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EDITED BY
Catalina Lomos,
Luxembourg Institute of Socio-Economic Research, Luxembourg

REVIEWED BY
Ayat Tarazi,
University of Granada, Spain
Ünal Deniz,
Scientific and Technological Research Council of Turkey, Türkiye

*CORRESPONDENCE
Anne Haarala-Muhonen
✉ anne.haarala-muhonen@helsinki.fi

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University students' experiences of fully online teaching and learning environment—differences among learning profiles

Anne Haarala-Muhonen[1]*, Henna Asikainen[1], Nina Katajavuori[1], Päivi Kinnunen[1], Leena Ripatti-Torniainen[2] and Tarja Tuononen[1]

[1]Faculty of Educational Sciences, Centre for University Teaching and Learning, University of Helsinki, Helsinki, Finland, [2]Faculty of Education and Culture, Tampere University, Tampere, Finland

This mixed-method study explores university students' experiences of fully online teaching–learning environments and their relations to students' approaches to learning profiles. Altogether, 504 students from different faculties completed questionnaire measuring approaches to learning and responded to an open-ended question about their experiences with online teaching–learning environment. A mixed-method approach was chosen to provide a comprehensive understanding of students' experiences by combining quantitative measures of learning profiles with qualitative insights into their perceptions. The qualitative responses were analysed using content analysis, while students' learning profiles were identified using K-means clustering and differences between the profiles were examined with a chi-square test. The results show that fully online teaching was experienced rather positively, and it was considered convenient. However, most of the learning experiences were negative making online studying and learning challenging. Three approaches to learning profiles emerged from the data. *Deep and organised* students clearly had more positive experiences of online learning and studying than the *Unorganised and deep students*. The *All-high students* experienced online teaching most positively, while they had more challenges in learning. The results show that the implementation of fully online teaching has not supported enough collaboration and communality, leading to various challenges. In addition, there is a pressing need for better-designed assignments, more constructive feedback from teachers, and enhanced support for students' study practices. These findings underscore the importance of viewing online teaching and learning as a holistic experience that profoundly influences students' academic success and overall educational journey.

KEYWORDS

fully online teaching and learning environment, approaches to learning, learning profiles, student experiences, higher education

1 Introduction

The COVID-19 pandemic has affected higher education teaching and learning activities in several rather permanent ways. Students have varying experiences of online teaching and learning. On the one hand, students felt their academic achievement improved in online learning, and they appreciated the flexible online learning environment (Bdair, 2021; Huang and Wang, 2023). On the other hand, it has been found that online teaching has had a negative

impact on the scheduling of studies, academic achievement (Bdair, 2021; Baticulon et al., 2021; Petillion and McNeil, 2020), and interaction with teachers and other students (Kedraka and Kaltsidis, 2020; Rahman et al., 2023). However, previous studies of online teaching and learning have barely considered students' study processes although there is evidence that approaches to learning are situational and related to student experiences of the teaching–learning environment in face-to-face teaching (Richardson et al., 2012; Parpala et al., 2013; Yin et al., 2022). Furthermore, previous mixed-method research showed that students' experiences of face-to-face teaching were related to their learning profiles (e.g., Hailikari et al., 2018). Therefore, there is a need for a mixed-method study of the online teaching context to provide in-depth insights into the experiences of fully online learning and the relation to different learning profiles.

1.1 Students' online teaching and learning experiences

The digitalisation of teaching and learning has become an increasingly important aspect of higher education, and the use of online teaching is believed to enhance the learning experience and support design of student-centred teaching–learning environments (Ellis and Goodyear, 2010; Reigeluth, 2014). The research has shown that well-designed courses, students' motivation, engagement, time management, and confidence with online technologies supported students' positive and successful experience of the online teaching environment (Derakhshan and Fathi, 2024; Huang and Wang, 2023; Song et al., 2004; Yang and Ghislandi, 2024). In addition, students considered online teaching convenient and flexible; provided easy access from home to a virtual class, appreciated that no time was needed for travel to the university and that the assignments of asynchronous courses could be returned anytime; furthermore, regular online appointments offered by the teacher supported learning and studying (e.g., Bdair, 2021; Chen, 2023; Deniz and Yakut-özek, 2023; Grønlien et al., 2021; Song et al., 2004). Instead, the challenges students experienced related to the lack of a sense of community in online learning, unclear learning objectives, and technical problems (Deniz and Yakut-özek, 2023; Selim, 2007; Selvanathan et al., 2023; Song et al., 2004; Wester et al., 2021). The lack of interaction with other students and teachers (Davidoff and Jayusi, 2024; Kedraka and Kaltsidis, 2020; Rahman et al., 2023) as well as problems with self-regulation, including scheduling the studies, have been highlighted by recent studies during the pandemic (Bdair, 2021; Baticulon et al., 2021; Cheng et al., 2023; Deniz and Yakut-özek, 2023; Petillion and McNeil, 2020). In addition, students have been concerned about the technological challenges with assessment protocols (Petillion and McNeil, 2020). In general, students have experienced the teaching–learning environment more negatively during the pandemic than before (e.g., Briggs et al., 2023; Kedraka and Kaltsidis, 2020; Parpala et al., 2021; Petillion and McNeil, 2020). Furthermore, there is some evidence that the pandemic and fully online learning decreased students' wellbeing (e.g., Deniz and Yakut-özek, 2023; Huckins et al., 2020; Kaparounaki et al., 2020; Parpala et al., 2021; Zimmermann et al., 2021). Overall, studies of online teaching and learning have focussed on online pedagogy regarding quality of online courses, students' engagement and motivation and online communication and collaboration, whereas analyses of broad, encompassing experiences of fully online teaching and learning and its relation to students' learning profiles are few.

1.2 Approaches to learning and learning profiles

Approaches to learning refer to students' aims and processes in studying, and three different approaches to learning are generally recognised (e.g., Asikainen and Gijbels, 2017; Biggs, 2001; Entwistle, 2009; Entwistle and Ramsden, 1983; Marton and Säljö, 1976; Marton and Säljö, 1984; Yin et al., 2023). In a deep approach, the student's intention is to understand and analyse information and integrate new information into his/her existing knowledge, whereas in a surface approach the students focus on memorisation and reproduction of information, which results in fragmented knowledge (Entwistle, 2009). However, a study by Lindblom-Ylänne et al. (2019) suggests calling the surface approach to learning an unreflective approach because it embodies a fragmented knowledge base rather than memorisation and reproduction of knowledge. The third approach, organised studying, refers to the effort in studying and how students manage and organise their studies (Entwistle and McCune, 2004). This approach describes everyday study practices; therefore, it is called an approach to studying than an approach to learning (Entwistle, 2009).

Students can apply different combinations of approaches to learning. Various person-oriented learning profiles have been found among higher education students such as combination of deep approach and organised studying which has been related to good study success (e.g., Asikainen et al., 2020; Haarala-Muhonen et al., 2017; Entwistle, 1997; Parpala et al., 2022; Ruohoniemi et al., 2010; Tuononen et al., 2023; Vanthournout et al., 2013). Other profile, unorganised students applying a deep approach, has been found to be related to having problems in studying (Asikainen et al., 2013, 2020; Parpala et al., 2010). In addition, dissonant profile that refers to a high or even incoherent combination in which the deep approach is combined with the surface approach has been found (Fryer and Vermunt, 2018; Hyytinen et al., 2024; Tuononen et al., 2023).

1.3 Approaches to learning and experiences of teaching–learning environments

Approaches to learning have been found to fluctuate, depending on the teaching–learning environment and content of learning (Herrmann et al., 2017; Entwistle, 2009; Parpala et al., 2013; Yin et al., 2022). Students' high scores on the deep approach to learning have been found to relate positively to the experiences in the teaching and learning environment including the aspects of interest and relevance of the content, constructive feedback from the teachers, peer support, and alignment (Asikainen et al., 2014; Postareff et al., 2018), whereas the unreflective approach has been found to be negatively related to experiences with the teaching–learning environment (Herrmann et al., 2017; Parpala et al., 2013: Richardson and Price, 2003). In addition, Hailikari et al. (2018) found in their person-oriented study that unorganised students applying a deep approach experienced that the lack of information, face-to-face teaching, and self-regulation had impeded their studying; they also had challenges related to the student

community. Furthermore, students who applied the surface approach experienced lower interest and enthusiasm and less ownership towards their studies than the other profiles (Hailikari et al., 2018). It should be noted that previous studies have found that unreflective students have a higher risk of burnout, whereas students representing a deep approach wellbeing were on a higher level (Asikainen et al., 2020, 2022; Parpala et al., 2021) and had better study success (Haarala-Muhonen et al., 2017). During the pandemic, students' experiences of online teaching and learning have been generally lower than before the pandemic (e.g., Baticulon et al., 2021; Parpala et al., 2021; Petillion and McNeil, 2020). Research linking learning profiles and experiences of the teaching–learning environment has shown differences among learning profiles (Hailikari et al., 2018), also in the online teaching and learning environment (Parpala et al., 2021). However, research on this topic is limited. Therefore, this study aims to address a critical gap in the literature by exploring with mixed-method how students with different learning profiles describe their experiences of fully online teaching and learning environments. The use of mixed methods—quantitative clustering and qualitative content analysis—adds robustness to the research, offering a comprehensive view of the students' experiences. This methodological approach not only strengthens the validity of the findings but also enriches the debate by providing both statistical and qualitative evidence of the challenges and opportunities in online education. Understanding how different learners perceive and interact with the online learning environment can reveal nuances that quantitative measures alone might overlook. By prioritising students' voices, this research can contribute to the development of more effective online education environments.

The aim of the study was to explore students' experiences of studying and learning in fully online teaching and learning environment. In addition, it seeks to identify learning profiles among the students in an online setting and examine whether students' experiences of online teaching and learning vary across these profiles.

The research questions are as follows:

- How do university students experience teaching and learning in fully online environment?
- What kind of learning profiles can be identified among the students in fully online teaching and learning environment?
- How do students' experiences of fully online teaching and learning vary across different learning profiles?

2 Methods

2.1 Context

The Finnish higher education system is comprised of two primary types of institutions: universities and universities of applied sciences. Most universities in Finland are publicly funded, and a key feature of the Finnish higher education system is that students do not pay tuition fees, making it accessible to a broader population.

Admission to Finnish universities is based on either discipline-specific entrance examinations or the results of the National Matriculation Examination. The typical duration for completing a degree at a Finnish university is 5 years—3 years for a bachelor's degree followed by 2 years for a master's degree. Unlike in many other countries, Finnish students can extend their studies beyond the standard duration without facing penalties, allowing them to take up to 7 years to complete their degrees. This flexibility enables a personalised pace of education, accommodating various life circumstances. Conversely, motivated students have the option to accelerate their studies, with some completing their degrees in less than 2 years.

The data were collected in a large public, multidisciplinary research university in Finland from first- and second-year university students from different faculties during the pandemic in March–April 2020. The university had established the needed technology and infrastructure for online learning and teaching already many years before the pandemic. For instance, the Moodle online learning environment and tools such as the digital collaborative whiteboard Flinga were available for teachers and extensively used. In addition, teachers were regularly offered voluntary e-learning and pedagogical courses and training sessions. The students who participated in the study had, such as their peers in general, necessary technological skills and tools for online learning based on their upper-secondary school studies and an ICT course at the University. Despite the relatively solid technological infrastructure in the university, the sudden transition to fully online teaching was an unexpected situation and teaching was mainly carried out by lecturing in Zoom or by providing lecture recordings. Learning assignments, including group assignments, were given on some courses. In addition to the closed lecture halls, the libraries, student restaurants, and gyms as well as student association premises were closed and social events cancelled. Thus, the lockdown meant a withdrawal from most of the activities that had constituted students' lives before the pandemic. Yet, unlike many other countries, Finland did not introduce curfews.

2.2 Research design

This mixed-method study employs a concurrent triangulation design, combining both quantitative and qualitative analyses to provide a comprehensive understanding of the research problem (Onwuegbuzie and Leech, 2004). Data were collected simultaneously using a structured questionnaire, which included both closed-ended questions for quantitative analysis and open-ended questions for qualitative insights. Quantitative data allow to explore what kind of learning profiles can be found and the qualitative data offer deeper insights and explain the profile differences found from the quantitative findings. This kind of study design ensures that the strengths of both methods are utilised to enhance the validity and richness of the study's outcomes (Johnson and Onwuegbuzie, 2004).

2.3 Data collection and measurements

The data were collected using the HowULearn questionnaire (Parpala and Lindblom-Ylänne, 2012) which is implemented on a feedback system used at the University. The same data were used than the previous study (Parpala et al., 2021). The present study explored the students' experiences of online teaching and learning through an open-ended question added to the questionnaire: "How have you experienced online teaching and learning environment?." The purpose of this was to provide students with an opportunity to reflect openly their experiences of studying during the pandemic, using the

same question across different faculties. In addition, approaches to learning were measured by 12 items that were modified from previous studies (Entwistle and McCune, 2004; Entwistle et al., 2003). The three scales included the Deep, the Unreflective, and the Organised studying approach. All items were measured using the Likert scale, ranging from a score of 1 (totally disagree) to 5 (totally agree). Scales measuring approaches to learning are widely used and have been validated in different contexts (e.g., Herrmann et al., 2017; Parpala et al., 2022; Tuononen et al., 2023). Cronbach's alphas were 0.72 for the deep approach, 0.67 for the unreflective approach, and 0.69 for the Organised studying approach. The data gathering followed the ethical principles of research with human participants and the ethical review in the human sciences in Finland and the Finnish National Board on Research Integrity (TENK) guidelines. The questionnaire included a section asking respondents for consent to use the responses for research purposes; only the responses of those who gave permission were used in the present study.

2.4 Participants

We sent the questionnaire 1,664 first- and second-year students from different disciplines at one research intensive university. Students were studying in the Faculty of Biological and Environmental Sciences, Veterinary Medicine, Pharmacy, Educational Sciences, and Social Sciences. This selection was made to ensure a diverse representation of disciplines. A total of 665 students who had given consent to use the responses for research purposes completed the questionnaire of which 504 responded to the open question. Thus, our data comprised 504 students (response rate was 30.3%). Of these students, 421 were first-year students and 83 s-year students from different faculties. The first-year students were from the Faculty of Biological and Environmental Sciences ($n = 97$); the Faculty of Veterinary Medicine ($n = 49$); the Faculty of Pharmacy ($N = 89$); the Faculty of Educational Sciences ($n = 77$); and the Faculty of Social Sciences ($n = 109$). The second-year students were from the Faculty of Law ($n = 68$) and Theology ($n = 15$).

2.5 The validity and reliability of the research

The validity and reliability of this study are supported by several factors. The study employed a mixed-method design, which enhances validity by triangulating quantitative and qualitative data, providing a comprehensive understanding of students' experiences (Onwuegbuzie and Leech, 2004). The use of the HowULearn questionnaire, which includes well-established scales measuring approaches to learning (Entwistle and McCune, 2004; Entwistle et al., 2003), adds to the reliability of the measurements. The questionnaire was developed as a part of research project *The Students' Approaches to Learning and their Experiences of the Teaching-Learning Environment* at the present university (Parpala and Lindblom-Ylänne, 2012). These scales have been validated in various contexts and show acceptable internal consistency (e.g., Asikainen and Gijbels, 2017; Geitz et al., 2024; Herrmann et al., 2017). In this study, the Cronbach's alpha ranged from 0.67 to 0.72, which is considered adequate (Taber, 2018). The open-ended question was discussed and decided upon by the authors representing different areas of pedagogical expertise. The study also followed ethical guidelines, ensuring that only responses from students who consented to participate were included. The response rate of 30.3% from a diverse group of 504 students across multiple faculties further supports the study's validity by providing a broad representation of the student population. Overall, the methodological rigour, combined with ethical considerations and robust data collection instruments, underscores the reliability and validity of the study's findings. In qualitative analysis, we also take reliability and validity into account (see Analysis).

3 Analysis

To examine the variety of students' experiences of fully online teaching and learning environment and how they differ according to different learning profiles, a mixed-methods approach was applied by combining quantitative and qualitative research methods (e.g., Johnson and Onwuegbuzie, 2004). Open-ended questions about students' experiences of online teaching and learning were analysed by content analysis (Flick, 2002). The length of open-ended answers varied from one to two sentences or even longer. This allowed our respondents the opportunity to elaborate on their thoughts more fully if they wished.

In the first phase, the students' responses regarding their experiences at the beginning of the COVID-19 pandemic were analysed in an iterative manner to acquire an overall view of students' descriptions and identify different categories. First, the authors divided the data faculty-wise. The six authors initially read and analysed 20 open-ended responses (a total of 120 responses) in their appointed data independently forming initial categories. After that, all the authors discussed these tentative categories, and they were then redefined. Next, the authors again analysed the rest of their appointed data independently. Based on the negotiated understanding of the categories, the first and the sixth author analysed and cross-checked the whole data separately and listed any unclear descriptions. Later, they discussed these unclear descriptions and agreed on the categorisation. The final 14 categories were then organised thematically in five broader categories to clarify the structure of the findings. After qualitative analysis, the learning profiles were analysed from the data using K-means clustering. K-means clustering is a most widely used statistical method for partitioning a dataset into distinct clusters based on similarity, where each observation belongs to the cluster with the nearest mean (Morissette and Chartier, 2013). Finally, the qualitative categories were quantified using dummy variables and differences on the experiences between the profiles were analysed with chi-square analysis.

Our interdisciplinary research team brought together expertise from varied perspectives which enriched the research process but also carried inherent biases. To mitigate these potential biases in interpreting students' responses in the unforeseen situation created by the lockdown, the team engaged in frequent peer debriefing and discussions in the research design stage, then iteratively revisited coding decisions, and conducted triangulation between qualitative findings and quantitative learning profiles. This collaborative, reflexive approach aimed to ensure that both the richness of students' narratives in a context that was new to students and researchers alike and the rigour of statistical analysis were appropriately balanced and accurately represented.

4 Results

4.1 Students' experiences of fully online teaching and learning environment

One key observation from the students' answers is that the majority mentioned multiple aspects of their experiences with fully online teaching and learning. Many respondents highlighted both positive and challenging aspects, often sharing several experiences in each category. In further analyses, the content analysis of the open-ended answers resulted five categories of students' experiences of fully online teaching and learning environment: (1) teaching; (2) studying and learning; (3) interaction; (4) study environment, and (5) wellbeing. We have summarised these main categories and subcategories in Table 1 along with examples of students' answers belonging to each category. We will first describe each of the main categories and associated subcategories and then discuss some overarching notions on the categories.

The first main category consisted of descriptions of *Teaching in fully online teaching and learning environment*. The category consisted of both positive and negative teaching experiences. *Positive experiences of teaching* included mainly in very general level descriptions and feelings that online teaching has been very good, good, great, nice, or quite good including sometimes hopes for the continuity of online teaching (after pandemic). When students more accurately described the positive experiences of online teaching, they mentioned the convenience and flexibility of teaching and especially lecture video recordings were considered useful and provided an opportunity for flexible studying. *Overall general negative experiences of teaching* comprised overall mentions that online teaching has been experienced negatively or unfavourably. *Poor arrangements of teaching* were often mentioned. Students experienced that sometimes teaching was not adapted to online learning, or the teaching event was organised poorly. In addition, students had challenges in online group work, and they were concerned about the assessment methods online. Furthermore, students experienced that the *Workload* of courses had increased due to several small study assignments that were used to compensate for teaching.

The second category, *Studying and learning,* included both positive and negative descriptions. *Smooth studying and learning* included mentions that studies had progressed smoothly, students had good experiences of online studying, and that online studying was suitable for them. In addition, descriptions of increased motivation, improved concentration, and enhanced quality of learning were found. *Flexibility of studying* comprised mentions that flexibility in studying had increased, and it was easier to schedule studying and manage time and workload in online studying. In addition, there were mentions that the increased independence in studying had influenced studies positively. The category also included mentions that it was positive that there was no need to travel to campus; thus, there was more time and flexibility in online studying.

Four subcategories were related to negative factors of online studying and learning. *Procrastination* comprised descriptions that beginning to study was more difficult and that it was difficult to act and complete the tasks. In addition, this category included mentions that progress of studies had become more difficult. *Challenges in learning* included mentions of having difficulties in concentration or independence being demanding for the student. Descriptions that learning is more difficult and inefficient or boring were included in this category. *Challenges in time management* included descriptions of challenges in scheduling and maintaining a study rhythm and reports that online studying required more time. *Decrease in motivation* included mentions of decreased motivation or a lack of motivation and difficulties to maintain motivation.

The difficulties of interaction were clearly shown in the students' responses, and the third category *Interaction* included descriptions of the *Lack of interaction* and missing interaction with students and teachers. In addition, the category covered descriptions of lack of guidance or difficulties to ask guidance as well as lack of feedback from teachers.

The fourth category of *Study environment* showed the challenges the students faced in the fully online teaching–learning environment in the lockdown situation. Students had difficulties with studying at home, especially if other family members were present, either adult family members working, children needing help with school assignments, or young children needing care. The facilities at the University were also lacking, such as the possibility of studying in the library. All in all, the students felt that the free time and study time could not be efficiently separated.

The fifth category of *Wellbeing* had two subcategories. When students experienced that their W*ellbeing decreased*, they experienced increased stress, anxiety, or depression. They also mentioned other factors that had worsened wellbeing, such as feeling the situation hard and exhausting. However, some students experienced that during the remote teaching, their *Wellbeing increased*, they had less stress, and their coping skills improved.

To summarise, one of the most prominent aspects of students' experiences related to the increased flexibility of teaching and studying. Especially recorded lectures provided more flexibility for students to choose the time and the place when and where they preferred to study. This flexibility further helped students with time management issues and managing the workload of courses better. Thus, it seems that the increased flexibility may help to compensate some of the challenging in online studying for some students. However, our data also clearly point out that the increased flexibility does not compensate all negative aspects of online studying. Students also experienced challenges related to procrastination, time management, and decreased motivation and interaction. These are the issues that seem to relate more to students' self-directness and study skills in general.

4.2 Learning profiles

Three different learning profiles emerged based on the scales measuring approaches to learning: (1) the Unorganised and deep students ($N = 167$); (2) the Deep and organised students ($N = 230$); and (3) the All-high students ($N = 107$) (see Figure 1). The first profile, *Unorganised and deep students*, included students who scored high on deep approach but the lowest on organised studying. The second profile, the *Deep and organised students*, comprised students who had the highest scores on both deep approach and organised studying. The third profile, *All-high students*, included students who scored relatively high on all approaches.

The cluster scores can be seen in Table 2.

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TABLE 1 Students' experiences of fully online teaching and learning environment.

Categories and subcategories (frequencies)	Codes	Example
Teaching		
Positive experiences of teaching (168)	Good (70) and quite good (63), experiences of online teaching, increasing flexibility in online teaching (35).	The online lectures have been amazing, especially when you get the lecture recordings. I do not learn really that well during lectures so the chance to listen to them at my own pace in a comfortable environment has been great. I really hope this practice continues as an alternative way of lecture participation.
Overall general negative experience of teaching (80)	General negative experiences (80)	I do not like online lectures. I'd rather physically go to the lectures.
Poor arrangements of teaching (136)	Poor online teaching and teaching arrangements (49), too little teaching available (20), challenges in evaluation (18), challenges in groupwork (23), challenges in practical courses (14), other challenges in online teaching (12)	Group work is almost impossible and you get less out of the lectures because of poor interactivity.
Workload (43)	Workload increased during online teaching (43)	The kind of workload has increased […] and some of the assignments are so multidimensional that I feel like I'll forget a deadline.
Studying and learning		
Smooth studying and learning (180)	Progress smoothly (19), good experiences (84), average experience (46), concentration improved (12), increased motivation (12) improved quality of learning (7)	Studying online feels natural to me […] I even feel like I'm more productive now than in a normal situation. Doing assignments instead of lectures suits me much better and I feel like I learn things better this way.
Flexibility of studying (93)	Flexibility in studying and easier to schedule (49), positive influence of independence (16), no need to travel (28)	Through online learning I can choose to spend my time optimally and study the areas that interest me at my own pace.
Procrastination (83)	Challenges to start study work (52), and difficulties in making progress (31)	It's pretty difficult to get something done.
Challenges in learning (82)	Difficulties in concentration (47) and independence demanding (16) learning more difficult (19), poor learning experiences (36)	It's been difficult to concentrate during online learning, when all my studying happens in the same environment by staring at the same computer screen.
Challenges in time management (74)	Challenges in scheduling and maintaining studying rhythm (74)	I have not managed to plan my studies that well; even though I make timetables for myself, I have not followed them.
Decrease in motivation (49)	Difficulties in maintaining motivation and decreased motivation (49)	I've had less motivation and studying has become more about completing the given assignments.
Interaction		
Lack of interaction (98)	Difficulties in interaction, missing interaction with students/teachers (49), Lack of interaction (22) no feedback or guidance, difficulties to ask for guidance (27)	You do not get any feedback. It's harder to internalise the information by doing independent study on the slides and material rather than from lectures and group lessons in interactive situations.
Study environment		
Challenges related to study environment (145)	Studying at home difficult (67), lack of library and university facilities (29), free time and study time comingle (49)	There's no other problem with distance learning except that I do not get to go to the library to study. Sometimes it's hard to draw a line between studying, work and free time.
Wellbeing		
Wellbeing increased (25)	Stress decreased (18) coping improved (7).	I feel that I've had less stress through distance learning and I've learned things in a more internalised manner, now that we have done assignments and tasks instead of lectures. Also, less time gets wasted when I focus on my studies better.
Wellbeing decreased (97)	Stress increased (26), experiences of anxiety and depression (19), challenges in coping (31) and in general well-being reduced (21).	I like studying but I noticed that I stress more to complete the assignments. […] I get annoyed and feel inferior.

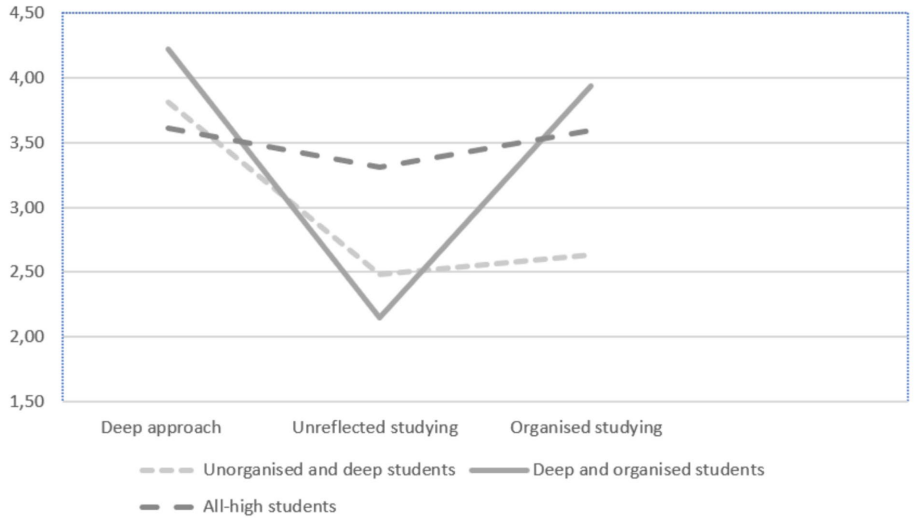

FIGURE 1
Cluster centres of the three clusters.

TABLE 2 Cluster centres.

Sum scale	M	Sd	Unorganised and deep students	Deep and organised students	All-high students
Deep approach	3.95	0.55	3.81	4.22	3.61
Unreflected studying	2.50	0.66	2.48	2.15	3.31
Organised studying	3.43	0.75	2.63	3.94	3.59

TABLE 3 Differences between the profiles in their experiences of fully online teaching and learning environment.

	P1 (*N* = 167)	P2 (*N* = 230)	P3 (*N* = 107)	x^2	*p*
Positive experiences of online teaching	39 (23.4%)	70 (30.6%)	40 (37.4%)	6.34	0.042
Smooth studying and learning	38 (22.8%)	81 (35.2%)	26 (24.3%)	8.66	0.013
Challenges in learning	45 (26.9%)	35 (15.2%)	30 (28.0%)	10.87	0.004
Procrastination	41 (24.6%)	20 (8.7%)	16 (15.0%)	18.80	<0.001
Challenges in time management	37 (22.2%)	26 (11.3%)	11 (10.3%)	11.20	0.004

P1, Unorganised and deep students; P2, Deep and organised students; and P3, All-high students.

4.3 Differences between experiences of fully online teaching and learning environment and the learning profiles

The chi-square analyses showed some differences among the learning profiles in students' experiences of fully online teaching and learning environment (see Table 3). The statistically significant differences in experiences of subcategories were found with (1) positive experiences of online teaching; (2) smooth studying and learning; (3) challenges in learning; (4) procrastination; and (5) challenges in time management. The *Unorganised and deep students* had fewer positive experiences of teaching, and they experienced more challenges in time management and procrastination than students in other profiles. In addition, the *Deep and organised students* had more positive experiences about studying and fewer experiences of challenges in learning and poor experiences than students in other profiles. All high students had more often positive experiences of online teaching, but they were more likely to have challenges in learning.

5 Discussion

The study used a mixed-method approach to explore students' experiences of fully online teaching and learning and the relation of these experiences to the learning profiles. The findings highlight the division of students' experiences of fully online teaching, the challenges associated with online learning, and the influence of learning profiles on students' experiences.

The results revealed variations in students' experiences with fully online teaching highlighting a polarisation within the student population. While some students found online teaching to be a good fit in their studying, others felt that it was entirely unsuitable. Our results suggest that positive experiences of fully online teaching were associated with the flexibility that it offers, allowing students to participate in teaching sessions and pursue their studies independently. Many students appreciated the freedom to schedule their own study time and work at their own pace and focus on their individual tasks without the need to commute to campus. This aligns with previous research showing that students value asynchronous learning and the time saved by not having to travel to campus (e.g., Bdair, 2021; Chen, 2023; Deniz and Yakut-özek, 2023; Grønlien et al., 2021). The pandemic thus seems to have specified esteem for independence, which existed before pandemic-related restrictions. Overall, students expressed satisfaction with the availability of teaching and course materials. Notably, there were no mentions of lack of ICT tools, problems with technology or lack of ICT skills to operate in the online teaching–learning environment. This contrasts with findings conducted almost two decades ago (Selim, 2007; Song et al., 2004), suggesting that the technological infrastructure and support in Finland and at the University of Helsinki was adequate to enable studying in the lockdown. However, some students expressed difficulties in adapting to online learning environments, particularly in terms of course organisation, workload management, and assessment. These findings suggest that while technological infrastructure had improved over time, pedagogical challenges in online teaching remained. The results highlight that investments in teachers' pedagogical competence should be integral to investments in technological infrastructure.

Despite some positive experiences, the majority of students reported facing challenges in online learning. Many struggled with procrastination, maintaining motivated and keeping on study routines and scheduling their study time. In addition, they had difficulties in concentrating. These results align with recent studies of fully online learning (e.g., Huckins et al., 2020; Kaparounaki et al., 2020). The pandemic highlighted these challenges as students had to study in shared spaces at home. This disruption affected the balance between their study and personal lives leading to inefficient planning, time management, and implementation of the studies. Such issues have been widely recognised in fully online learning not only during the pandemic (e.g., Bdair, 2021; Baticulon et al., 2021; Cheng et al., 2023; Deniz and Yakut-özek, 2023; Petillion and McNeil, 2020) but also before it (e.g., Michinov et al., 2011). The results reinforce the notion that online learning requires good self-regulation skills, particularly time management skills. Furthermore, previous studies have found that students have faced growing problems in regulations their studying (Räisänen et al., 2020; Tuononen et al., 2023). These findings emphasise the need for additional support mechanisms to help students develop effective study strategies in online environments.

Three different learning profiles emerged from the data, namely, the *Unorganised and deep students*, the *Deep and organised students,* and the *All-high students*. These profiles align with the findings of previous study (Tuononen et al., 2023). Our results show that the *Deep and organised students* had clearly the most positive experiences of online learning; it positively affected their smooth studying, suggesting their ability to reflect on learning processes and use the most suitable learning methods in new teaching and learning environments. This supports earlier findings that a deep and organised approach to learning is associated with positive experiences in both face-to-face (Hailikari et al., 2018; Postareff et al., 2018) and online settings (Parpala et al., 2021). In contrast, the *Unorganised and deep students*' experiences of online teaching were more negative, and they expressed significant challenges with time management and suffered procrastination. This profile has also been shown in previous studies to be challenging in university studies, being associated with slower progress (Haarala-Muhonen et al., 2017) and a more negative experience of the teaching and learning environment (Hailikari et al., 2018; Parpala et al., 2021). The experiences of *All-high students* were mixed. They experienced online teaching most positively; however, they had more challenges in learning processes than the students in the two other learning profiles and they experienced that independent learning and studying was challenging. This result suggests that the high scores of the unreflective approach to learning in this learning profile might impede students' ability to contract a coherent whole; thus, teaching and guidance to support their learning is needed so that they may benefit from clear tasks and assignments with deadlines in online learning (Deniz and Yakut-özek, 2023; Selim, 2007; Song et al., 2004; Wester et al., 2021). These results show that despite the unprecedented event of lockdown at university, one learning profile, the Deep and organised students, related to success in learning and studies even in such an unexpected situation. It appears critically important to support students to reflect on and develop their learning skills to use strategies which support deep and organised approaches to learning.

Across all learning profiles, students frequently mentioned the lack of interaction and support from teachers and peers as a major challenge. This finding was recognised in online teaching and learning among higher education already students before the pandemic (e.g., Selim, 2007; Song et al., 2004; Andrade, 2015), indicating that a sense of community can diminish in online studying. Already a study by Young (2006) emphasised that effective communication is a key element of online teaching, which further highlights the importance of fostering opportunities for discussion among students and between students and teachers. As these results have been available to educators and pedagogical experts, the pandemic-caused shift to online teaching could have been designed to specifically address these factors, focussing on creating social processes and facilitating purposeful collaboration. The findings underscore the need for more intentional design of online courses to promote collaboration and communication among students.

6 Limitations

Our study has some limitations that should be noted. First, the material was collected in a lockdown situation, where students were instructed to stay at home; lecture halls and libraries were closed. The nuances in each University and country may affect how applicable our results are to other contexts, especially in countries in which COVID-19 regulations were significantly tighter or looser than in Finland. While our study includes 504 students from various faculties, it did not account for the diversity within the sample concerning demographics, such as age, gender, socioeconomic status, mental health, or prior online learning experience. This lack of demographic detail could have affected students' experiences, challenges in online learning, potentially limiting the generalisability of the findings across different student populations. Furthermore, in our study, we had no background information about the ICT tools used by the students in their studies. For example, we did not know if they used a smartphone, a tablet, or a computer in their studies. Neither was this information

on the accessibility of online teaching was not reflected in the students' replies. The study relied on self-reported questionnaires and open-ended responses, which can introduce bias as students may have different perceptions of their experiences and may not accurately report their challenges or successes. Finally, the study assessed students' experiences at just one point in time, without tracking how their experiences or learning profiles might change over the course of a semester or in future semesters.

7 Conclusion and implications

The lockdown created an opportunity to explore online teaching and learning in the context of a broader study experience, rather than just gaining a perspective on a single course. The result of the present study clearly shows the heterogeneity of study skills among the students that emerged in three different learning profiles emphasising the importance of effective and high-quality learning processes in higher education. Notably, the students had varied experiences in fully online teaching and learning, presenting a challenge for future educational strategies.

It is crucial to consider the benefits of continuing to offer online teaching. Online teaching supports student wellbeing by providing flexibility in learning, making it a justified method to integrate into future educational practices. However, the study indicates that fully online learning demands significant student independence, which can be particularly challenging for students with less organised study habits and students who tend to procrastinate. This could be supported by employing activating methods, formative assessment, and continuous feedback to help distribute learning more evenly throughout the course. Integrating various assignments, group tasks, and peer group learning into the course structure can enhance students' engagement and learning. Systematic use of peer groups can also foster essential peer interactions in online teaching. Online teaching is here to stay, and fully online courses can achieve high-quality teaching and learning.

Recognising that students' study skills significantly impact their online experience highlights the importance of clear and structured online teaching following principles of constructive alignment. In addition, maintaining a balance between online teaching and face-to-face teaching is crucial. Blended learning, which alternates between contact and online learning using the idea of a flipped classroom, could be a viable solution. For example, mass lectures could be recorded for students to review at their convenience, while in contact teaching sessions could focus on deepening knowledge and skills thorough discussions and related tasks.

To conclude, online teaching presents new opportunities for higher education such as meeting the future goal of increasing student enrolment in universities (The Council of the European Union, 2021). Future research should focus on exploring ways to support unorganised students in online teaching and how online teaching can best foster deep learning approach for students. Recommendations for policymakers and practitioners include investing in blended learning models, enhancing teacher training for online environments, and creating robust support systems for students to ensure a high-quality online learning experience.

Data availability statement

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

Ethics statement

Ethical review and approval were not required for the study on human participants in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

AH-M: Writing – original draft, Writing – review & editing. HA: Writing – review & editing. NK: Writing – review & editing. PK: Writing – review & editing. LR-T: Writing – review & editing. TT: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2025.1520120/full#supplementary-material

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