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Teacher Education during the COVID-19 Lockdown: Insights from a Formative Intervention Approach Involving Online Feedback

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Abstract: This paper examines preservice teachers' perspectives on assessment feedback developed in a teacher education course during the first lockdown due to the COVID-19 pandemic. As initially negotiated with students, feedback was learner-centred and involved a formative intervention approach applied iteratively by the teacher educator over the course of one semester. Although such feedback was initially face-to-face, it had to be given exclusively online following the unexpected closure of the university. Analysis of student teachers' perspectives, which were collected through an online questionnaire completed after their final assessment, reveals both positive and critical aspects regarding the feedback provided by the teacher educator. While reaffirming the significance of feedback as a crucial element for learning in online teacher education contexts, the findings also show that the clarity, affective bonding and multimodal meaning-making involved in face-to-face interaction are particularly challenging when the communication of feedback is digitally mediated. The implications and limitations of such findings are discussed.

Keywords: feedback; face-to-face and online feedback; preservice teacher education; COVID-19

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1. Introduction

On 13 March 2020, the Portuguese Ministry of Science, Technology and Higher Education announced the closure of all higher education institutions to mitigate the spread of SARS-CoV. All activities were suspended on 16 March [1] until the end of the academic year. Additionally, the same communication specified that "efforts should be made to promote online teaching and learning, maintaining activities through teacher and student interaction via digital tools" [1] (p. 1).

The forced transition to online teaching after the fourth teaching week raised unforeseen challenges to the teaching and learning practices with which teachers and students had to cope, leaving almost no time to prepare. This paper focuses on the perspectives of a class of Portuguese masters-level student teachers on the assessment feedback provided during a course conducted under these new circumstances. As will be made clear throughout the paper, the greatest change to this teacher education environment arising from the move to digitally mediated communication was found in the social dimension of the learning process [2], especially with regard to the provision of teacher feedback, which has a pivotal and transversal role in student teachers' learning.

Student teachers' lived experience can play a significant part in their education, especially in developing insights that may inform future learning in similar circumstances. Accordingly, student teachers' perspectives on their learning and the learning process itself, with a special emphasis on feedback, were collected, analysed and discussed. The findings suggest the decisive role that feedback continues to play in assessment practices conducted online in teacher education, in particular its potential for experiential and reflective learning. The results also reveal certain especially demanding aspects of teacher feedback conducted online, most of which are concerned with the interpersonal communication that is inherent

to the social presence of the learning process [2]. As such, this paper aims to contribute to the understanding of online feedback assessment practices [3] for preservice teachers.

1.1. Pedagogy Revisited. Possibilities and Challenges for Online Assessment

As an immediate answer to the new circumstances caused by the sudden and extensive development of teaching and learning in online environments, there have been calls for more comprehensive approaches to the pedagogy of online education, integrating technology to support teaching and learning activities. For example, Carrillo and Flores [2] have highlighted the key components for a successful higher education experience in a computer-based scenario. For these authors, learning is "the result of the interaction of three presences" which the digitalization of communication cannot circumvent: (a) social presence (the ability of participants to engage affectively, to communicate in a collaborative environment, and develop interpersonal relationships); (b) cognitive presence (the way participants "construct meaning through sustained reflection and communication in a community of inquiry"); and (c) teaching presence (designing, facilitating and directing social and cognitive processes to achieve significant learning outcomes [2] (pp. 468–469).

Other authors identify positive aspects related to the transition to online environments in higher education due to the COVID-19 pandemic. Ruiz and his colleagues [4] looked at the ways in which different digital resources introduced to alleviate some of the constraints of online teaching, such as lack of face-to-face interaction, influence how students learn by improving habits and digital skills. This study highlighted the importance and benefits of students learning at their own pace, enhanced by online learning tools within a perspective of lifelong learning.

Among many other dimensions of online teaching and learning, assessment has been the specific target of much recent research attention. Critical issues have been identified, such as student motivation [5]; assessment equity [6]; challenges and limitations related to the scarcity of resources and infrastructures, the range of learning outcomes, the commitment of students in submitting assessments [7]; challenges in assessing practical knowledge and skills, fairness, or technical malfunction [4,8].

To overcome the constraints associated with online assessment, the existing literature suggests the use of a variety of strategies and tools, such as the redesign of assessment, the use of quizzes, take-home assessments, demonstrations, oral presentations, fact sheets, e-portfolios [7], argumentative essays, synthesis papers, critical analysis, blog posts, student diaries, discussions on blogs, wikis or forums, research projects and student presentations of the outcomes of asynchronous assignments (to be performed synchronously or asynchronously) [8], and well-designed open-book tests [6]. In addition, there is acknowledgment of the value of continuous assessment [9] and involving students in the online assessment process [10]. Other authors suggest the use of active-learning techniques in distance-learning environments [11]. Flores et al. [12,13] have highlighted the importance of contextual factors, teacher support and availability, as well as the quality of the pedagogical materials for students' successful adaptation to online teaching. In discussions about online assessment, feedback has been the focus of special attention, to which we now turn.

1.2. Feedback Revisited. Possibilities and Challenges in Digitally Mediated Education

An extensive body of research on assessment has long been highlighting the role of feedback in enhancing students' learning outcomes and in the development of self-regulation [14–21].

Feedback is a communicative endeavour, involving teachers and students in meaning-making processes. As such, feedback is "a process through which [learners] make sense of information from various sources and use it to enhance their work" [22] (p. 1315). Such information is "provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding" [16] (p. 81). Thus, feedback does not stop "when students' work is returned to them" [23] (p. 4), as it entails a strategic asset for improving their learning [24]. From the perspective of higher education students, which

is of particular concern to our study, quality feedback depends upon: (i) timeliness; (ii) balance between positive and constructive commentaries; (iii) direct feedback on content; (iv) linguistic clarity and legibility; (v) grade justification and (vi) feeding forward [25]. Consequently, proficiency in developing feedback has been assumed as "a core competency for all teachers" [23] (p. 522).

The centrality of feedback in teaching and learning processes explains the current renewed interest in the feedback that is provided in digitally mediated communicative contexts in higher education [10]. It has been assumed that there are both benefits and challenges related to "trying something new, especially when it involves technology" to develop assessment feedback [24] (p. 4). The use of technology is definitely seen as an important asset for assessment and feedback methods [25], especially as it facilitates interaction and enhances learning among students. Using feedback in online teaching and learning activities may positively influence students' motivation and their sense of belonging to an online learning community [26]. Additionally, it has been assumed that using a diversity of technologies may facilitate and boost assessment for learning and feedback [27]. Indeed, recent findings in Portugal suggest that students may adapt better to online teaching and learning processes when they are provided with timely and relevant feedback and are able to self-regulate their learning [28,29]. Research also shows that online feedback may influence students' future work and learning strategies [30]. Students tend to use self-regulated learning strategies more frequently in online contexts than in hybrid environments [31]. In addition, attention has been given to the supporting and boosting role that multimodal feedback can have on learning, especially when it is "imaginative, critical, and in-tune with our increasingly digitally-mediated society" [32] (p. 17). One of the main challenges related to online feedback is associated with real-time elaborated evaluation and the quality of the information that is offered about students' work [33,34]. Hast [35] states that one of the major drawbacks of online feedback lies in its implementation and interpretation. Furthermore, echoing Hodges et al.'s [36] argument for the centrality of the quality of learning experiences and learning environments mediated by digital technologies, Carless [37] points out the need to situate feedback in learning environments that offer an equitable assessment system able to enhance students' learning and achievement, facilitating their judgments and active role in response to feedback. Related challenges lie in students' adequate technological access, motivation to access online feedback [37] and even resistance related to defective or inefficient technology [28]. According to research by Deeley [28], students' resistance to using technology varied from 'mild' to 'severe', being associated with technology failures or inefficiency.

The COVID-19 pandemic has changed both the lives of preservice teachers and teacher educators with implications for both institutional and pedagogical responses [2,38–40]. Discussions specifically focusing on assessment feedback practices conducted in teacher education contexts have generally acknowledged the above-outlined possibilities and challenges in higher education contexts [41,42]. Yet, there is an urgent need to investigate the provision of feedback in the remote teaching of student teachers. In particular, it is necessary to develop our "understanding [of] factors that can inform best practice in online assessment" [29] (p. 15). This paper aims specifically to look at student teachers' perspectives on feedback practices conducted remotely during a formative intervention approach developed for a masters-level teacher-education course in Portugal.

2. Materials and Methods

When the first lockdown was formally declared in Portugal, the formative context in which our study was situated had just begun its second year of experimentation. The approach was designed with close reference to four key assumptions about preservice teachers' professional learning, namely Pedagogical Content Knowledge (PCK), rehearsed practice as well as epistemology of reflective practice and assessment, involving both teacher's feedback (assessment for learning) and student teachers' self-inspection (assessment as learning) [43].

The approach aimed to create a sheltered environment for the development of robust professional learning for master's level student teachers. Following a scaffolding approach, the students were to apply theoretical knowledge (learned in their first degree) to designing a practical portfolio focusing on literacy education in pre- and elementary school. In addition, they were to use their practical rehearsals to individually develop their epistemology of reflective practice. With this in mind, the approach also looked to develop a strong agentic identity before the practicum, which only takes place in the following academic year. It included complementary individual and collaborative students' learning tasks, designed to activate the learning processes involved in doing and thinking, as well as different types of teacher activity. The formative intervention approach was planned to be implemented during the fifteen-week period allocated to the teaching of a master's course. Specifically, it was to occur in three major iterations, each focusing on development of a section of the practical portfolio relating to a distinct educational 'level' for which each of these student teachers were preparing themselves, namely the final year of preschool education as well as the first and third year of elementary education. These school levels were intentionally chosen due to the differences in the focus of the literacy education in each case (for more details see Pereira, Fernandes, Braga and Flores [42]).

When teaching was resumed online, the formative approach followed the established pedagogical procedure. The students continued their collaborative and individual working plan, albeit by communicating among themselves online, and the teacher guided the iterative learning process in online seminars. Crucially, as the teacher and students' communication evolved from face-to-face interaction into digitally mediated practices, the teacher's feedback was profoundly transformed. Instead of the anticipated continuous and predominantly face-to-face feedback and three key moments of written feedback (one for each occasion in the portfolio's assembly), feedback became dependent on detailed and extensive written comments for building the portfolio (on at least six occasions per group). This involved the teacher identifying instances where the students' work could be improved and challenging them to rethink their options as far the didactics of the Portuguese language in the preschool and first and third year of elementary education. The teacher's feedback focus accordingly varied throughout: from oral language development, language awareness, emergent literacy, beginning reading (learning of letters), comprehension, text composing to the teaching of grammar. In addition, working group meetings were held on the learning platform after written feedback had been sent (on up to six occasions per group); and whole class meetings were also held on the learning platform for the general appraisal of the work accomplished and further discussion of the feedback. The teacher regularly sent informative and explanatory emails to the class. No more face-to-face communication occurred beyond that held in the first three initial weeks. Consequently, the key change brought about by the new teaching circumstances was in the social presence of the learning process [2], while pedagogical and teaching presence generally remaining unaltered.

When the learning process came to an end (June, 2020), the first author, who was the teacher educator, decided to investigate student teachers' perspectives about her feedback, as well as about their own learning and the learning process itself. This was in order to respond to the following overarching research question: How did student teachers perceive the feedback conducted in this new, online learning scenario? The interest in this area was determined by the first author's perception that feedback had been a distinct aspect of her own work and a cornerstone of her students' learning. Despite the self-study nature of this evaluative case study [44], the research went well beyond a personal and subjective study [45,46], being framed within a historical, institutional and policy context, with the aim of contributing towards improving remote teaching practices. In fact, by answering this question, we aim to add to the understanding of online feedback processes in teacher education in general, besides helping to enhance future development of the formative intervention approach that framed the study. Data collection, analysis and interpretation,

conducted with close reference to the reviewed theory, were carried out in collaboration with the two researchers co-authoring this article.

2.1. Participants

Data were collected through an online questionnaire. The participants were a complete group of 24 preservice student teachers enrolled in a master's in preschool and elementary education at a Portuguese public university (first-year students, second semester). They were all full-time female students, aged between 21 and 35 years old, six of whom had undertaken their first degree/minor at another university and had no prior experience in online teaching.

2.2. Instrument

Besides collecting biographic data, the questionnaire was specifically designed to address the following subquestions:

1. How did student teachers perceive the learning they developed in this context?
2. How did student teachers perceive the formative approach?
3. How did student teachers perceive their teacher's feedback?

Table 1 presents the structure of the questionnaire. The use of closed and open-ended questions was intended to deepen our grasp of participants' points of view in order to finally provide an answer to our main overarching research question.

Table 1. Instrument: Areas, topics and items in the questionnaire.

Areas of Inquiry	Main Topics	Items	No
1. Perceptions about learning	Agreement—professional knowledge development: PCK and future practice	1.1. How did student teachers perceive the learning they developed in this context? (a) Curricular framework: preschool (b) Curricular framework: elementary school (c) Aims: preschool (d) Aims: elementary school (e) Content: preschool (f) Content: elementary school (g) Teaching strategies: preschool (h) Teaching strategies: elementary school (i) Integrated vision of language and literacy teaching at both educational levels (j) Envisioning future action: in the practicum, preschool (k) Envisioning future action: in the practicum, elementary school (l) Envisioning future professional action	12
	Continue/Agreement	1.2. Yes/No 1.3. Open-ended question	
2. Perceptions about the formative process		2.1. How did student teachers perceive the formative approach	
	Continue	2.2. Open-ended question	
	Improve	2.3. Open-ended question	

Table 1. *Cont.*

Areas of Inquiry	Main Topics	Items	No
3. Perceptions about feedback	Importance—Aspects of feedback communication Agreement—Importance of feedback Agreement—Quantity and quality of feedback	3.1. How did student teachers perceive their teacher's feedback? 3.1.1. How well did students appreciate situations in which feedback was communicated? a. Modes and media used to communicate (face-to-face, online meeting, written via email) b. Different audiences (working group, whole class) c. Feedback focus (preschool practical work, 1st year practical work, 3rd year practical work) 3.1.2. How important was feedback? a. For group work b. Individual learning c. Self-monitoring d. The final grade e. Understanding the concept of feedback in education 3.1.3. How did student teachers perceive the quantity and the quality of content? a. Sufficiency b. Relevance c. Timeliness d. Clarity e. Appropriateness f. Motivation g. Constructiveness: what was achieved h. Constructiveness: what needed improvement i. Constructiveness: how to improve	17
	Value	3.2. Open-ended question	
	Miss	3.3. Open-ended question	
	Continue	3.4. Open-ended question	
	Improve	3.5. Open-ended question	

The first area of inquiry—perspectives about learning—was covered by a set of items asking students whether they agreed with statements related to the development of different aspects of their PCK of language and literacy teaching for each educational level:

1. Curricular framework: preschool and elementary school (questions a. and b.); aims: preschool and elementary school (questions c. and d.); content (questions e. and f.); teaching strategies: preschool and elementary school (questions g. and h.);
2. An integrated understanding of language and literacy teaching at both educational levels (question i.);
3. Ability to envision their future teaching practice during the practicum in preschool, in elementary school and beyond (questions j., k., l.).

A further open-ended question asked students whether the learning content approach should continue or not in the future, offering space for students to explain their reasons.

The second area of inquiry—perspectives about the formative approach—was covered by two sets of open-ended questions asking students' opinions about whether the formative intervention approach should continue or not in the future and whether or not it should be improved, again offering space for students to give their reasons (questions 2.1 and 2.2).

The third area of inquiry—perspectives about feedback—was covered by three sets of questions (questions 3.1.1, 3.1.2, and 3.1.3), the design of which was generally informed

by the literature review on assessment feedback presented above. The questions asked students to offer their appraisal of different aspects of the teacher's feedback, namely:

- The importance of features of feedback communication, such as modes and media, audience, and focus (question 3.1.1 a. to c.);
- The quantity and quality of feedback, with particular regard to its sufficiency, relevance, timeliness, clarity, appropriateness, motivation, constructiveness, whether it specifically identified what was successfully achieved, what needed to be improved and how that could be achieved (question 3.1.3 a. to i.).
- The importance of (i.e., the effectiveness) of feedback relating to group work, individual learning, self-monitoring of individual learning, the final grade, and understanding the concept of feedback in education (question 3.1.2 a. to e.).
- There were four further open-ended questions asking (i) what students appreciated the most (question 3.1) and (ii) what they missed in the teacher's feedback (question 3.2), as well as (iii) whether this type of feedback should continue (question 3.3) and (iv) whether it should be improved (question 3.4). With this set of questions, we aimed to gather further data that might allow us to strengthen our findings from the closed-ended questions.

We considered that the first and second inquiry areas were fundamental for interpreting our detailed study of feedback, assuming that any perception about feedback is inextricably associated with the learning which it is intended to promote (in our case, learning about the didactics of language and literacy) and also with the learning context in which it takes place.

The questions were designed according to the fundamental principles of clarity, coherence and neutrality, taking into consideration the assumption that questionnaires should serve to aid research, rather than provide perfect or unique solutions [47–49]. The appropriateness of the questionnaire's instructions, questions, options and length were checked before it was finally implemented. A group of experts in Educational Science evaluated the items, ensuring their alignment with the research goals, and the final version of the questionnaire was revised taking into account their comments and suggestions.

2.3. Analysis

Statistical analyses were performed using the IBM SPSS Statistics v24.0 software. Descriptive statistics were used to organise and summarise the quantitative data obtained through the closed set of items. The data collected through the open-ended questions were analysed through inductive content analysis guided by the principles of completeness, representativeness, consistency, exclusivity and relevance [50], and by recognising the interactive nature of the data analysis [51]. Open-ended questions were subject to inductive content analysis, which was guided by the key theoretical categories identified in the literature review. Emergent categories were also identified. The categorisation was triangulated by all the researchers involved in the study. In the analysis, Rn identifies each of the 24 respondents.

2.4. Ethics

Ethical issues aimed at guaranteeing the protection of the participants and the integrity of the research process were considered in this research [52]. Thus, all participants were fully informed of the research goals and provided their written consent [53]. In addition, the confidentiality and anonymity of the participants were assured. All types of data referring to institutions and participants were omitted. Moreover, the data collected will be exclusively used for research purposes and for the improvement of the formative approach underpinning this research.

3. Results

Analysis of the data collected shows (3.1) a positive appraisal of the development of professional knowledge, and (3.2) a generally positive appraisal of the learning process. It

also indicates (3.3) a positive appraisal of the feedback conducted (3.3.1) as well as certain critical aspects in students' perspectives (3.3.2).

3.1. Positive Appraisal of the Development of Professional Knowledge

Student teachers' perspectives about the learning that they developed were very positive, as evidenced in Table 2. With few exceptions, students either agreed or strongly agreed with almost all the statements about the different aspects of the PCK that was the target of their learning, namely curriculum, content, strategies for language and literacy education at both educational levels, as well as agreeing with the statements about the development of their agentic identity.

Table 2. Perceptions of knowledge development.

	f (%)						
As a Result of This Project I Have . . .	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**	**Missing**	**Total**
. . . developed a better knowledge of the Curricular Guidelines for preschool education.	0	0	0	9 (37.5%)	15 (62.5%)		
. . . developed a better knowledge of the syllabus and key curriculum stages for Portuguese in elementary education.	0	0	0	9 (37.5%)	15 (62.5%)		
. . . a better understanding of the goals of Portuguese language didactics in preschool education.	0	0	0	14 (58.3%)	10 (41.7%)		
. . . a better understanding of the goals of Portuguese language didactics in elementary education.	0	0	3 (12.5%)	15(62.5%)	6 (25.0%)		
. . . a better knowledge of the specific content of Portuguese language didactics in preschool education.	0	0	1 (4.2%)	13 (54.2%)	10 (41.7%)		
. . . a better knowledge of the specific contents of Portuguese language didactics in elementary education.	0	0	1 (4.2%)	10 (41.7%)	13 (54.2%)		24 (100%)
. . . developed my knowledge of didactic strategies for teaching Portuguese in preschool education.	0	0	0	9 (37.5%)	15 (62.5%)		
. . . developed my knowledge of didactic strategies for teaching in elementary education.	0	0	0	10 (41.7%)	14 (58.3%)		
. . . developed an integrated vision of Portuguese didactics in preschool and elementary education.	0	0	0	11 (45.8%)	13 (54.2%)		
. . . developed a more concrete idea of the teaching practice I can develop during the practicum in preschool education.	0	0	0	10 (41.7%)	14 (58.3%)		
. . . developed a more concrete idea of the teaching practice I can develop during the practicum in elementary education.	0	0	0	14 (58.3%)	10 (41.7%)		
. . . developed a more concrete idea of my future professional practice.	0	0	0	11 (45.8%)	12 (50.0%)	1 (4.2%)	

This positive appraisal was confirmed in their answers to the open-ended question, in which students unanimously considered that the learning content should remain the same in future editions of the course because:

> It is a means of better understanding how to put theory into practice in preparation for our professional teaching practice. (R4)

> It is a way to truly prepare ourselves for the future, to introduce us to a world that is meaningful to us and to offer us a simulation of what we can do when we are working professionally. (R24)

3.2. General Positive Appraisal of the Learning Process

The respondents also gave generally positive opinions about the learning process as a whole. According to them, the formative approach should continue and the main reasons again point to its effectiveness in terms of enhancing learning and preparing them for future professional teaching practice:

> This approach provided a broad vision and, above all, a practical idealisation of a pre-school educator and an elementary teacher's role, with their inherent challenges and strategies. (R8)

> This course allowed me to answer some of my personal questions. It allows us to have a broader view of what to teach and, particularly, how to teach. (R9)

> This approach should continue because it has many advantages. The work developed enabled us to have a global view of language didactics and, at the same time, enhance our knowledge of some contents. (R10)

Though most students stated that the learning process does not need any improvement, especially "considering the circumstances in which we are living" (R23), some said that they should have been given more time to put together each part of the portfolio; that they needed portfolio examples; and, of particular relevance to our paper, that teacher feedback should be improved, which is the area to which we will now turn our attention.

3.3. Feedback

Student teachers' perspectives about the feedback conducted in this formative context were largely positive. Although 95.8% of the student teachers agreed that this feedback approach should continue in the future, they also identified some critical points regarding its current form. Both positive and critical appraisal came up in the quantitative and qualitative data.

3.3.1. Positive Appraisal

Students expressed a generally positive to very positive appraisal of their teacher's feedback: its communication, its importance for learning, as well as its quantity and quality. The answers to the open-ended questions were especially useful to develop a finer-grained understanding of these quantitative results.

Communication Appraised: Specific Audience and Focus, and Multimodal, Multimedia Meaning-Making

Student teachers' perceptions about feedback communication were very positive. In the questionnaire, the student teachers attributed greater importance to the written feedback received by email (70.8%), while also appreciating face-to-face feedback (66.6%). The feedback provided through the platform in tutorial meetings received the lowest score (45.8%). However, in the open-ended questions, several students stated how important it was to have multimodal (oral and written) feedback, highlighting the importance of their complementarity:

> I consider that written feedback combined with oral feedback (face-to-face or online) is fundamental. (R10)

> All feedback, both written and oral, was well connected. (R23)

> The teacher's written feedback wasn't always entirely clear. However, it was clarified during the online seminars. (R24)

Student teachers attributed greater importance to the feedback that was offered specifically to each working group (87.5%) as compared with the more general feedback that was offered to the whole class (37.4%). Additionally, students agreed that feedback focusing on the specific parts of the portfolio was very important: 83% (for the preschool and first year sections) and 92% for the section dealing with the third year).

Importance of Feedback for Experiential, Reflective Learning

As Table 3 illustrates, student teachers recognise the role of the teacher's feedback in developing their group's portfolio (91.6%), in building their knowledge (83.4%), in developing their understanding of their learning process (self-regulation) (79.2%) and in clarifying the general meaning of feedback in education (70.8%). Interestingly, the level of student teachers' agreement decreases regarding the importance of feedback in defining their final grade.

Table 3. Importance of the feedback process.

	f (%)					
	Totally Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Totally Agree**	**Total**
The teacher's feedback was important for the construction of my group's portfolio.	0	0	1 (4.2%)	1 (4.2%)	22 (91.6%)	24 (100%)
The teacher's feedback was important in building my knowledge.	0	0	2 (8.3%)	2 (8.3%)	20 (83.4%)	
The teacher's feedback was important in developing my understanding of my learning.	0	0	1 (4.2%)	4 (16.6%)	19 (79.2%)	
The teacher's feedback was important in defining my final classification.	0	0	3 (12.5%)	9 (37.5%)	12 (50.0%)	
The teacher's feedback was important in clarifying my understanding of the meaning of "feedback in education".	0	0	1 (4.2%)	6 (25.0%)	17 (70.8%)	

The qualitative data confirmed the quantitative results, with student teachers' relating feedback to the experiential and reflective knowledge that they were able to build in the context of the formative intervention approach:

> Feedback assisted us in building our knowledge. (R6)

> I appreciated the fact that we managed to learn from [feedback] and, in addition, at times when the group felt lost, with the teacher's clarifications, we were often able to co-develop our knowledge and subsequently fulfil the whole portfolio. (R9)

> Feedback was essential for me to be able to learn everything I learned—I recognise that. (R10)

> Its self-regulation; the feedback allowed me to reflect on the goals as a future educator and teacher. (R13)

> In my opinion, the fact that the teacher continually pointed out to us ways of improving the activities we had proposed was of great value, as it helped us gain a more global perspective as well as an understanding of the great potential of all the exercises and activities. (R24)

Feedback Content: Quantity and Quality Appraised

The quantity and quality of the teacher's feedback was appraised positively to very positively by the majority of the students. Over twenty students expressed their agreement or total agreement regarding the sufficiency, necessity, timeliness, adequacy and constructive nature of the teacher's feedback in relation to their work (see Table 4.). In their qualitative accounts, students justified these opinions by stating that there was a lot of feedback, that it emphasised the best-achieved aspects, that it was fit-for-purpose and that it pointed out avenues for improvement, as the following examples illustrate:

> Despite knowing that it's exhausting for the teacher and even for the students who have to revisit the work and correct much of it, I think it definitely helps a lot in gaining a fuller and better understanding of everything that is developed. (R10)

The teacher did not devaluate the effort made by the group. She always stressed that we were building a positive and solid path, even if there were aspects that should be improved. (R5)

Identifying the lapses that were made, for example, in the use of concepts. (R3)

We managed to learn a lot from the feedback given by the teacher. In addition, at times when the group felt lost, with the teacher's clarifications, we were often able to co-develop our knowledge and subsequently fulfil the whole portfolio. I also appreciated the teacher's availability. (R14)

The importance the teacher gave to our opinions and the way she showed us the way forward. (R23)

Table 4. Student teachers' evaluation of the feedback process.

	f (%)					
	Totally Disagree	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Totally Agree**	**Total**
The teacher's feedback was sufficient	0	2 (8.3%)	5 (20.8%)	7 (29.2%)	10 (41.7%)	24 (100%)
The teacher's feedback was necessary	0	0	1 (4.2%)	2 (8.3%)	21 (87.5%)	
The teacher's feedback was timely (given at the right time)	0	1 (4.2%)	1 (4.2%)	6 (25.0%)	16 (66.6%)	
The teacher's feedback was clear	0	2 (8.3%)	5 (20.8%)	10 (41.7%)	7 (29.2%)	
The teacher's feedback was appropriate	0	0	2 (8.3%)	9 (37.5%)	13 (54.2%)	
The teacher's feedback was motivating	0	1 (4.2%)	7 (29.2%)	5 (20.8%)	11 (45.8%)	
The teacher's feedback was constructive: it showed what was successfully achieved	0	1 (4.2%)	2 (8.3%)	9 (37.5%)	12 (50.0%)	
The teacher's feedback was constructive: it revealed what could be improved	0	0	1 (4.2%)	5 (20.8%)	18 (75.0%)	
The teacher's feedback was constructive: it showed how to do it	0	0	3 (12.5%)	10 (41.7%)	11 (45.8%)	

Although student teachers made a positive appraisal of the quantity and the quality of the teacher's feedback, this area of inquiry showed the least consensus among the participants. Therefore, we will revisit this table below in order to present the critical aspects.

3.3.2. Critical Aspects

Interestingly, the content and communication of online feedback were also regarded as critical aspects. In the closed items of the questionnaire, student teachers showed less agreement in their responses to the items referring to the quantity and quality of the teacher's feedback, such as sufficiency, clarity, and motivation. Table 4 reveals that 20.8% of the student teachers neither agreed nor disagreed and 8.3% disagreed that "the teacher's feedback was sufficient". This trend was repeated regarding clarity of feedback and its capacity to motivate: 20.8% of the student teachers neither agreed nor disagreed and 8.3% disagreed that "the teacher's feedback was clear", while 29.2% of the student teachers neither agreed nor disagreed and 4.2% disagreed that "the teacher's feedback was motivating". These more critical opinions on *sufficiency*, *clarity* and *motivation* were again confirmed by the qualitative answers in the questionnaire, albeit unevenly. Students' critical appraisal of the online communication of feedback was especially well evident in the qualitative answers.

Feedback Content: Sufficiency

In the open-ended questions, only one student referred to sufficiency by saying that what she missed the most was more feedback while developing the portfolio. In a very different direction, another student, already quoted, stated that this type of feedback should continue:

> Despite knowing that it's exhausting for the teacher and even for the students who have to revisit the work and correct much of it, I think it definitely helps a lot in gaining a fuller and better understanding of everything that is developed. (R10)

Feedback Content: Motivation (or Balance between Teacher's Positive and Negative Feedback)

Against other quoted opinions, one participant also highlighted the need for a greater balance between positive and negative content, which she considered important for the reinforcement of her self-esteem and confidence:

> At an early stage, the feedback sometimes seemed to be poorly received by me and my workgroup because we had done so much work and only the things we needed to improve appeared i.e., a positive comment was sometimes missing. When positive feedback did appear (in the end) it was very good for confidence building. (R10)

Feedback Content: Clarity

Limitations found in the clarity of the teacher's feedback was the aspect most often referred to in the open-ended questions. Students stated that feedback could have been "more direct" and that "in some cases, the group felt a bit lost" (R3). Another student teacher called for "more clarity in the suggestions" (R2). In her opinion, clearer and more focused feedback, which took into consideration what had already been done, should be developed. Thus, student teachers would have liked to have received "more concrete" (R5), more "coherent" (R6), "clearer" (R7) and "explicit" (R22) feedback, so that they could "understand better what was intended" (R18). Even issues that students related to timeliness can be interpreted as pointing to the lack of clarity of the teacher's feedback, which might not have been understood:

> We sent the work several times and the teacher corrected only a few things. In the final feedback, she sent us a lot of comments to correct. (R19)

Communication: Calling for Face-to-Face Meaning-Making

In students' responses there was a general acknowledgment that "distance education is not so dynamic and enriching" (R6), and that "in general, face-to-face classes would have been an added value" (R22). This call for face-to-face meaning-making was found very often in students' answers. In effect, several students expressed their preference for oral feedback when compared to the use of the written mode, while others expressed their absolute preference for face-to-face interaction:

> In my opinion, feedback given in person or by video conference was much more productive and better understood than that received by email. (R8)

> In my opinion, the feedback in an online seminar with each group is more profitable than written feedback. (R24)

> I can only highlight the importance of face-to-face feedback. (R12)

When they justified their preferences, student teachers state that face-to-face interactions would have offered the opportunity for more *quality* conversation, enhancing *clarity* and boosting their meaning-making:

> In my opinion, in-person or video conferencing feedback was much more productive and better understood than feedback received by email. (R8)

> In addition to the written feedback, if there had been more conversations, it would have been easier to understand the teacher's feedback. However, at the same time, I am aware that if there was only oral feedback, some things would not be taken into account, either by forgetting or not appreciating them. (R10)
>
> I think that what I missed the most in the feedback was it being face-to-face, although that was impossible during the entire process. I think that understanding would have been easier in person. (R12)
>
> I missed the face-to-face moments with the teacher to clarify doubts. Sometimes the doubts exposed by email were not completely clarified. (R13)
>
> The teacher's feedback was complete. However, the feedback provided through a conversation or dialogue, face-to-face or via blackboard, was more understandable. We were able to explain our doubts more easily and, consequently, we understand more easily what to do and how to overcome our difficulties. (R8)

4. Discussion and Conclusions

This study set out to investigate student teachers' perspectives about the online feedback provided in the online learning environment set up following the closure of the university due to the COVID-19 pandemic. The goal of the research was to develop insights about online feedback practices which may inform similar online contexts in the future, along with the subsequent development of the formative intervention approach that framed the study. While our findings are not generalizable due to the specific nature of the study, we nevertheless consider that they highlight a set of ideas that may be of particular relevance for better understanding online feedback practices in teacher education, as claimed by Grieve et al. [29]. We thus hope that they can contribute to developing teachers' proficiency in conducting online feedback [22].

Students affirm that they have built professional knowledge and appreciated the learning process underpinning it, which is in line with our previous findings with regard to the first year in which the formative intervention approach was tried [42]. Moreover, when considered in light of our current focus of interest, these results can be interpreted as pointing to two more important implications. On the one hand, they suggest the potential effectiveness of our formative intervention approach as a context for online teaching in general, and for the development of online feedback practices in particular. Hodges et al. [36] draw attention to the distinction between well-planned online learning experiences and those that have been swiftly offered in response to the COVID-19 pandemic crisis. Though necessarily requiring further research, the formative approach under investigation seems to answer this need, and the principles underpinning it (namely, PCK, rehearsed practice, epistemology of reflective practice and assessment both of learning and as learning) are potentially significant for designing online learning environments. On the other hand, the students' positive appraisal of their learning and the learning process confirm our interpretations of their perspectives regarding the feedback that scaffolded such learning. As such, our findings also suggest the general importance of giving close consideration to the specific pedagogic context in which feedback is conducted when studying how it is realised.

The available literature has shown that student teachers respond to feedback in distinct ways within specific courses, curricula and contexts, depending on their previous experiences and their personal characteristics [21], and this was confirmed by our data as well. In fact, we have found the convergent and divergent perspectives offered by this research, including thoughts on the limitations of feedback, to be highly significant for developing insights about online feedback practices.

In our case, from the point of view of the participants themselves, feedback had a positive impact on their learning since they could use it to expand their learning and work [54] and to develop their self-regulation [12,13,30]. Our findings therefore corroborate the role of feedback in student teachers' learning, achievement, and improvement [55,56],

especially through its formative dimension [17], highlighting the idea that it is also an important instructional approach for use in online environments [3].

In addition, our analysis of what the students said about their teacher's feedback is in line with key theoretical tenets regarding feedback dimensions in teacher education, though revealing some particularly significant aspects.

In effect, the results show how fundamental characteristics of feedback for teacher learning [55] continue to be essential in contexts in which feedback is given online, namely that it is framed within a practical learning approach, focused on specific content and involves specific audiences; as well as how the quantity and quality of feedback are important for experiential and reflective learning [20,31]. These are very much in line with the main conclusions reached by Paterson et al. [26] regarding students' preferences for feedback in higher education, although with a focus on online feedback in teacher education courses in our case. Yet, our findings suggest that two features are especially important for conducting online feedback in teacher education, namely clarity of meanings that are communicated and modes and media for meaning-making. While clarity has been the focus of much research [33–35], modes and media have not. Additionally, findings suggest that they are closely related. In our data, the use of diverse modes of conveying feedback, in which information was represented complementarily, was a particular target of students' appraisal, confirming what research has been indicating regarding the importance of considering multimodal communication in digitally mediated feedback [32].

However, contrary to what might be assumed (cf. Deeley [28]), our data suggest that the facilitation of communication enabled by digital, multimodal communication media does not immediately translate into quality feedback. Online feedback was experienced to be less effective than interpersonal face-to-face negotiation of meanings, which emerged as a preferred medium for the clarity and understanding of feedback. These findings suggest that meaning-making is a critical aspect of online feedback.

When looked at from the perspective of Carrillo and Flores [2], these findings suggest that online feedback affects the social presence of learning [57]. When seen in the light of semiotic theories of communication, our findings can be interpreted as showing that online feedback lacks important sources of meaning-making that add meanings conveyed by verbal language in interpersonal communication, such as gaze, eye contact, gestures, and posture [58,59], while also pointing to the need for online feedback to use strategies that may mitigate the embodied multimodality that is inevitably missing.

The main aim of this study was to contribute to the understanding of online feedback processes in teacher education. Our tentative conclusions are as follows:

- Online feedback involves the design and organisation of strong learning contexts that are underpinned by acknowledged learning principles [35,42];
- Online feedback supports learning, provided key and well-established features converge in its enactment. As such, it appears as a key part of "the different pedagogical approach required for an effective online learning experience" [2,60,61].
- Online feedback demands the use of complimentary modes of meaning-making that might enhance feedback as interpersonal communication [2,57], with a special emphasis on strategies that may compensate for the lack of embodied meaning-making. This would be clearly in line with Lamb's argument that: "When a convincing part of the rationale for placing greater emphasis on multimodality within assessment and feedback has been the need to align approaches with the evolving nature of meaning-making practices across society and education, we should recognise that a considerable amount of what takes places in schools, colleges, and universities remains deeply committed to the language in its various forms" [32] (p. 14).

These tentative conclusions are now in need of future research. The major limitation that we have identified in the questionnaire refers to what counts as quality feedback. This element was beyond the scope of this paper, but constitutes an essential topic in need of further research.

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