castro, M. Trends for the Future of Education Programs for Professional Development. *Sustainability* **2021**, *13*, 7244. [CrossRef]
11. Goh, P.S.C.; Wahab, N.A. Paradigms to drive higher education 4.0. *Int. J. Learn. Teach. Educ. Res.* **2020**, *19*, 159–171. [CrossRef]
12. Finsterwald, M.; Wagner, P.; Schober, B.; Lüftenegger, M.; Spiel, C. Fostering lifelong learning—Evaluation of a teacher education program for professional teachers. *Teach. Teach. Educ.* **2013**, *29*, 144–155. [CrossRef]
13. Bennet, M.; Moriarty, B. Lifelong learning theory and pre-service teachers' development of knowledge and dispositions to work with Australian Aboriginal students. *Int. J. Pedagog. Learn.* **2016**, *11*, 1–9. [CrossRef]
14. Dunlap, J.C.; Grabinger, S. Preparing students for lifelong learning: A review of instructional features and teaching methodologies. *Perform. Improv. Q.* **2003**, *16*, 6–25. [CrossRef]
15. Binkley, M.; Erstad, O.; Herman, J.; Raizen, S.; Ripley, M.; Miller-Ricci, M.; Rumble, M. Defining Twenty-First-Century Skills. In *Assessment and Teaching of 21st-Century Skills*; Griffin, P., McGaw, B., Care, E., Eds.; Springer: Berlin/Heidelberg, Germany, 2012; pp. 17–66.
16. Lalor, J.; Lorenzi, F.; Rami, J. Developing professional competence through assessment: Constructivist and reflective practice in teacher-training. *Egit. Arast. Eurasian J. Educ. Res.* **2015**, *15*, 45–66. [CrossRef]
17. Yaman, F.; Yazar, T. Investigating the Llife long learning tendency of teachers (the example of Diyarbakır). *Kast. Educ. J.* **2015**, *23*, 1553–1566.
18. Halamish, V. Pre-service and in-service teachers' metacognitive knowledge of learning strategies. *Front. Psychol.* **2018**, *9*, 2152. [CrossRef]
19. Beylefeld, A.; Le Roux, A. Guided group reflections of first-year pre-service teachers: Moving beyond the rhetoric of go and reflect. *Perspect. Educ.* **2015**, *33*, 1–19.
20. Erdoğan, D.G.; Arsal, Z. The development of lifelong learning trends scale (LLLTS). *Sak. Univ. J. Educ.* **2016**, *6*, 114–122. [CrossRef]
21. Solmazand, D.Y.; Aydin, G. Evaluation of lifelong learning tendencies of pre-service teachers. *Anthropologist* **2016**, *24*, 55–63. [CrossRef]
22. Coşkun, Y.D.; Demirel, M. Lifelong learning tendency scale: The study of validity and reliability. *Procedia-Soc. Behav. Sci.* **2010**, *5*, 2343–2350. [CrossRef]
23. Zion, M.; Sadeh, I. Curiosity and open inquiry learning. *J. Biol. Educ.* **2007**, *41*, 162–169. [CrossRef]
24. Faulkner, J.; Latham, G. Teacher qualities for 21st century learning. *Aust. J. Teach. Educ.* **2016**, *41*, 137–150. [CrossRef]
25. Costa, A.L.; Kallick, B. Habits of mind in the curriculum. *Learn. Lead. Habits Mind* **2008**, *16*, 42–58.
26. Caena, F. Developing a European Framework for the Personal, Social & Learning to Learn Key Competence (LifEComp). In *Literature Review & Analysis of Frameworks*; Punie, Y., Ed.; Publications Office of the European Union: Luxembourg, 2019.
27. Marzano, R.; Pickering, D. *Dimensiones del Aprendizaje: Manual Para el Maestro*; ITESO: Jalisco, México, 2005. Available online: https://biblioteca.pucv.cl/site/colecciones/manuales_u/Dimensiones%20del%20aprendizaje.%20Manual%20del%20maestro.pdf (accessed on 4 November 2021).
28. Sahin, M.; Akbasli, S.; Yelken, T.Y. Key competences for lifelong learning: The case of prospective teachers. *Educ. Res. Rev.* **2010**, *5*, 545–556. Available online: https://academicjournals.org/journal/ERR/article-abstract/1AFAAD24190 (accessed on 4 November 2021).
29. Pilli, O.; Sönmezler, A.; Göktan, N. Pre-service teachers' tendencies and perceptions towards lifelong learning. *Eur. J. Soc. Sci. Educ. Res.* **2017**, *10*, 326–333. [CrossRef]
30. Isik, A.D.; Derya, I.A. The relationship between primary school teacher candidates tendency for lifelong learning and their perceptions of computer self-efficacy. *Educ. Res. Rev.* **2015**, *10*, 2512–2523. [CrossRef]
31. Makarova, O.Y.; Andreeva, M.; Baratova, O.A.; Zelenkova, A.V. Supplementary Professional Education as a Socially Relevant Component of Lifelong Learning. In Proceedings of the International Conference on Linguistic and Cultural Studies, Tomsk, Russia, 11–13 October 2017; pp. 21–27.
32. Özen, R.; Öztürk, D.S. The relationship between pre-service teachers' lifelong learning tendencies and teaching profession anxiety levels. *Univers. J. Educ. Res.* **2016**, *4*, 7–15. [CrossRef]
33. Tezer, M.; Aynas, N. The effect of university education on lifelong learning tendency. *Cypriot J. Educ. Sci.* **2018**, *13*, 66–80. [CrossRef]
34. Hahl, K.; Mikulec, E. Student reflections on teacher identity development in a year-long secondary teacher preparation program. *Aust. J. Teach. Educ.* **2018**, *43*, 42–58. [CrossRef]
35. Nutov, L. Learning experiences of pre-service teachers and the lecturer's role in a qualitative research methods course. *Qual. Rep.* **2019**, *24*, 31–54. [CrossRef]
36. Forzani, F.M. Understanding "core practices" and "practice-based" teacher education: Learning from the past. *J. Teach. Educ.* **2014**, *65*, 357–368. [CrossRef]
37. Darling-Hammond, L.; Hammerness, K.; Grossman, P.; Rust, F.; Shulman, L. The Design of Teacher Education Programs. In *Preparing Teachers for a Changing World: What Teachers Should Learn and Be Able To Do*; John Wiley & Sons: Indianapolis, IN, USA, 2005; pp. 390–441. Available online: https://eric.ed.gov/?id=ED496378 (accessed on 4 November 2021).
38. Muller, M.; Alamos, P.; Meckes, L.; Sanyal, A.; Cox, P. Teacher candidates' perceptions of opportunities to develop core practices in a teacher education program. *Estud. Pedagog.* **2016**, *42*, 145–163. [CrossRef]
39. Zeichner, K.; Peña-Sandoval, C. Venture philanthropy and teacher education policy in the US: The role of the new schools venture fund. *Teach. Coll. Rec.* **2015**, *117*, 1–44.
40. Ball, D.L.; Sleep, L.; Boerst, T.A.; Bass, H. Combining the development of practice and the practice of development in teacher education. *Elementary Sch. J.* **2009**, *109*, 458–474. [CrossRef]

41. Windschitl, M.; Thompson, J.; Braaten, M.; Stroupe, D. Proposing a core set of instructional practices and tools for teachers of science. *Sci. Educ.* **2012**, *96*, 878–903. [CrossRef]
42. Davin, K.J.; Heineke, A.J. Preparing teachers for language assessment: A practice-based approach. *TESOL J.* **2016**, *7*, 921–938. [CrossRef]
43. Grossman, P.; Hammerness, K.; McDonald, M. Redefining teaching, re-imagining teacher education. *Teach. Teach. Theory Pract.* **2009**, *15*, 273–289. [CrossRef]
44. TeachingWorks: TeachingWorks. Available online: http://www.teachingworks.org/ (accessed on 7 October 2021).
45. DeGraff, T.L.; Schmidt, C.M.; Waddell, J.H. Field-based teacher education in literacy: Preparing teachers in real classroom contexts. *Teach. Educ.* **2015**, *26*, 366–382. [CrossRef]
46. McDonald, M.; Kazemi, E.; Kelley-Petersen, M.; Mikolasy, K.; Thompson, J.; Valencia, S.W.; Windschitl, M. Practice makes practice: Learning to teach in teacher education. *Peabody J. Educ.* **2014**, *89*, 500–515. [CrossRef]
47. Davis, E.A.; Boerst, T. Designing Elementary Teacher Education to Prepare Well-Started Beginners. In *TeachingWorks*; University of Michigan School of Education: Ann Arbor, MI, USA, 2014. Available online: https://www.teachingworks.org/images/files/TeachingWorks_Davis_Boerst_WorkingPapers_March_2014.pdf (accessed on 4 November 2021).
48. Canrinus, E.T.; Klette, K.; Hammerness, K. Diversity in coherence: Strengths and opportunities of three programs. *J. Teach. Educ.* **2019**, *70*, 192–205. [CrossRef]
49. Dalinger, T.; Thomas, K.B.; Stansberry, S.; Xiu, Y. A mixed reality simulation offers strategic practice for pre-service teachers. *Comput. Educ.* **2020**, *144*, 103696. [CrossRef]
50. Jenset, I.S.; Klette, K.; Hammerness, K. Grounding teacher education in practice around the world: An examination of teacher education coursework in teacher education programs in Finland, Norway, and the United States. *J. Teach. Educ.* **2018**, *69*, 184–197. [CrossRef]
51. Grossman, P.; Kavanagh, S.S.; Dean, P.C. The Turn Towards Practice-Based Teacher Education: Introduction to the Work of the Core Practices Consortium. In *Teaching Core Practices in Teacher Education*; Grossman, P., Ed.; Harvard Education Press: Cambridge, MA, USA, 2018.
52. Jenset, I.S. The enactment approach to practice-based teacher education coursework: Expanding the geographic scope to Norway and Finland. *Scand. J. Educ. Res.* **2020**, *64*, 98–117. [CrossRef]
53. McGrew, S.; Alston, C.; Fogo, B. Modeling As an Example of Representation. In *Teaching Core Practices in Teacher Education*; Grossman, P., Ed.; Harvard Education Press: Cambridge, MA, USA, 2018.
54. Schutz, K.; Grossman, P.; Shaughnessy, M. Approximations of Practice in Teacher Education. In *Teaching Core Practices in Teacher Education*; Grossman, P., Ed.; Harvard Education Press: Cambridge, MA, USA, 2018.
55. Kloser, M.; Wilsey, M.; Madkins, T.C.; Windschitl, M. Connecting the dots: Secondary science teacher candidates' uptake of the core practice of facilitating sensemaking discussions from teacher education experiences. *Teach. Teach. Educ.* **2019**, *80*, 115–127. [CrossRef]
56. Grossman, P.; Compton, C.; Igra, D.; Ronfeldt, M.; Shahan, E.; Williamson, P.W. Teaching practice: A cross-professional perspective. *Teach. Coll. Rec.* **2009**, *111*, 2055–2100.
57. McDonald, M.; Kazemi, E.; Kavanagh, S.S. Core practices and pedagogies of teacher education: A call for a common language and collective activity. *J. Teach. Educ.* **2013**, *64*, 378–386. [CrossRef]
58. Matsumoto-Royo, K.; Ramírez-Montoya, M.S. Core practices in practice-based teacher education: A systematic literature review of its teaching and assessment process. *Stud. Educ. Eval.* **2021**, *70*, 101047. [CrossRef]
59. Ashford-Rowe, K.; Herrington, J.; Brown, C. Establishing the critical elements that determine authentic assessment. *Assess. Evaluation High. Educ.* **2014**, *39*, 205–222. [CrossRef]
60. Virtanen, P.; Niemi, H.M.; Nevgi, A. Active learning and self-regulation enhance student teachers' professional competences. *Aust. J. Teach. Educ.* **2017**, *42*, 1–20. [CrossRef]
61. Darling-Hammond, L.; Snyder, J. Authentic assessment of teaching in context. *Teach. Teach. Educ.* **2000**, *16*, 523–545. [CrossRef]
62. Gulikers, J.T.; Bastiaens, T.J.; Kirschner, P.A.; Kester, L. Relations between student perceptions of assessment authenticity, study approaches and learning outcome. *Stud. Educ. Eval.* **2006**, *32*, 381–400. [CrossRef]
63. García-Jiménez, E. La evaluación del aprendizaje: De la retroalimentación a la autorregulación. El papel de las tecnologías. *RELIEVE-Rev. Electrónica De Investig. Y Evaluación Educ.* **2015**, *21*. [CrossRef]
64. Orsmond, P.; Merry, S.; Callaghan, A. Communities of practice and ways to learning: Charting the progress of biology undergraduates. *Stud. High. Educ.* **2013**, *38*, 890–906. [CrossRef]
65. DeMink-Carthew, J.; Grove, R.; Peterson, M. The influence of the core practices movement on the teaching and perspectives of novice teacher educators. *Stud. Teach. Educ.* **2017**, *13*, 87–104. [CrossRef]
66. López-Pastor, V.; Sicilia-Camacho, A. Formative and shared assessment in higher education. Lessons learned and challenges for the future. *Assess. Evaluation High. Educ.* **2017**, *42*, 77–97. [CrossRef]
67. Finlay, L. Reflecting on 'Reflective Practice'. The Open University: Milton Keynes, UK, 2008. Paper 52. Available online: http://oro.open.ac.uk/68945/1/Finlay-%282008%29-Reflecting-on-reflective-practice-PBPL-paper-52.pdf (accessed on 4 November 2021).
68. Fernández, S.; Paz, M. *¿ Hacia dónde avanza el sistema educativo en Chile? Análisis de las Recomendaciones OCDE Contenidas en Evaluaciones de Políticas Nacionales de Educación: Educación en Chile (2004–2016) en el Contexto de la Reforma en Marcha*; Ministerio de Educación: Santiago, Chile, 2017. Available online: https://biblioteca.digital.gob.cl/handle/123456789/424 (accessed on 4 November 2021).

69. Vargas, A.R. Ley de desarrollo profesional docente en Chile: De la precarización sistemática a los logros, avances y desafíos pendientes para la profesionalización. *Estud. Pedagógicos* **2016**, *42*, 261–279. [CrossRef]
70. Comisión Nacional de Acreditación. *Carreras de Pedagogía: Análisis de Fortalezas y Debilidades en el Escenario Actual. Serie Estudios Sobre Acreditación*; Comisión de Acreditación: Santiago, Chile, 2018. Available online: https://docplayer.es/86931009-Carreras-de-pedagogia-analisis-de-fortalezas-y-debilidades-en-el-escenario-actual.html (accessed on 4 November 2021).
71. Consejo Nacional de Educación. *Indices 2016: Tendencias Matrícula en Educación Superior*; CNED: Santiago, Chile, 2019.
72. Mizala, A.; Hernández, T.; Makovec, M. *Determinantes de la Elección y Deserción en la Carrera de Pedagogía*; Proyecto FONIDE: Santiago, Chile, 2011.
73. Peirano, C. Las carreras de pedagogía y sus desafíos. *Ing. Civ.* **2009**, *51*, 17.
74. OECD. *Educación en Chile*; Fundación SM: Santiago, Chile, 2018.
75. Flores-Lueg, C.; Turra-Díaz, O. Contextos socioeducativos de prácticas y sus aportes a la formación pedagógica del futuro profesorado. *Educ. Em Rev.* **2019**, *35*, 267–285. [CrossRef]
76. Facultad de Educación. *Modelo de Formación Práctica 2017–2021*; Universidad del Desarrollo: Santiago, Chile, 2016.
77. Creswell, J. *A Concise Introduction to Mixed Methods Research*; Sage Publication: Los Angeles, CA, USA, 2014.
78. Creswell, J.; Clark, V. *Designing and Conducting Mixed Methods Research*; Sage Publication: Los Angeles, CA, USA, 2017.
79. Onwuegbuzie, A.; Leech, N. Linking research questions to mixed methods data analysis procedures. *Qual Rep.* **2006**, *11*, 474–498. [CrossRef]
80. Matsumoto-Royo, K.; Ramírez-Montoya, M.S.; Conget, P. Diseño y validación de un cuestionario para evaluar oportunidades de práctica pedagógica, metacognición y «lifelong learning», brindadas por los programas de formación inicial docente. *Estudios Sobre Educ.* **2021**, *41*. [CrossRef]
81. Mair, P. *Modern Psychometrics with R*; Springer: Berlin/Heidelberg, Germany, 2018.
82. Gallagher, M.W.; Brown, T.A. Introduction to Confirmatory Factor Analysis and Structural Equation Modeling. In *In Handbook of Quantitative Methods for Educational Research*; Brill Sense: Rotterdam, The Netherlands, 2013; Volume 1, pp. 287–314.
83. Glaser, B.; Strauss, A. *The Discovery of Grounded Theory: Strategies for Qualitative Research*; Aldine: Chicago, IL, USA, 1967.
84. Levin, T.; Wagner, T. Mixed-methodology research in science education: Opportunities and challenges in exploring and enhancing thinking dispositions. *Qual. Res. Lit. Sci. Educ.* **2009**, *1*, 213–243.
85. Leech, N.L.; Onwuegbuzie, A.J. An array of qualitative data analysis tools: A call for data analysis triangulation. *Sch. Psychol. Q.* **2007**, *22*, 557–584. Available online: https://psycnet.apa.org/record/2007-19518-005 (accessed on 4 November 2021). [CrossRef]
86. Peredrienko, T.; Belkina, O.; Yaroslavova, E. New language learning environment: Employers'-learners' expectations and the role of teacher 4.0. *Int. J. Instr.* **2020**, *13*, 105–118. [CrossRef]
87. De Jong, T.; Lane, J.; Sharp, S. The efficacy of simulation as a pedagogy in facilitating pre-service teachers' learning about emotional self-regulation and its relevance to the teaching profession. *Aust. J. Teach. Educ.* **2012**, *37*, 4. [CrossRef]
88. Anijovich, R.; Camilloni, A.R.W.d. *La Evaluación Significativa*; Paidós: Buenos Aires, Argentina, 2010.
89. Snead, L.O.; Freiberg, H.J. Rethinking student teacher feedback: Using a self-assessment resource with student teachers. *J. Teach. Educ.* **2019**, *70*, 155–168. [CrossRef]
90. Garcia-Esteban, S.; Villarreal, I.; Bueno-Alastuey, M.C. The effect of telecollaboration in the development of the Learning to Learn competence in CLIL teacher training. *Interact. Learn. Environ.* **2019**, *29*, 973–986. [CrossRef]
91. Rodger, S.; Fitzgerald, C.; Dávila, W.; Millar, F.; Allison, H. What makes a quality occupational therapy practice placement? Students' and practice educators' perspectives. *Aust. Occup. Ther. J.* **2011**, *58*, 195–202. Available online: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1440-1630.2010.00903.x (accessed on 4 November 2021). [CrossRef]