

Article

The Perceptions of Student Teachers of Online Pedagogical Courses and Assessment Practices in Finnish Subject Teacher Education

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Abstract: The purpose of this case study was to explore how student teachers at the University of Helsinki perceived pedagogical courses in emergency remote teaching. The dataset consists of the responses of 79 students to an online questionnaire and interviews with five students. Descriptive statistics, multiple linear regression analysis, and content analysis were used to analyze the data. The students pointed out that, on average, teachers have mastered the pedagogy of remote teaching well, although older teachers had more challenges than younger teachers. The quality of teaching was reported as being high. Teachers' pedagogical knowledge was the strongest predictor of successful remote teaching. In terms of assessment, teachers mostly used essays and other written assignments to assess students' achievement. According to most students, the assessment practices were implemented successfully. The results provide insights for developing remote teaching in teacher education.

Keywords: teacher education; emergency remote teaching; TPACK model



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1. Introduction

The aim of this case study was to shed new light on student teachers' experiences with remote teaching in subject teacher education in Finland. As in many other countries, since March 2020, teaching in higher education in Finland has been abruptly moved online due to the pandemic as the universities and schools shut down (see Assunção-Flores and Gago [1] for Portugal; Daniel [2] globally; Kidd and Murray [3] for England; König et al. [4] for Germany). However, for some courses in which contact teaching is imperative, such as laboratory courses, classroom teaching mode was maintained. In addition, at various stages of the pandemic, teachers were allowed to teach some parts of the courses via contact teaching. Yet, the amount of contact teaching in Finnish higher education has been limited during the pandemic, which is why concerns have been raised about the quality of teaching, assessment, interaction, and support.

Teachers in Finland acquire their formal qualification by completing pedagogical courses (60 credits—one credit = 27 study hours) in faculties of education. The specific content of these courses varies across universities. At all universities in Finland, teacher education is based on research and seeks to educate autonomous and reflective practitioners who can interpret the core curricula and invent and question the ways to put it into use in their daily realities.

In Finland, remote teaching during the COVID-19 pandemic has been investigated from a range of perspectives. For example, previous research has focused on language teachers' assessment and feedback practices [5], academic achievement in physics and chemistry [6], and comparisons between Thai and Finnish higher education students [7]. These studies show that students in Finland faced challenges with time management [6] but not particularly with technical issues [6,7]. A recent study about PhD students in

Finland found that the pandemic had decreased well-being and hindered the completion of the students' dissertations [8]. However, the experiences of student teachers during the pandemic are an uncharted area in Finnish research. Therefore, this paper makes a major contribution to the field of education by outlining how student teachers have experienced teacher education in emergency remote teaching in Finland. The central questions in this paper are as follows: (1) What perceptions do student teachers have about online pedagogical courses in emergency remote teaching? (2) Which factors predict successful emergency remote teaching? (3) How have student teachers perceived teachers' assessment practices in emergency remote teaching?

2. Emergency Remote Teaching and Assessment in Online Contexts

Usually, remote teaching is intentionally used in education, which means that the content of the course is planned to suit online platforms. However, remote teaching is sometimes unplanned and forced, particularly due to catastrophes or other unprecedented circumstances. In the literature, this type of teaching can be characterized as emergency remote teaching [9]. Whittle and colleagues [10] proposed a framework of emergency remote teaching environments. This framework encompasses three nonlinear and iterative steps: inquiring, classifying, and designing. Effective teachers inquire about their own and students' familiarity with and access to technology, safety, and health. As constant re-evaluation is important in a crisis, effective teachers revisit inquiries repeatedly. When teachers have identified salient factors through inquiry, they are grouped into constants (accessible by all) and variables (accessible by only some). At the design stage, teachers use the constants and the variables to design instruction and to accelerate learning [10].

Implementing high-quality remote teaching requires a great deal of knowledge of pedagogy and teaching. Scholars have introduced a particular framework to address this knowledge, namely Technological Pedagogical Content Knowledge (henceforth, TPACK) [11]. The TPACK framework is based on Shulman's [12] work on pedagogical content knowledge. This framework assists in understanding how knowledge of technology, pedagogy, and content are interrelated in orchestrating good, context-specific teaching [11]. Koehler and colleagues [13] defined these components as follows: content knowledge can be characterized as subject-matter knowledge, while pedagogical knowledge refers to knowledge of using instruction to enhance learning. Lastly, technology knowledge refers to using technology efficiently in teaching to meet the requirements of the curriculum [13]. Mishra and Koehler [11] argue that these three components do not exist in isolation; rather, their interplay is complex. In other words, teachers need to display competence in all three domains to integrate technology into teaching [14]. However, it is crucial to underline that TPACK is not synonymous with adding more technology to teaching; instead, the focus is on the relationship between subject matter and the affordances of technology to foster learning [15]. In this study, we address the TPACK model to illustrate both teachers' and students' knowledge and skills that manifest in the results.

From the students' perspective, the TPACK framework is central; research has found that when teacher educators use technology accordingly in teaching, student teachers are able to select pertinent technology tools to integrate them into their own teaching [16]. Modeling the efficient use of technology for student teachers is focal as they do not always recognize the interplay between teaching and technology [17]. However, more qualitative research is required to explore how the framework manifests itself in teaching [18].

In addition to the TPACK model, Garrison and colleagues [19] introduced a framework including three crucial prerequisites for successful remote teaching in higher education. This framework encompasses three elements: cognitive, social, and teaching presence. Cognitive presence is defined as the extent to which the students in a learning environment "are able to construct meaning through sustained communication" (p. 89). Social presence is taken to mean the ability of the students "to project their personal characteristics into the community" (p. 89). Lastly, teaching presence refers to designing the learning experience and facilitation [19]. We describe the practices that surface in our data in relation to the

three modes of presence. In a pedagogy of care in remote teaching, social and teaching presence are key factors [20].

How students in higher education have perceived the pandemic and emergency remote teaching has been the subject of several studies. For example, Browning and colleagues [21] found that the pandemic has impacted most students negatively, causing stress and anxiety. The researchers also emphasized that the risk of psychological impact increases if one is young or a woman. In Russia, a study on university teachers' perceptions showed that most students can study online and use online platforms. However, some students exhibited problems with connections, self-regulation, and motivation to study online [22]. Moreover, the impact of the pandemic has been heterogeneous; for some students, study time increased during the pandemic, while study time simultaneously decreased for others [23]. In a similar vein, the effect of the pandemic on teacher–student interaction also seems to be heterogeneous. On the one hand, teachers were more available, and several communication channels were offered, which increased interaction; on the other hand, human contact was lacking as the cameras were mostly off [24]. Some students were also shy, particularly if the lessons were recorded. Thus, remote teaching is considered to be impersonal, while contact teaching is regarded as being involving [24]. According to Fuchs [7], students consider online instruction to be a suitable alternative for contact teaching in a time of crisis, but completing group work in emergency remote teaching is challenging for some students. In terms of assessment, closed-book exams at the end of the study unit were not recommended; instead, teachers should opt for more flexible assessment practices [25]. Even though teachers in higher education were not prepared for online assessment, they have created innovative assessment practices that increase authenticity [26], and in general, teachers feel that their assessment has been reliable [5]. In the emergency remote teaching framework, assessment plays a major role, but teachers first need to inquire about resources, after which they design pertinent assessment practices [10].

The pandemic has changed teacher education as student teachers complete their internships partially or fully online and practice co-operation, adaptation, and interaction in new and innovative ways [1]. Although students have faced problems in teacher education due to the pandemic [1], some of these changes can be seen as an innovation that develops prior teaching practices and promotes sustainable pedagogy [27]. This underlines the importance of studying emergency remote teaching to enhance teacher education. However, most of the research on emergency remote teaching conducted in higher education is not based on theoretical frameworks [28]. Even though assessment is a quintessential element of teaching, research on assessment in higher education during the pandemic is sparse [28]. Therefore, this case study, which is grounded in rigorous research and frameworks, contributes to the literature by outlining students' experiences of courses and teachers' assessment practices in teacher education in emergency remote teaching.

Drawing on the classical division proposed by Scriven [29], approaches and methods of assessment can be categorized as summative or formative. The classification is determined by numerous factors, including timing, duration, frequency, and more recently, by their use and the gravity of the consequences of performance in the assessment [30]. In tertiary education, written exams for summative purposes are the most established type of assessment, dating back to ancient times. Over the last few decades, the use of formative evidence for course grades has also increased in teacher education. Pre-service teachers collect portfolios, write learning diaries, carry out self and peer-assessment, and provide and receive feedback on their work samples both live and online. In the times of COVID, supervised tests administered in large lecture halls have typically been replaced by various forms of take-home tests independent of place and time. Alternatively, summative evidence can be gathered through time-constrained tests administered on digital learning platforms either individually or in group settings.

Due to the exceptional situation, teacher education programs report considerable modifications in assessments and grading systems, such as shifting to a descriptive reporting mode instead of numerals and the exclusion of certain criteria based on attendance.

Concerns about maintaining quality also prevail [31], alongside worries about legality and security issues [32]. However, new openings involving more inclusive processes promoting student and teacher agency have been made [33]. While mediated online assessment models may advance certain dimensions of assessment processes, there are shortcomings due to reduced interpersonal communication, affective bonding, and the clarity of feedback provided on teacher education courses moved online at short notice [34]. On the other hand, positive relations can be fostered by comparatively simple means, such as happy face emoticons attached to quality feedback [35]. It is essential to incorporate systematic plans to provide relevant and timely feedback into online course plans right from the onset [36].

It goes without saying that online and hybrid forms of assessment require not only substantial knowledge but also a baseline of digital application literacy—i.e., the ability and skill to use the required software. Separating content and method of assessment is imperative for the fairness and validity of the value statement [37]. The urgent need for technical skills and online pedagogy has also been identified by pre-service teachers in the mandated transition from a physical classroom to a virtual space [38].

The enforced adoption of online modes in teacher education undoubtedly brought about assets that are here to stay, but issues of accessibility, the stability of technical equipment, and practical concerns call for long-term solutions [39]. When implementing online and hybrid forms of assessment, we need to consider carefully the suitability of various assessment options for each purpose and consider the limitations and benefits of online vs. other modes to capture the broad spectrum of learning outcomes [40,41].

3. Materials and Methods

3.1. Subject Teacher Education at the University of Helsinki

The pedagogical courses required by a student to qualify them to teach in a subject taught in basic and general upper secondary education in Finland consist of 60 credits (1 credit = 27 study hours). These courses are customarily taken after two or three years of subject courses in another faculty dedicated to sciences, modern languages or social sciences, for instance. Admission to pedagogical courses includes an interview, in which the suitability and motivation for undertaking teacher education are explored, alongside communicative ability. The students approved for entry to the pedagogical track will study education as their minor academic discipline that will be incorporated into their master's degree. After the completion of the pedagogical courses, the students are qualified to teach any subject in which they possess or acquire an adequate number of credits.

The pedagogical courses comprise three major components: general pedagogical courses (15 credits), subject didactics (25 credits), and practice (20 credits). The subject didactic strand also includes a research seminar. These are allocated across four periods of a study year ranging from August to May. The instruction is delivered in Finnish (the majority language of the country), Swedish (the second official language), or in English (a specific international track). Study units with theoretic and practical foci are implemented alternately. The academic courses are typically arranged on-campus, while the practice periods take place in state-owned training schools that belong to the university. The course objectives and core content are defined in the curricula, but the methods of implementation may vary between subjects and instructors. A mainstream on-campus course consists of lectures, practical exercises in small groups of about 20 people, and literature reading, either for a formal examination or as source literature for joint discussion. At teacher as researcher seminars, the students explore a theme of their choice and write a small-scale research report to be discussed at a group session. The practice component features lesson planning, giving an in-class lesson to real school pupils or adult students, and receiving feedback from the mentoring teachers in a training school. Observing classes by other student teachers and their mentors is a part of the school practice. Furthermore, relevant themes adhering to teachers' everyday work and subject-specific needs are covered by general and group mentoring sessions during the practice periods.

The knowledge and skills relevant to the assessment literacy of prospective language teachers are specifically targeted during a five-credit course in the spring term. Nonetheless, formative assessment as an inseparable constituent of teaching and learning is targeted at the basic didactic course at the very beginning of studying pedagogy and further throughout both practice periods at schools.

Course grades are based on written exams, essays, learning diaries, teacher as researcher theses, micro-teaching performance, and participation during interactive teaching modes evaluated by the teacher, jointly by peers and the teacher, or even including self-evaluation. Written exams are normally arranged under supervision in large plenary rooms and in a strictly determined timeframe, while essays, learning diaries, and reports allow multimodal submission (such as video clips or speech recordings) and individually flexible returning dates.

Traditional software (e.g., Moodle) with basic tools for written interaction and storing work samples has been in use for decades, but in 2020, teacher education pedagogies underwent an unexpectedly rapid evolution of technical implementation. From March 2020, all teaching was delivered at a distance, often via Zoom or Teams.

Despite the potential for interactivity with Zoom and Teams enabled by a small group function, all components of pedagogical study were revolutionized. The effect was minor regarding lectures, which were partly recorded and already accessible online. The most striking change was experienced in teaching practice, as student teachers were not allowed to attend schools or meet pupils at all due to the security regulations issued by governmental and regional administrative bodies. In fact, most age cohorts at all schools were moved to distance learning, so there were no pupils to teach at the training schools either.

During the lockdown, the regular types of assessment practices and evidence were accompanied and largely replaced by written work samples, although in some courses, alternative forms of submission were strongly encouraged. The major principles of course assessment remained unchanged in the COVID era, implying a summative course grade assigned for most study units. This does not include practice and reflection, which are assessed on a pass/fail basis, with the latter usually termed as performance “in need of completion”. Nevertheless, the solitary work from home and lack of live human encounters may have had an impact on the wellbeing and capacity of students to cope with the increased demand for written performance samples.

3.2. Participants

The participants in this case study were 79 student teachers in the Faculty of Educational Sciences at the University of Helsinki. The case study approach was used to allow a deeper understanding of an understudied topic in Finland. All the students had completed their pedagogical courses in emergency remote teaching. Ninety-two students answered our online survey, but 13 responses were excluded as they answered only the background questions. In terms of gender, 54 students were female and 19 were male. Five students did not want to disclose their gender, and one student was non-binary. Most students (35) had no prior experience of teaching before the pedagogical courses, while some (20) had already been teaching for more than one year. Courses in Finnish universities are assessed on a scale from zero (failed) to five (excellent), and the most common grade for pedagogical courses was four (56). For most students (59), the teaching practice periods had taken place completely in remote teaching. A total of 18 students had taught in both contact teaching and remote teaching. Two students had taught only in contact teaching.

In terms of the interviews, seven students expressed interest in participating. They were all sent a formal request via email, and five students agreed to participate. Table 1 summarizes their background information.

Table 1. Background of the interviewees.

Pseudonym	Length of Interview ¹	Age Group	Most Common Grade ²	How the Practice Was Conducted	Keenness to Become a Teacher
Andy	38	40 and over	4	Remote teaching	Very keen
Monica	38	40 and over	4	Remote teaching	Very keen
Betty	21	30–34	3	Contact and remote teaching	Somewhat keen
Valerie	44	40 and over	4	Remote teaching	Very keen
Violet	23	30–34	5	Remote teaching	Not really keen

Note: ¹: length refers to the length of the interview (minutes). ²: the grades range from 0 (failed) to 5 (excellent).

As Table 1 depicts, most participants had received high grades in the pedagogical courses and taught remotely in the basic and advanced practices. Most also wanted to become teachers.

3.3. Data Collection and Analysis

The data were collected in May 2021 at the end of the academic year via an online survey. Before the data collection, a pilot study was conducted ($N = 22$), based on which the survey was slightly modified. The survey comprised several salient themes in emergency remote teaching. The survey also included a link to the privacy notice. Participation was anonymous and voluntary, and the link for the online survey was sent via email to student teachers. The content of the survey is illustrated in Table 2.

Table 2. Content of the online survey.

Theme	Number of Question(s)	Scale
Background questions	8	Likert 1–5
General perceptions of remote teaching	6	Likert 1–5
Perceptions of remote teaching in the pedagogical courses	15	Likert 1–5
Suitability of remote teaching to specific courses	11	Likert 1–5
Use of assessment practices in courses	10	Likert 1–5
Students' experiences of assessment practices	1	Open-ended
What has worked well in remote teaching	1	Open-ended
What should be improved in remote teaching	1	Open-ended
Effects of remote teaching on students	5	Likert 1–5

As shown in Table 2, the survey encompassed eight salient themes about emergency remote teaching in addition to the background questions. The themes in bold are reported in this study.

Descriptive statistics were used to analyze the closed-ended questions, and multiple linear regression analysis was used to predict the successful implementation of remote teaching. Prior to conducting the multiple linear regression analysis, several assumptions, such as multicollinearity, independence, and homoscedasticity, were tested to ensure the suitability of the analysis. In terms of the open-ended questions, the responses were analyzed by means of content analysis [42], and categories based on the recurring themes appearing in the responses were formed. Direct quotes from the dataset have been used to illustrate the results of the open-ended questions. The quotes were translated into English.

The first author coded the interview data, and the third author coded the open-ended responses. The analyses were discussed together, and any disagreements or ambiguities were explored meticulously to reach a joint understanding of the themes.

4. Results

4.1. Students' Perceptions of Online Pedagogical Courses

The purpose of the first research question was to explore student teachers' perceptions of online pedagogical courses in emergency remote teaching. The results are depicted in Table 3.

Table 3. Teacher students' perceptions of online pedagogical courses.

	Item	M	S.D.
1.	On average, the teaching has been organized well.	3.78	1.05
2.	For the most part, the teaching has worked exemplarily.	3.87	0.99
3.	I am mostly satisfied with the quality of the teaching.	3.70	1.05
4.	My skills for participating in emergency remote teaching are sufficient.	4.47	0.96
5.	Students' skills for studying in emergency remote teaching are inadequate.	2.80	1.16
6.	Teachers master the pedagogy of emergency remote teaching.	3.25	1.15
7.	Planning group work (e.g., presentations) has worked well remotely.	3.49	1.25
8.	Working in small groups (e.g., Breakout Rooms) has worked well remotely.	3.54	1.24
9.	It is demanding to follow lectures remotely.	3.39	1.37
10.	I received insights from remote practicum for contact teaching.	3.68	1.15
11.	Mentoring during remote practicums was efficient.	3.86	1.15
12.	Interaction in remote practicum was deficient.	3.19	1.41
13.	My technical readiness to participate in remote teaching is sufficient.	4.44	0.94
14.	On average, other students have better technical skills than I have.	1.99	1.12
15.	The teachers of the pedagogical courses do not have sufficient technical skills for emergency remote teaching.	2.33	1.06

Note: M = mean, S.D. = standard deviation.

As depicted in Table 3, the students agreed that emergency remote teaching had mainly been executed well. They rated their skills and technical capabilities for online teaching as being adequate. Students were also confident that their skills were superior to their peers' skills. It seems that the teachers had mastered the pedagogy of online teaching. Group work succeeded well even though following online lectures was laborious according to the students. In terms of the teaching practicum, the students considered it to be successful although interaction had been deficient.

The interviews provided additional information on the results mentioned above. In terms of teachers, major differences could be noted in their technical pedagogical skills. The interviewees pointed out that some teachers had problems with the equipment. Valerie mentioned:

Teachers had problems with sharing one's screen, and they were not able to unmute students. Out of the 200 students, there was always one student whose mic was on, and you could hear everything from children to dogs to men in the background. And then, there was a lot of waiting time. "Where can I find this? Why did it go like that? Why don't you see my PowerPoint?" (Valerie)

Here, Valerie points out that teachers faced problems with practical issues of teaching related to using a computer or a laptop. In addition, Andy emphasized that teachers should have learned how to use the various online platforms before the courses, as emergency remote teaching was no longer still a novel concept in Finnish higher education in September 2020. Betty mentioned that younger teachers were more skilled with the online platforms than older teachers. Regarding students, most interviewees felt that students' skills for participating in online teaching were mostly good. However, Monica mentioned that some students had poor laptops and microphones, which caused them some problems. Violet pointed out that older students faced more challenges than younger students. Yet, she underscored that those younger students also encountered problems, such as what a file is and how files can be uploaded. According to the interviewees, their own skills for participating in remote teaching were high or above average.

The interviewees agreed that emergency remote teaching is suitable for mass lectures at which cognitive presence was sufficient. However, Andy and Violet mentioned that one can easily be distracted when following mass lectures at home. Monica explained that students cannot always see the blackboard in the lecture hall clearly, which can be avoided in online teaching. Concerning small group teaching, the interviewees also agreed that, to some extent, remote small group teaching can be implemented in remote teaching. However, Valerie and Betty emphasized that this depends on the students' technical skills. Valerie was also adamant that contact teaching is more suitable for small group teaching than remote teaching. Monica said:

In one course, Support for Learning and Well-being, we had structured meetings online in which the aim was clearly stated. Small groups worked well, but we had formed the group beforehand, and I knew three of the five students. Small groups work well if you have some sort of a relationship with the other members. (Monica)

As Monica stated, it was less effort to participate in small group teaching if she knew the students beforehand and if the instructions were clear. Obviously, establishing social presence is easier among familiar participants.

In terms of the teaching internship, only Betty felt that the internship could be executed well in remote teaching. The other interviewees felt that a lack of interaction with students and an inability to see students rendered the implementation of the internship in remote teaching challenging. Teaching presence may be difficult to orchestrate at a distance, and a far too challenging technical environment may hamper the deployment of content and pedagogical knowledge of a practicing student teacher. Moreover, the interviewees presented mixed opinions on whether the students had received tangible suggestions about how to teach in contact teaching. Andy and Betty learned about lesson planning and time allocation, while Monica discovered various teaching activities. However, Valerie stated

that she had various ideas about how to teach in contact teaching, but she was unaware of whether her ideas would work in the classroom. Violet emphasized that she had not acquired knowledge of how to teach in the classroom. Based on the interview excerpts, remote teaching is appropriate for meeting the needs of cognitive and teaching presence and to convey the pivotal content knowledge to pupils, but ensuring effective teaching presence and maintaining social presence is more challenging.

4.2. What Has Worked Well in Emergency Remote Teaching

Regarding what was deemed to have worked well in an emergency remote teaching setting, ease of attendance took first place (11). The fact that participation in lectures and group work via remote connection could be done from anywhere was seen a plus by several students. Attending teaching was possible in various situations and from various places, even when a student was ill at home and would normally have been unable to attend. Taking part remotely also saved time and money as commuting became unnecessary. The responses included mentions of mass lectures and group work becoming easier to attend than normal.

Lectures and group work have gone very well. It's been easy to get together online, as we didn't need to be in the same place physically. (Anonymous student teacher)

Attendance and the organization of mass lectures was the second most common answer (10). According to one student, remote mass lectures facilitated better interaction between the participants than can normally be arranged in a large lecture room. Another student said their concentration was improved by being able to listen to the lectures remotely on their own. One student admitted that the remote nature of the lectures made it easier to attend each lecture, which they likely would not have done had the lectures been arranged on campus.

The mass lectures worked well in distance learning. When we are in a big lecture hall, the interaction is lacking anyway. (Anonymous student teacher)

Here, the student pointed out that interaction is also challenging in lectures halls. Although a lack of interaction is a major concern in emergency remote teaching, this does not necessarily affect mass lectures, which are usually teacher-led.

The practical arrangements of the courses also received positive feedback (8). These students mentioned the ease with which teachers and fellow students used remote learning tools for effective teaching and group work.

Many courses were clearly well prepared in advance. Most teachers had a solid or excellent command of technology. (Anonymous student teacher)

As this student mentioned, teachers' skills for using the equipment efficiently were mainly solid. Use of technology is also apparent in the TPACK model.

4.3. What Should Be Improved in Emergency Remote Teaching?

Regarding suggested improvements, 19 students mentioned a lack of interaction with other students and teachers. The suggestions clearly call for the improvement of social presence. A wish for clearer guidance from the teachers to intensify teaching presence was also mentioned in multiple responses. It was suggested that students should be able to meet in person at some point to be able to make friends and form connections. It was also suggested that all courses should have some level of contact with the teacher instead of all materials merely being online for the students to find and learn on their own.

I wish there was some contact teaching in addition to remote teaching. It would make getting to know other students easier. (Anonymous student teacher)

The complete lack of direct contact with the students in the practice schools was seen as a disappointment, and some felt unsure about entering the workforce, having only practiced teaching remotely. It was also mentioned that it would be beneficial to

teach practice lessons alone without a student partner, as that would better mimic real-life situations in schools.

The teaching practice periods left me feeling a little uncertain. I taught only one lesson on my own, and all the others I taught with another trainee teacher. Everything was done remotely, which is not a very accurate representation of classroom teaching. I worry about how I will cope when I enter the workforce. (Anonymous student teacher)

As the student pointed out, the teaching practice did not provide a realistic experience of teaching. In other words, students are unsure whether they would be able to teach in person as they taught only remotely.

An equally crucial point of improvement, with 19 mentions, was the use of varied methods during teaching. Instead of a course consisting only of written essay tasks to be completed alone, a combination of methods—even with the opportunity for a more personal and tailored way to pass a course—was suggested. Some respondents felt that long lectures should include diverse types of activities, not just lecturing.

Lectures should have more breaks. No-one can listen to a 4 h lecture in one go. More varied activities and assignments. More variety in general. (Anonymous student teacher)

Eight students wished for less group work, and 10 students mentioned that they would prefer less work in general. Some felt that the workload was higher than during normal times. Ten students felt that they lacked sufficient instructions for course assignments or that materials were difficult to locate in the various online platforms used. They thought clear instructions were important during distance learning to enable a meaningful experience of cognitive and teaching presence.

In some of my courses, I was unsure of the assessment criteria, and locating materials on Moodle has been difficult. The online platform that is used should be easier to navigate in distance learning, so that locating materials does not pose an extra challenge. All important information should always be quick and easy to find. (Anonymous student teacher)

4.4. Predicting Successful Implementation of Emergency Remote Teaching

To ascertain which teaching components predict the success of emergency remote teaching (the second research question), multiple linear regression was used. First, correlations were explored between the items. The analysis showed that four items had relatively high correlations (above 0.50) with the first three items about the successful implementation of remote teaching. These items were as follows: *my skills for participating in emergency remote teaching are sufficient, Teachers master the pedagogy of emergency remote teaching, planning group work (e.g., presentations) has worked well remotely, and working in small groups (e.g., Breakout Rooms) has worked well remotely*. Hence, these items were chosen as the predictors of successful implementation of remote teaching.

Second, multiple linear regression was conducted to test whether students' skills, teachers' pedagogical knowledge, preparation of groupwork, and working in small groups significantly predicted the successful implementation of remote teaching. The first analysis revealed that working in small groups did not significantly predict the implementation of remote teaching ($\beta = 0.03, p = 0.779$). Hence, that item was deleted, and multiple linear regression was rerun with the remaining three items. The results of the analysis are shown in Table 4.

Table 4. Outcome of the multiple linear regression analysis.

Predictor	un. β	st. β	df	t	p	95 % Lower	95 % Upper
Students' skills	0.341	0.312	3	3.522	<0.001	0.148	0.534
Teachers' pedagogical knowledge	0.411	0.451	3	5.778	<0.001	0.269	0.552
Preparation of group work	0.209	0.250	3	2.651	0.010	0.052	0.366

Note: un. = unstandardized, st. = standardized.

Based on the information in Table 4, the fitted regression model was as follows: implementation of emergency remote teaching = $0.195 + 0.341$ (students' skills) + 0.411 (teachers' pedagogical knowledge) + 0.209 (preparation of group work). The overall regression was statistically significant ($R^2 = 0.62$, $F(3, 75) = 40.841$, $p < 0.001$). It was found that students' skills ($\beta = 0.312$, $p < 0.001$), teachers' pedagogical knowledge ($\beta = 0.451$, $p < 0.001$), and preparation of group work ($\beta = 0.250$, $p = 0.010$) predicted the implementation of emergency remote teaching. The most powerful predictor was teachers' pedagogical knowledge, which appeared to take priority among the three TPAC components.

4.5. Students' Perceptions of Assessment Practices in Emergency Remote Teaching

The purpose of the third research question was to explore students' perceptions of teachers' assessment practices in online pedagogical studies. First, the students were asked how often teachers had used specific assessment practices. The results are illustrated in Table 5.

Table 5. Use of assessment practices in pedagogical courses.

Item	M	S.D.
Exam in Moodle	2.13	0.88
Written exam at the university	1.17	0.64
Pair test	1.06	0.29
Essay	3.69	1.21
Other written assignment	3.90	1.19
Presentation	3.36	1.29
Video made by a student	1.86	0.92
Learning diary	1.99	1.26
Self-assessment	2.97	1.35
Peer assessment	2.91	1.18

Note: pair test refers to a test that two students perform together.

As illustrated in Table 5, teachers had implemented essays, other written assignments, and presentations as the main forms of student assessment. Formative assessment in the form of self and peer assessment was also applied to an extent. Videos, learning diaries, and exams were rarely used as assessment practices.

A closer analysis of the interview data revealed that mixed opinions about the assessment practices were noted. Andy was mostly satisfied with the practices, particularly in the spring term, because the assignments were implemented continuously during the course instead of course exams. Similarly, Violet agreed that the assessment had been executed well. However, Valerie and Monica explained that the clarity of assessment varied between the courses; in some courses, the assessment criteria were clear and logical, whilst the assessment practices and criteria in other courses were unclear. Betty mentioned that it is more challenging to assess students in remote teaching.

In addition, the amount of teacher feedback was low according to most interviewees. That said, Violet mentioned that she had received more feedback in the pedagogical courses than in her major courses. The form of the feedback had been mostly written. The interviewees suggested some practices for providing oral feedback, such as online

discussions with the teacher and discussing student work. However, as Monica pointed out, it is difficult to provide individual oral feedback in a group of 20 students. Valerie suggested that teachers could record their feedback, which would render it more personal.

In the open-ended question about student teachers' experiences of assessment practices, 20 respondents found the methods used to be good and successful for the most part. One student mentioned that they enjoyed the varied assessment methods used. Another student considered the grades they received to be fair and not something they felt they wanted to question. It was also mentioned by one student that they were able to have a personal say in the way assessment was conducted, and that this was seen as a positive issue.

Assessment practices have been successful. I believe I only had one exam, and all others were group work assignments or essays. I found the learning game/simulation during the Didactics II course a particularly enjoyable and useful way of completing the course. (Anonymous student teacher)

Here, the student indicated their satisfaction with the assessment practices. They also mentioned that assessment did not focus on traditional exams as teachers had employed various practices.

One respondent pointed out that active participation was more difficult during distance learning due to the nature of the technology involved and the lack of natural face-to-face communication. Moreover, also evident from some responses was a sense of empathy for the teachers conducted the assessments at a time when existing practices developed for face-to-face situations had to be adapted rapidly for distance learning. A feeling of understanding was reflected in one student's response, stating that assessment had been successful, considering the available means under the circumstances.

I'm sure teachers have had to come up with new and creative solutions for assessment during distance learning. I'm sure the assessment has been successful with the means available during this time. I have no major grievances. (Anonymous student teacher)

The second largest group consisted of 13 students who found the assessment practices to be stressful. The reasons for this ranged from an overabundance of group work to too much work in general. Multiple answers mentioned group work as a source of stress.

Assessment was often based on group work, and during distance learning, work doesn't always get distributed evenly between the members. This cannot be considered in assessment. I didn't always consider this a positive thing, as under the circumstances, I would personally have been happy with just passing a course. However, other group members were more ambitious, and this has caused me stress during the year. (Anonymous student teacher)

This student accentuated the problematic nature of group work in emergency remote teaching. An uneven distribution of work can be stressful for students, which increases the negative effect of assessment.

Some found that new, innovative practices added to their stress in a situation in which everything in general was new. Others felt that the amount of group work and assignment was excessive and that they would have preferred more exams instead of chaotic group work.

I found all the new and strange ways to do assessment a little unnecessary. For example, filming a video was a new practice for me, and I felt like it was too much when added to the unusual learning circumstances we had. When teaching is completely different from how it normally is, assessment should remain as similar and familiar as possible (learning diaries, presentations, exams). (Anonymous student teacher)

As this student discussed, teachers used new assessment practices in emergency remote teaching. However, the transition to a new type of teaching was challenging for many students, and it is possible that the overabundance of new practices hindered learning.

5. Discussion

The results of this study provide a comprehensive insight into student teachers' perceptions of emergency remote teaching and assessment. Given that most of the previous research on the pandemic has overlooked assessment and not been firmly based on theoretical frameworks [28], our study, resting on rigorous research, advances the understanding of teacher education and assessment practices in emergency remote teaching. The aim of the first research question was to explore how students experienced online pedagogical courses in emergency remote teaching. The main results indicate that students were satisfied with the quality of teaching, their skills are sufficient for participating in emergency remote teaching, they have been able to work with peers, and most teachers master the pedagogy of remote teaching. In other words, students mainly have positive perceptions of emergency remote teaching, although they also emphasized that online lectures can be laborious, and teaching internships conducted online have not provided every student with a teaching toolkit for contact teaching. The effects of remote teaching were therefore heterogeneous. These results corroborate previous studies [22,23]. As most teachers were deemed to be able to use technology appropriately in teaching, they possess technological knowledge [13]. However, the interview data suggested that older teachers faced more problems using the equipment. A further area in need of improvement was the balance between cognitive and social presence to ensure a rewarding teaching and learning environment.

According to the students, they succeeded in collaborating in small groups. From the point of view of high-quality teaching, this is crucial. Cognitive and social elements of teaching are focal in successful remote teaching [19], and they can be enhanced particularly in small groups. Small groups can serve several purposes in remote teaching, and it is unclear how the respondents have interpreted this item. The Zoom program, which is widely used in remote teaching, offers both ad hoc and permanent grouping options in its breakout room function, but these can be used in a variety of ways. The item neither specified the pedagogical purpose nor the kind of "functionality" targeted. In the interviews, students gave their views on purely practical concerns of working in groups to jointly prepare pieces of assessment evidence. Collaboration and interaction alongside digital competence is currently considered in assessing students' learning and performance, and the facilities provided by the universities should be appropriate at any time, not only in periods of mandated remote teaching.

Since the overall findings of the regression analysis suggest that students' skills, teachers' pedagogical knowledge and skills, and preparation of group work were the best predictors of successful emergency remote teaching, remedial actions should primarily address these components. It is obvious that both students and teachers need to acquire a wide range of technical skills to use multiple applications, not only for entertainment but also for traditional literary work. Although the technical competence was considered high among students, some of them still may be well familiar with complex gaming innovations but confused by conventional text processing tools. Teachers, again, should seek to maintain and update their expertise on a regular basis, not merely in cases of emergency, such as the lockdown. As teachers' pedagogical knowledge is the most powerful predictor of successful remote teaching, regularly updating one's skills and knowledge is of the essence. This is in line with the findings of Garrion and colleagues [19], who argue that designing pertinent teaching practices is key in remote teaching.

The third research question asked about teachers' assessment practices in online pedagogical courses in emergency remote teaching. According to the students, the most suitable assessment practices are essays, other written assignments, and presentations. Written exams, learning diaries, and videos were the least suitable assessment practices. Traditional closed-book exams are not recommended for emergency remote teaching [25], and the results indicate that students have internalized this recommendation. Concerning the qualitative data, the results suggest that most teachers have employed pertinent, even multifaceted, assessment practices. From that perspective, it seems that most teachers possess sufficient technical pedagogical knowledge [13]. As caution must be applied when

choosing suitable online assessment practices [40,41], it seemed that several teachers were able to choose and employ assessment to enhance learning in teacher education. That said, some students experienced the assessment as stressful, and the workload had been high.

We argue that the practical contribution of this study relates to the planning of courses in teacher education. COVID-19 will not be the last pandemic affecting education. Therefore, the findings of rigorous research provide insights into how instruction can be implemented successfully and safely when educators and students are faced with future catastrophes. In remote teaching, more attention should be paid to teachers' technological skills, opting for assessment practices suitable for enhancing learning, implementing high-quality teaching, and fostering interaction and joint knowledge creation through empathy and social presence. Teachers of teacher education require more training in these domains to advance their professional growth and pedagogical skills. Simultaneously, this will enhance students' learning. Moreover, as research has revealed that there are instructive teaching practices in emergency remote teaching, it is probable that hybrid teaching will be more common in the future, both in Finland and abroad. Our results provide insights for creating and developing high-quality hybrid teaching modes to better accommodate students as teacher education can take place more asynchronously in the future. In terms of assessment, teachers have planned a range of new practices to suit online platforms. As teachers are most likely to be better equipped with skills for online assessment now compared to at the beginning of the pandemic, the use of multimodal assignments might increase in the future, even after the pandemic. To create instructive multimodal assignments, our results provide implications for creating the assignments and what to consider in the planning stage.

The current study was limited by its small number of participants, which means that the participants are not representative of all Finnish student teachers. This also affected the quantitative analyses; it was challenging to compare students' perceptions, as the groups would have been uneven. As this case study only explored teacher education at one university, another source of uncertainty is the lack of generalizability of the results. Students' perceptions were also explored at a general level, not focusing on their teaching subjects and whether differences exist between them. A natural progression of this work would be to explore teacher education by increasing the sample size and exploring whether some variables, such as gender and teaching experience, affect students' perceptions of remote teaching. Another interesting topic would be to observe student teachers' training lessons in emergency remote teaching.

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