

Students' perspectives on the functionality of the flipped classroom approach in a master's thesis seminar

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Abstract

Research studies are an important part of educational sciences curricula in Finland. However, these studies are challenging to conduct, given the various issues associated with teacher-led activities, lack of social presence, engagement, students' collaborative work and time management, and large-scale writing process management comprising this environment. This study aimed to develop a program of master's thesis seminar higher education pedagogy that employed a flipped classroom (FC) approach. While the FC approach has been investigated in several contexts of higher education, it has only been minimally explored in the master's thesis seminar. Participating students views and mixed-methods were used. Based on the quantitative results, students considered guidance and satisfaction with the FC approach high and difficulty low. Moreover, the FC approach was well suited to, and preferred by, the students, while not being overly straining. Based on the qualitative and mixed-methods results, the FC approach was seen as functional, goal-oriented, and flexible. Team spirit and the supervisor's presence were

considered to be positive aspects. However, negative experiences were also identified, such as time usage and opportunities for peer feedback. The results, discussion, limitations, and implications are presented in terms of research-based development work on an FC approach based master's thesis seminar in higher education.

Keywords: flipped classroom, master's thesis, higher education, pedagogy, online learning

Introduction

Research studies are a significant part of the curricula of educational sciences in Finnish university-level education and are relevant to the study programs of both educational scientists and pre-service teachers. Mandatory and elective research studies, often supported by methodological coursework (e.g., qualitative, quantitative, and mixed-method designs) and the conducting of investigations, are included in these five-year master-level training programs. The study programs lead, first, to a three-year Bachelor of Arts degree (Education; 180 ECTS), and then to a two-year Master of Arts degree (Education; 120 ECTS). Students in teacher education graduate to become teachers in various fields at all levels of support in the Finnish education system. Students who concentrate in the general study programs of the educational sciences do not gain a professional qualification to work as teachers; rather, they are generalists (Rouhelo, 2008) who can specialize in various disciplines, such as adult education, media education, or educational leadership.

Research-based training in educational sciences and teacher education

Within Finland's higher education (i.e., university-level) programs that are specifically focused on the educational sciences and teacher education, the acquisition of research-based knowledge is widely promoted (Säntti et al., 2018; Uljens, 2001), and to this end, studies aim to provide students with skills in conducting research in practice (see, e.g., Finnish National Agency for Education & Ministry of Culture and Education, 2021; UEF, 2021; ULA, 2021). Such exposure improves the ability of students to solve and redefine educational and pedagogical challenges they may encounter in their future working life and to develop schools and other organizations as parts of society (Toom et al., 2010; Rouhelo, 2008). According to Metsäpelto et al. (2020), Finnish teachers are considered active partners in school development and collective decision making, and by acquiring research-based knowledge through their educational curricula, they are prepared to embrace this role in the future. Students who graduate from a generalist education program possess the necessary competencies to, for example, apply theoretical educational knowledge to practice, manage projects, plan and conduct teaching and training, and operate in professional networks (Rouhelo, 2008; Tuominen, 2013).

Research and methodological studies are implemented in practice when students write first their bachelor's (6–10 ECTS) and later master's theses (30 ECTS) (UEF, 2021; ULA, 2021). The bachelor's thesis process introduces students to research and methodology themes, and the master's thesis obliges students to demonstrate their familiarity with their discipline and their capacity for independent academic thought and work. The writing of the master's thesis is supported by a mandatory seminar course (5–10 ECTS) that lasts approximately one academic year. This course typically consists of interactive face-to-face or online meetings and independent assignments and tasks that provide support to students in completing their theses. Such activities can include reviewing relevant literature, engaging in written individual tasks, making a research plan for the thesis, and presenting and peer reviewing their theses during the seminars. In the seminars, students learn from one another and their various topics, share knowledge of different methods and viewpoints, and gain knowledge of the research process as a whole. The main objectives are to design the plan of the thesis process required by the research aims, prepare and present the thesis research plan at the seminar, and produce the main results. Additional intended outcomes of the seminar course are to equip the student with scientific knowledge in the field of education and to discuss and choose appropriate theoretical and methodological frameworks related to the research enterprise.

Challenge of teaching a master's thesis seminar

The present study aimed to develop teaching methods grounded in research for the master's thesis seminar. The seminar course that supports individual students in writing their master's thesis is implemented in various ways in Finland and in other Nordic countries. Few studies have reported on the development of master's thesis courses. Therefore, the current study may inspire ideas about how to develop one's teaching methods in relation to the masters' thesis seminar and give students a voice in the research-based development of higher education pedagogies. The motive for research-based pedagogical development stemmed from teachers' personal experiences of teaching master's seminars and supervising students' theses. Prior to the pedagogical development described here, master's seminars were organized as a series of either face-to-face or online seminar meetings. At each meeting, one or two students presented their thesis manuscripts, and these presentations were followed by discussions with the supervisor and other students enrolled in the seminar. However, this pedagogical format mainly engages the thesis authors and their discussants, making the role of other students in the seminar unclear (Svinhufvud, 2015). As one seminar meeting typically included a presentation of one or two manuscripts, the teachers did not seem to have a clear vision of how the group as a whole was proceeding with their theses. This approach meant that general themes such as methodology, concepts, and theories had to be taught repeatedly over the academic year. In addition, students may have difficulties getting started in the writing process and in structuring a large research assignment (Ward & Dixon, 2014). They also struggled with

time management issues such as balancing their studies with family or work commitments. Similar experiences have also been identified in other studies focusing on students' perspectives with respect to the master's thesis process (Drennan & Clarke, 2009; Macfadyen et al., 2019; McCallin & Nayar, 2012).

Flipped Classroom

To improve the functionality of the master's thesis seminar and tackle the challenges described above, the flipped classroom (FC) was chosen as a pedagogical approach. The FC approach has two key features. The first is the sequencing of pre-class and in-class instruction and activities (e.g., Bergmann & Sams, 2012), which prepares students for face-to-face meetings with pre-materials (Talbert, 2017). Thus, according to Abeysekera and Dawson (2015), in-depth cognitive activity is facilitated in face-to-face meetings. The second key feature is the central role of technology in developing and applying the FC approach (Aguilar et al., 2020; Becker & Birdi, 2018). Technology and electronic materials (e.g., online videos) can be used to facilitate sequencing, thereby enabling more location- and time-flexible learning and support for students' learning process (Alexander et al., 2019). However, some scholars have pointed out the current use of technology in the FC approach may not leverage the full potential of digital tools (e.g., Becker & Birdi, 2018). Although there is no single model for implementing the FC approach (O'Flaherty et al., 2015), some core features have been suggested that can make this endeavor successful: clearly structured learning materials (Hung, 2015), consistency in sequencing (Prober & Khan, 2013), feedback and (formative) assessment (Tusa et al., 2018; Yeung & O'Malley, 2014), timely support from teachers (Kim et al., 2014), and guidance concerning the FC approach (Sointu et al., 2022; Gannod et al., 2008).

Previous studies have indicated that the FC approach encompasses both challenging and encouraging aspects in its pedagogical support of learning. In terms of challenges, students must possess time management skills and take responsibility for their own learning (Boevé et al., 2017), which requires self-regulation (Lai & Hwang, 2016). For students with less developed self-regulation skills, the result may be increased task avoidance (Hyppönen et al., 2019). Study dropout may be more likely if students are unable to adapt to the new teaching approach (Chen et al., 2014). Moreover, unclear structure and guidance can easily lead to frustration for students (Gannod et al., 2008). However, positive aspects also exist. The FC approach has been found to enhance positive learning experiences (Sointu et al., 2022; Awidi & Paynter, 2019; Strelan et al., 2020), improve content learning (Tusa et al., 2018; Davies et al., 2013), and support a deeper level of learning in FC settings where the teacher is available to provide learning support (Gilboy et al., 2015). Students have been found to be more open to collaborative learning activities in FC (Strayer, 2012), which is perceived as a positive factor of student learning (Love et al., 2014; McNally et al., 2017). Kim and colleagues (2014) found that FC can facilitate a safe and open learning

Students' perspectives on the functionality of the flipped classroom approach in a master's thesis seminar atmosphere. FC also seems to improve teachers' content, pedagogical, and technological usage qualities from the student's perspective (Sointu et al., 2019b).

Research studies are an important part of Finnish university-level studies in the educational sciences. However, there has been less research on master-level thesis supervision and teaching a master's thesis seminar than on doctoral-level thesis supervision (Cornelius & Nicol, 2015; Drennan & Clarke, 2009; Marnewick et al., 2020). Some studies have suggested models for the supervision of master's thesis work (e.g., Dysthe et al., 2006; Macfadyen et al., 2019; Marnewick, 2020), but studies that include the use of the FC approach in teaching a master's seminar or applying it in fully online learning settings are, to our knowledge, scarce. Therefore, the purpose of this study was to investigate the functionality of the FC approach in the master's thesis seminar based on participating students' views.

Methods

Research context

The master's thesis seminars, on which the pedagogical development and this study are focused, were conducted as a collaboration of three master's thesis supervisors in two Finnish universities during the 2019–2020 academic year. Two of the supervisors (authors 1 and 3 of this article) worked as a pair using a co-teaching approach in one university and supervised seminar A, which had an enrollment of 30 master's students. This seminar was conducted face-to-face until the restrictions caused by the COVID-19 pandemic in Spring 2020 obliged that it become an online group. The third supervisor (author 2) was responsible for seminar B in the other university. This seminar was arranged online and included 13 master's students.

Both seminars A and B were conducted pedagogically using similar applications of the FC approach. The seminar groups met regularly during the academic year, and each meeting focused on a specific theme, such as concepts and theories, methodology, research ethics, or the writing of the results section. Following the FC approach, each seminar meeting consisted of three phases: (1) pre-seminar, (2) seminar meeting, and (3) post-seminar (Table 1).

Table 1

Application of the FC approach in the master's thesis seminar

<i>Pre-seminar phase</i>	<i>Seminar meetings</i>	<i>Post-seminar phase</i>
<ul style="list-style-type: none"> • Introductory materials (videos, literature, online resources, etc.) • Pre-assignments 	<ul style="list-style-type: none"> • Asking and responding to questions • Presenting (e.g., videos) • Discussing (e.g., roundtables) • Carrying out tasks 	<ul style="list-style-type: none"> • Assignments • Progressing with own thesis (writing, collecting and analyzing data, etc.)

For the pre-seminar phase, teachers assigned students preliminary tasks that introduced them to the theme of the seminar meeting, for example, reading articles or other material and watching introductory video lectures that had been prepared by the teachers. In the seminar meeting, students' knowledge of the theme was deepened through discussions. Teachers responded to questions students had formulated during the pre-seminar phase, and students conducted group assignments or presented their theses. In the post-seminar phase, students wrote their theses according to the seminar's theme or wrote other assignments. The role of digital technologies in facilitating learning was central as a key feature of the FC approach (Bergmann & Sams, 2012; Becker & Birdi, 2018). The seminar meetings were held on MS Teams software, which allowed for various working methods during seminars, and the Moodle learning management system was used as a course platform for delivering learning materials produced using several types of digital technologies and for returning assignments.

Altogether, there were 43 students enrolled in seminars A and B. The targeted time for completing a master's thesis is one academic year. The completion of master's theses in the two master's seminars involved in this study is presented in Table 2. Twenty-eight students completed their master's thesis in the targeted time, i.e., during the 2019–2020 academic year: four students completed them by December 2020 and six by spring 2021. Three students had not yet completed their theses at the time of writing of this article, and two students postponed their seminars or masters' theses for personal reasons.

Table 2

Completion of master's theses

<i>Thesis completed</i>	<i>Number of theses</i>	<i>Cumulative %</i>
By Sept. 2020	28	65.1 %
By Dec. 2020	4	74.4 %
By Sept. 2021	6	88.4 %
Not yet completed	3	95.3 %
Postponed their master's thesis or seminar for personal reasons	2	100 %

Note: The seminar course began in fall 2019. The expected timeline for completing the master's thesis is the next fall from the start of the seminar (i.e., fall 2020).

Data collection

Data were collected via an anonymous electronic survey in late May 2020. Overall, 29 students (67%) of the total of 43 course participants responded to the survey. Student participation in the survey was voluntary (i.e., a convenience sample), informed consent was requested, and no identification data were collected. The survey included a questionnaire, individual statements, and open-ended questions. The citations among the results from the individual statements and open-ended answers in the questionnaire were translated into English by the second and third authors. The citations in the results were chosen to represent the most meaningful or detailed themes discussed.

Measures and data analysis

A mixed-methods approach was used in this study to capture the strengths of both quantitative and qualitative methods (Creswell & Plano Clark, 2018). We used (1) the short Functionality of Flipped Classroom Questionnaire (FFCQ; Sointu et al., 2022; Hyypiä, 2019) to obtain quantitative data, (2) individual statements, (3) open-ended questions, and (4) a mixed-methods analysis to obtain a more holistic understanding of the FC approach to master's seminar classes from the students' perspective.

Quantitative data were collected using the FFCQ, which includes three subscales: (1) satisfaction with FC (SFC; four items, e.g., “used teaching approach supported my learning well”), (2) level of difficulty (DIFF; three items, e.g., “the contents of the pre-materials were challenging”), and (3) guidance received during the FC study approach (GUID; six items, e.g., “students were guided well by the teaching approach used”). Students responded to the FFCQ using a six-point Likert-type scale (1 = I totally disagree, 2 = I mostly disagree, 3 = I slightly disagree, 4 = I slightly agree, 5 = I mostly agree, 6 = I totally agree). Previous studies have indicated the adequate reliability ($\alpha = 0.78-0.96$; Hyypiä et

al. 2019, Sointu et al., 2019a) and initial validity (Sointu et al., 2022; Hyypiä, 2019) of FFCQ. With the FFCQ data, we first investigated the internal consistency with Cronbach's alpha (α). Nunnally's (1987) criterion of $\alpha > 0.7$ was used in this study for acceptable reliability. If α was acceptable, a mean sum variable of each FFCQ subscale was calculated to maintain the original response categories for interpretation. These sum variables were investigated using descriptive statistics (mean [M], median [Mdn], and standard deviation [SD]) (e.g., Field, 2018) to describe the functionality of the FC approach in the master's thesis seminar. Quantitative data were analyzed via SPSS v27.

Individual statements consisted of statements regarding how students viewed the FC approach: whether it suited them, whether they would prefer to study in a more traditional manner (e.g., Sointu et al., 2019b), and how motivating, meaningful, relevant, or challenging FC was for them (Sointu et al., 2020). Moreover, elements of usability (i.e., pre-materials, contact teaching, preparedness, use of time, support, interest, and quality) were investigated. The individual statements are presented with percentages in the results.

In the **open-ended questions**, students reflected on their experience of studying in the master's thesis seminar organized according to the FC approach; they described what they liked the most and the least in the seminar and provided general feedback and suggestions for developing the master's seminar further. An inductive thematic analysis was conducted to analyze the textual data gathered through these open-ended questions (Terry et al., 2017); NVivo Pro software v12 was used to assist in the analysis process. First, the students' texts were read through, with the aim of developing an overall understanding of and familiarity with the data. Second, the data were coded using initial codes that were generated during the process to mark meaningful text passages in which students described their perceptions and experiences. During the third phase of the analysis, all data extracts with the same code were combined into potential themes, the combined data were re-read and re-organized as necessary, and the final themes were produced. This three-phased analysis process was cyclic in nature, and the work proceeded by going back and forth in phases and clarifying the themes (Terry et al., 2017).

In the mixed-methods phase, we further analyzed the qualitative results based on the quantitative FFCQ difficulty subscale. The FFCQ difficulty scale was categorized into three subcategories (1 = not difficult, 2 = in between, 3 = difficult). Based on the categorization, the open-ended questions were subjected to a qualitative content analysis (e.g., Newby, 2014; Schreier, 2013). First, the data were examined to obtain an overall picture. Second, the data were coded with colors based on the above-mentioned categorization and organized according to the following questions: *What did you like the most in the course?* *What were you the least satisfied with in the course?* and *How did you experience the overall flipped approach in the course?* Then, the statements in the subcategories were examined, and the content was analyzed to obtain an understanding of the differences or similarities in the students' experiences in relation to the difficulty subscale.

Results

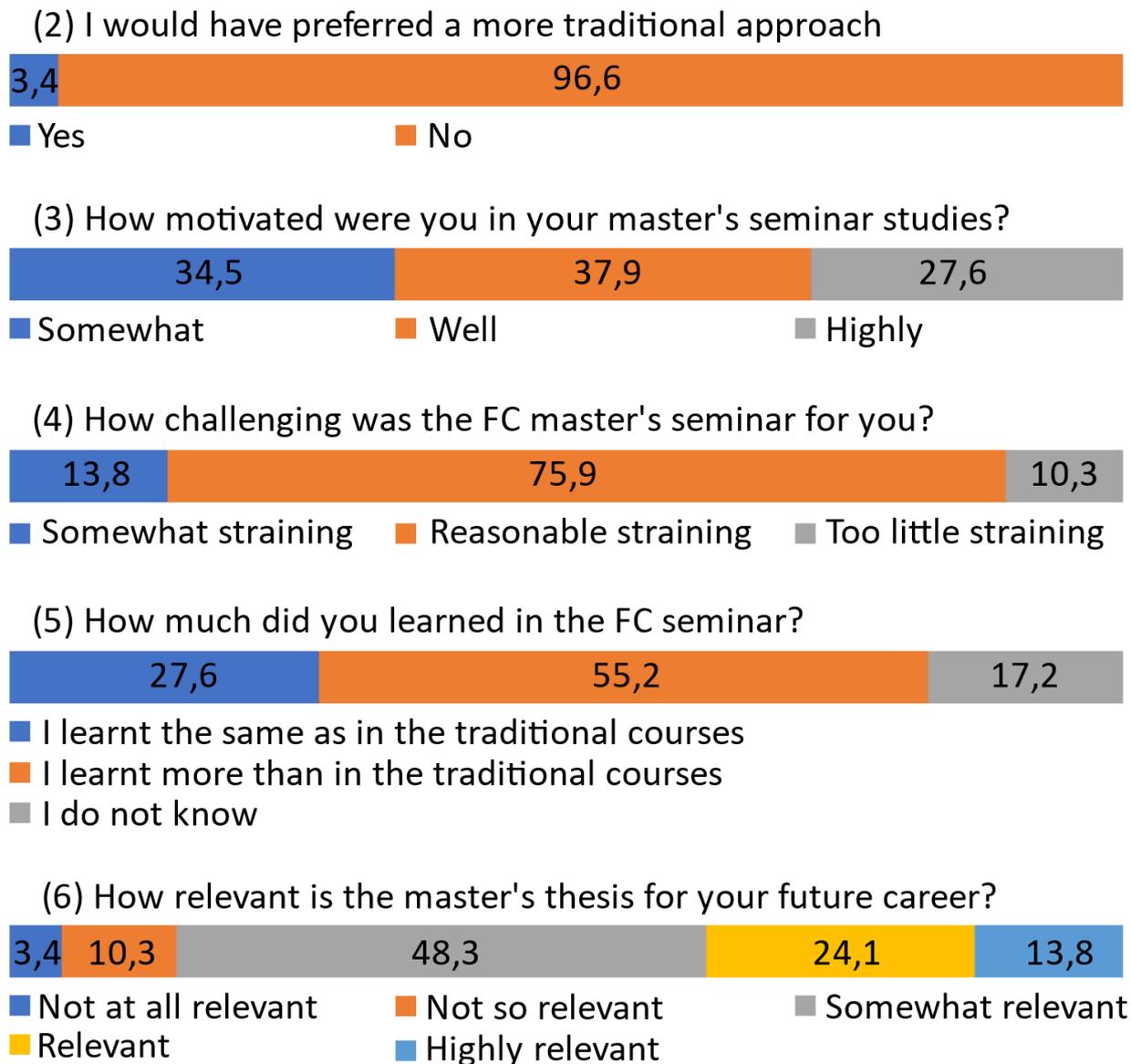
Results of the quantitative analysis

The internal consistency for the FFCQ subscales of satisfaction with the flipped classroom (FC) (SFC $\alpha = 0.81$), level of difficulty (DIFF $\alpha = 0.77$), and guidance received during the FC study approach (GUID $\alpha = 0.88$) met the criteria set by Nunnally (1978), indicating adequate reliability of the subscales. Therefore, we were able to compute mean sum variables for further descriptive statistics. The data indicated that the SFC ($M = 4.60$, $SD = 0.82$) and GUID ($M = 4.88$, $SD = 0.81$) were rather high, considering the original metric of the FFCQ. More precisely, the means fell into the “slightly” and “mostly” agreement response categories, indicating that the students were satisfied with the use of FC in their master's seminar as well as the level of guidance provided. Moreover, the *Mdn* approached 5 (i.e., mostly agree) in both of the subscales. On the other hand, the level of DIFF was lower ($M = 2.08$, $Mdn = 2.00$, $SD = 0.82$), indicating that students mostly disagreed that the flipped master's seminar was difficult.

The data included individual statements is presented in the Figure 1. Based on these statements, (1) 55.2% considered the FC approach to suit them very well, while 44.8% considered that it suited them well (no negative responses); (2) only one student out of 29 (3.4%) would have preferred to study in a traditional master's seminar.

Figure 1

Individual statements from the FC master's seminar data+



(3) The majority of the students were motivated to study in their master's seminar: 34.5% were somewhat motivated, 37.9% were well motivated, and 27.6% were highly motivated; (4) 13.8% of the students considered the master's seminar to be straining, 75.9% considered it to be reasonably straining, and 10.3% considered that it was not straining enough; (5) from a learning perspective, 27.6% considered that they learned as much as in a traditional course, 55.2% that they learned more than in a traditional course, and 17.2% responded "I do not know"; and (6) from the future career perspective, the master's thesis seminar was not at all relevant for 3.4% of the students or not very relevant for 10.3%, while 48.3% considered it to be somewhat relevant, 24.1% relevant, and 13.8% highly relevant to their future careers.

Results of the qualitative thematic analysis

This section presents the results of the thematic analysis of the textual data gathered through the open-ended questions. Some data extracts are also presented to provide examples of coding. Students responded to the survey anonymously and are referred to with pseudonyms. On a general level, students perceived the FC as a functional, goal-oriented, and flexible pedagogical approach. According to their experiences, learning through the flipped approach in the master's seminar was efficient and motivating; it helped them to anticipate and plan their master's thesis process and enabled goal-oriented and individual progression. Seminar meetings were characterized as dialogical and stress-free in nature. For some students, the flipped approach was a new working method requiring to consider their learning.

I was remarkably more active. When I wasn't only in a listeners' role, I focused more (Student 28)

Students were asked what they liked most and least in their master's seminar. The three themes of the most-liked features, according to students' responses, were (1) dialogicality, (2) student-centeredness and good team spirit, and (3) the logical and versatile nature of the FC approach. The master's seminar provided students with an arena for discussions, questions, and peer feedback. The groups seemed to develop a good team spirit that was facilitated by the supervisors' strong presence, as reflected in this student's response:

I'll mention here the greatest one, which was extremely significant for me, and that is the teachers' presence. They truly listened and truly understood. And before anything else cared! I felt that I had support no matter what kind of help I needed. If there was something I didn't understand, all I had to do was ask. I didn't feel at any point that I would have to do this alone, but there was always someone with me, particularly providing that mental support. (Student 5)

The assignments students conducted during the seminar were perceived as versatile, and students felt they gained a wide understanding of the kind of research that is conducted in their field of study and also of the different kinds of methodological approaches, as this extract from the data exemplifies:

I gained a general picture of what is studied in the field of Special Education at the moment. (Student 23)

As a general note, there were fewer comments on the least-liked features of the master's thesis seminars than on the most-liked features, reflecting students' generally positive experiences. Nevertheless, it was possible to identify three themes among the least-liked features in the data: (1) the small amount of peer feedback, (2) challenges in terms of time use and contents of the seminar meetings, and (3) differences in the progression of one's own thesis and the seminar's themes. The students seemed to perceive feedback from their

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peers to be beneficial to their learning and would have liked to receive more of it along the way, as this student expressed:

There were far too few opportunities for direct peer feedback during the research process. (Student 6)

Students sometimes felt the seminar meetings repeated content they had already learned during the pre-seminar phase by becoming acquainted with the provided materials and other resources. In addition, they perceived the time management of the meetings to be confusing at times, as shown by this student's experience:

The only minor minus was that I think that in some seminar meetings we used too much time, for example, to go through things we had already been informed about or some other pointless items. Seminar meetings need a strict framing so that only the agreed-upon contents are handled within the agreed-upon time limit. (Student 18)

The third theme included students' experiences of progressing with their thesis at a different pace than the themes of the master's thesis seminars. For some, it appeared as if the seminars were progressing faster or slower than they would have hoped, as in this student's case:

I didn't get as much out of the meetings as I would have hoped for. For example, in one meeting, the theme was interviewing, and as my thesis was not quite there yet, I wasn't able to participate. (Student 8)

In their responses, students provided general feedback and suggestions on to develop the master's thesis seminar based on the FC approach in the future. A few notes in the feedback expressed students' appreciation of the pedagogical development teachers had been engaged in:

I think it is great that you've had the courage to start conducting the master's seminar a bit differently. I hope you continue developing new kinds of working methods. (Student 12)

Two themes for further development were identified in the data: (1) improving the structure and time management of the master's seminar, and (2) developing the learning materials and assignments. Students suggested using time more efficiently during the seminar meetings and clarifying the overall structure of the master's thesis seminar as a course so that it would better suit their goal of completing their thesis in time, as shown by this student's response:

Presentation times and time allocation in seminar meetings in general should be much stricter. The meetings went into overtime too often. (Student 1)

The second theme included suggestions for developing the materials and assignments used in the master's thesis seminar. Students suggested more and smaller assignments to make it easier to structure the large writing task into smaller steps. They also suggest that written handouts could be used along with the introductory video lectures.

Pre-materials and videos could be accompanied by practical tasks, for example, by dividing the composition of the research plan into smaller phases through flipped assignments. (Student 12)

Results of the mixed-methods analysis

The results of the mixed-methods data are presented in three parts. Overall, experiences of the approach used in the masters' seminars were highly positive in all categories. Some differences were found in relation to peer support or peer feedback, student-centered approach, versatile teaching methods, materials, assignments, and tasks when examining the subcategories (1 = not difficult, 2 = in between, 3 = difficult).

Students who experienced the course as not difficult ($n=13$) liked the peer support, peer reviewing, and support from other students the most. One student described the importance of peer support as follows:

In contact teaching comfortably received support from other students for doing their own and working on their own thesis. Perhaps it was that support and encouragement provided by others that were the best feature of this course. (Student 20)

The theme of the student-centered approach in the seminars was perceived positively, as were the versatile methods used in teaching. The students who experienced the course difficulty as in between ($n =10$) liked the assignments and tasks the most. They also reported the student-centered approach to be a positive theme in the course. Peer support and peer reviewing were also experienced positively among these students, as were the versatile methods in teaching. The theme of versatile teaching methods occurred only in the statements of those who found the course not difficult or in between. Those students who reported the course to be difficult ($n = 6$) similarly liked peer support, peer reviewing tasks, peer feedback, and overall support from other students the most. The student-centered approach was also a theme that featured prominently in the statements of students who found the course difficult.

Students who experienced the course as not difficult ($n =13$) were least satisfied with the time allocation; they reported that the time was not optimal throughout the course schedule, or they felt more time was needed for the whole course. In addition, they believed that the assignments and tasks should have included more supportive materials and templates to assist in the actual writing of the thesis. The students who felt the course difficulty was in between ($n =10$) were the least satisfied with the time for peer support,

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and they felt that more peer-reviewing tasks should have been included in the course. The students who found the course difficult ($n = 6$) were also concerned that there was not enough time for peer support and more peer-reviewing tasks, and they also felt that assignments and tasks should have included more supportive materials and templates for writing the thesis.

Students who experienced the course as not difficult ($n = 13$) evaluated the flipped approach as being very efficient, useful, functional, easier, and more supportive when compared to the traditional methods approach used in other courses. One student expressed the usefulness of the approach as follows:

I found studying to be useful and developing. I particularly liked that the use of advance materials increased my own responsibility and, by extension, my interest.
(Student 24)

Those students who felt that the difficulty was in between ($n = 10$) experienced the approach as supporting their own activity during the seminars and helping their well-being when they were already familiar with the topics they were to learn in the contact meetings. Students who experienced the course as difficult ($n = 6$) had ideas about how to develop the materials, assignments, and tasks to support students' learning to an even greater degree, as mentioned above in the qualitative thematic analysis results section.

Discussion

The purpose of this study was to investigate the functionality of the FC approach in the master's thesis seminar based on participating students' views. Based on the research purpose and mixed-methods approaches, the overarching aim of this study was to present research-based pedagogical development work on the master's thesis seminar. The challenges associated with previous seminars were teacher-led activities, the lack of a social presence, the engagement and collaborative work of students, time management, and the writing process management of a substantial work of scholarship (i.e., master's theses). We chose the FC approach to confront these challenges.

The results of this study support previous findings that the FC approach can enhance students' positive learning experiences and that guidance for the FC approach is an important factor of student satisfaction (Sointu et al., 2022; Awidi & Paynter, 2019; Manson et al., 2013; Strelan et al., 2020). This was shown by the group-level results of the quantitative data, indicating higher levels of guidance and satisfaction and a lower level of difficulty. The individual statements also reflected the results at the group level, as did the qualitative data results in general. This may be due to time- and location-flexible learning (e.g., Alexander et al., 2019), face-to-face meetings that facilitate in-depth cognitive activity (Abeysekera & Dawson, 2015), and well-guided pedagogy at the beginning of the seminar (Sointu et al., 2022; Manson et al., 2013).

Based on the mixed-methods results, peer support, peer feedback, and peer reviewing were the themes that all students experienced as meaningful, regardless of their experiences of the course being difficult, in between, or not difficult. This is a clear message to higher education teachers that regardless of the teaching method or approach, students crave peer support, and it should be enhanced. The mixed-methods results also revealed that the greater the difficulty reported by students with FC in the master's thesis seminar, the more they considered the need for peer support, peer-reviewing tasks with supportive materials, and templates for writing their theses. Although the FC approach is thought to support students' collaborative learning activities (Strayer, 2012), there seems to be a clear need to facilitate more peer-supporting activities. Peer support seems to be vital, especially for master's students; therefore it is suggested that assignments and the practical organization of master's seminar meetings be developed to promote the full potential of peer support for students' work.

In line with the core idea of the FC approach, its application in this study also fostered student-centeredness in the pedagogical organization of the master's thesis seminars. The dialogical nature and openness of the seminar meetings promoted a friendly atmosphere and good team spirit, which have been identified as important in the process of conducting a master's thesis (de Kleijin et al., 2014). The teachers' role and strong presence seemed to be highly important (Gilboy et al., 2015), and the FC approach can enable this within the context of the master's thesis seminar pedagogy. Moreover, previous studies have indicated that a safe learning atmosphere is important for learning and collaborative learning (e.g., Eteläpelto & Lahti, 2008), and this can be facilitated by the FC approach (Kim et al., 2014). In this sense, the learning of highly challenging content (i.e., writing one's own master's thesis) can be well supported in an FC context (see also Gilboy et al., 2015).

For some students, the FC approach may be novel; therefore, it would be helpful to allocate time for learning this new approach at the beginning of the seminar, particularly among students with lower self-regulation and time management skills (e.g., Boevé et al., 2017; Hyppönen et al., 2019; Lai & Hwang, 2016). An effort should be made to give students a clear understanding of the whole master's thesis process at the beginning, as it will help them to plan their work more efficiently. Sequencing of teaching using the FC approach can offer a solid platform for adhering to the timeline of master's thesis studies and graduation, as the rate of master's thesis completion (65.1%) in this sample shows.

Another important aspect of successful FC implementation is the clear structure of learning materials (Hung, 2015) and consistency in sequencing (Prober & Khan, 2013). Although the results showed positive aspects of the FC approach in the master's thesis seminar, the qualitative and mixed-methods results also indicated challenges. The dual use of materials (i.e., using them in both the pre-seminar phase and seminar meeting activities) may confuse students and reduce engagement in the use of the materials,

especially pre-seminar materials. Therefore, materials should be clear and, more importantly, clearly offered so that the students may follow better the sequencing. Moreover, the data demonstrated that, for some students, the seminars did not match the pace of their thesis writing. In a yearly cohort-founded teaching schedule, this can be a challenge, as the teacher(s) of the seminar need to follow the curriculum and the pace of the majority of the students. However, the use of learning management systems with an FC approach might offer the possibility of customizing learning to enable students to conduct their masters' seminars at their own pace. Obviously, this creates a challenge for peer support and collaborative work; however, it could be an important future line of research-based development work. Therefore, more research is warranted.

There was no difference in terms of students' perceptions and experiences based on whether they attended the face-to-face or online courses. Seminar A started as a face-to-face course; however, rapid pedagogical changes had to be made in March 2020, due to restrictions caused by the COVID-19 pandemic. Such sudden changes in pedagogical arrangements during the pandemic have been defined in recent literature as emergency online teaching (EOT) (Hodges et al., 2020). As seminar B was organized as an online course from the beginning, the restrictions did not affect it, and because seminar A already had a strong foundation in the FC approach, the transition to EOT was rather simple. Therefore, the FC approach can offer a relieving venue for teacher(s) to adapt their teaching in sudden circumstances, such as those presented by COVID-19. In particular, as social presence is often a challenge in online groups (e.g., Donnelly, 2013), the already constructed pre-seminar phase materials can assist the teacher(s) in adapting and using time to build up the social presence for online learning. This study contributes to the current global discussion on developing higher education in the post-pandemic era. Devlin and Samarawickrema (2022) stated that in addition to effects of the global pandemic, the context of HE has changed and become more complex due to increased student diversity, digital transformation, and evolving assessment philosophy and practice, among other issues. As the future seems just as unpredictable and complex, the focus should be on developing flexible and adaptive pedagogies that facilitate HE students' meaningful learning in a rapidly changing world. The overall experience of the functionality of the FC approach-based master's thesis seminars were positive and encourage further development in this sense.

Although some challenges were confronted during the master's thesis seminar and were reflected in the results, the main result was that the FC approach can be considered a suitable and meaningful approach for teaching research methods in master's thesis seminars. The challenges associated with organizing a master's seminar based on traditional methods (e.g., Svinhuvud, 2015) can be addressed by creating an open atmosphere and a dialogic environment (e.g., de Kleijin et al., 2014), which FC facilitates. More precisely, the FC approach seems to facilitate student-centeredness, social presence, active engagement, and collaborative work. It also supports time-management and the

large-scale writing process. Research-based knowledge is widely promoted in the educational sciences and teacher education. Research studies are a significant part of these studies, and the master's thesis is a large part of the five-year master's training in Finnish university-level education. Therefore, the FC approach can be implemented for the benefit of research studies.

This study had some limitations. First, although the data were drawn from two Finnish universities, they comprised a rather small convenience sample. Future research would benefit from more representative data. Additionally, the convenience sample may be biased owing to the voluntary nature of the participation. However, we used an existing questionnaire for the quantitative data, accompanied by individual statements and open-ended questions for qualitative and mixed-methods analysis to increase the trustworthiness of the results (including researcher and data triangulation). Additionally, a rather large proportion (i.e., 67%) of possible respondents participated in the study. Second, no attempt was made to control the learning or the differences between more traditional seminar teaching and FC seminar teaching. In the future, a larger replication with possible (quasi-)experimental designs should be considered. Third, the seminars (i.e., seminar A and B in different universities) had different approaches for the flipped classroom (FC) in the beginning. Seminar A used a face-to-face approach in contact meetings, while seminar B used online teaching. However, this changed due to COVID-19, and both were in online teaching mode for the last three months of the seminar (including when the data were collected in late May 2020). Additionally, the similarity of the approaches in seminar A and seminar B were well discussed and planned together from the beginning. Nevertheless, future research would benefit from the individual implementation of the FC approach (i.e., face-to face or fully online), and outside of EOT situations. Finally, this research considered only master's level theses. For implementing FC in bachelor's theses or doctoral dissertation studies, we strongly recommend conducting research for these settings.

Conclusions

Our research-based, higher education development work has clear implications for higher education teachers, researchers, and developers. The background and research context information are shared in detail to facilitate the development of one's own seminars based on the FC approach. This paper explains the foundations and key elements worth considering in this context. The research results, accompanied by our own thoughts and the limitations of the project, should provide assistance to those considering the possible benefits and challenges of the FC approach in master's seminar teaching. This research approach could be used for other research purposes in higher education. Overall, by providing one possible approach to development, this study can be used to consider how the learning of higher education students can be comprehensively supported. We would

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like to emphasize the collaborative nature of research-based development work (which we engaged in here) and to encourage others to do this type of work collaboratively among colleagues. Moreover, the importance of student voices in research development work should not be neglected; therefore, we encourage readers to plan and report their students' research for the benefit of our higher education, research-based community.

Acknowledgements

We wish to thank all of our seminar students for participating in our teaching and study as well as our colleagues for supporting our work.

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