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Flipped classroom – a qualitative study of medical students

ORIGINAL ARTICLE

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Background and aim

In the flipped classroom model, students prepare for lessons in advance, enabling teaching sessions to be used for discussion, reflection and other active learning activities. The aim of this qualitative study was to explore the impact of preparatory tasks on medical students' motivation, engagement and perceived learning.

Material and method

Two focus group interviews were conducted in May 2024 with 14 medical students at the University of Oslo, Campus South. The students had experience with both traditional lectures and the flipped classroom. The interviews were analysed using a reflexive thematic approach, with a focus on students' experiences with preparation and learning.

Results

Student motivation increased when expectations were clearly expressed and preparatory tasks were adapted to the scope of the teaching session. Students preferred brief preparatory tasks that were provided well in advance. Active incorporation of preparatory work into lessons, in the form of quizzes, discussions and case studies, promoted engagement and self-efficacy. Students felt that the flipped classroom approach deepened their understanding of the material and increased their confidence in academic discussions, particularly in relation to complex topics. They also felt that the teaching model supported the development of professional identity and preparation for clinical practice.

Interpretation

Combining well-defined preparatory tasks and active incorporation of these into the flipped classroom promotes students' motivation, engagement, self-efficacy and reflective thinking.

Main findings

In this qualitative study, students reported that it was easier to prepare for lessons when the preparatory work was of a realistic scope.

Many students found the teaching more engaging when their preparatory work was actively incorporated into lessons.

Several felt that the flipped classroom approach improved their academic confidence and self-efficacy.

Traditional lectures in higher education face growing competition from active learning approaches (1, 2). Lectures are often instructor-led and characterised by one-way communication, which can lead to student passivity (3). Mandatory preparation before lectures has been shown to promote deep learning, increase engagement and improve learning outcomes (4, 5). This teaching model is known as a 'flipped classroom' (2, 4–8).

In medical education, the flipped classroom approach involves students studying the subject matter in advance, using resources such as videos, journal articles or assigned tasks, or independently seeking relevant information to complete their preparation (6). The teaching session is then used to explore the material through discussions, case studies and skills training, enabling students to apply the content in relevant, often clinical, contexts (7). The aim is to enhance students' ability to apply their knowledge in clinical practice. However, recent research indicates that the effectiveness of this approach depends on both its implementation and students' perceptions (4, 8).

The medical curriculum at the University of Oslo was revised in 2014, with a greater emphasis placed on active learning (9). In 2023, a decentralised medical education programme was established at Sørlandet Hospital, Campus South, where the flipped classroom was adopted as the primary teaching model. Students were given a brief introduction to the teaching model in the induction programme on their first day. Instructors were introduced to the principles of the flipped classroom in one-day seminars organised by the University of Agder. At Campus South, students are taught in groups of up to ten per semester, and no time is allocated in the timetable to prepare for flipped classroom sessions.

Research shows that students' motivation to prepare for lessons is influenced by factors such as the learning environment, the format of learning resources, perceived relevance and prior knowledge (10). However, research remains limited on the impact of different types of preparatory tasks on students' motivation, engagement and perceived learning outcomes in the flipped classroom model, especially in medical education (8).

The aim of this study was to explore medical students' experiences with the flipped classroom and their motivation to prepare for teaching sessions.

Material and method

The study material was collected in semi-structured focus group interviews conducted in May 2024 with students from the first two cohorts at Campus South. An administrative contact at the campus recruited participants via

email. All 16 students from the autumn 2023 and spring 2024 cohorts who had been taught using the flipped classroom approach in the subjects gynaecology and paediatrics (equivalent to year 5 of study) were invited to take part. The cohorts had four and eight months of experience, respectively, with the flipped classroom.

The interviews were conducted after teaching sessions in a hospital conference room, allowing uninterrupted discussion. Food was provided after the interviews. The second author (HETM) acted as moderator for both focus groups, and the secretary was a member of the administrative staff from Campus South. The moderator had experience with flipped classrooms but did not teach at Campus South. Her role was to guide the interviews and discussions, maintain focus and ask follow-up questions to clarify points and ensure a consistent understanding.

A semi-structured interview guide was devised in advance (appendix). The guide focused on students' experiences with preparing for teaching sessions and with the flipped classroom compared with traditional lectures. Open-ended questions were posed to allow participants to discuss each topic as freely as possible. At the end of the interview, participants were invited to share any further thoughts that might inform the study. The interviews lasted 49 minutes (Interview 1) and 56 minutes (Interview 2), and audio recordings were transcribed verbatim.

Data analysis

The data were analysed in accordance with Braun and Clarke's six-step reflexive thematic analysis (11). In step one, two of the authors (UMSK and HETM) familiarised themselves with the dataset independently by reading the transcripts repeatedly. In the second step, they condensed the dataset into meaning units and coded the material using an inductive approach. In step three, the codes were grouped to identify themes that provided a deeper understanding of the research question and the dataset. The two authors then met to discuss the grouped codes and themes. They considered whether themes should be merged, split or discarded (step 4), until a shared understanding of the themes was achieved (step 5).

The final step of the analysis involved writing the results section. The three authors jointly reviewed the dataset and selected quotes that illustrated the final themes. During this part of the analysis, we moved iteratively back and forth between the various steps. This integrated, reflexive process led to an overall assessment of the transcripts and coding, as well as refinement of the themes. We also discussed how pre-understandings, roles and experiences might influence the interpretation of the material. Two of the authors (UMSK and IV) are responsible for overseeing the teaching of paediatrics and gynaecology. To minimise potential bias, they were not involved in the interviews but contributed to the interpretation and analysis of the data.

Ethical considerations

Written informed consent was obtained from participants prior to the interviews. Audio recordings were stored on a password-protected server and deleted after transcription. The transcripts were anonymised, and no personally identifiable information was retained. The study was approved by Sikt (the Norwegian Agency for Shared Services in Education and Research) and was deemed not to require approval from the Regional Committee for Medical and Health Research Ethics (ref. 155285/24).

Results

Fourteen students (88 %) agreed to participate in the study: three men and eleven women aged 23–30 years. Two focus group interviews were conducted, with six and eight participants, respectively. The groups included students from both cohorts.

The analyses revealed the following three main perspectives:

Perspective 1: Preparatory tasks must be of a realistic scope

The students reported generally positive experiences with preparatory tasks for the flipped classroom but highlighted several factors that impacted on their motivation to allocate time for preparation. Students agreed that the scope of preparation should be proportionate to the duration of the teaching session. For example, the students felt that a 45-minute session should not require more than 15–20 minutes of preparation. Several emphasised that they were more willing to carry out the preparatory tasks when they considered the effort to be proportionate to the benefit. One perspective was that excessively demanding preparatory tasks could be demotivating, leading some students to forego them altogether.

Conversely, the students emphasised that they were more likely to undertake the preparatory work if tasks were clearly defined and provided well in advance. Uncertainty about what the preparation entailed, or only receiving the tasks shortly before the teaching session, could make planning difficult and limit opportunities to prepare. Several students noted that long days with lectures made it difficult to find time for preparation and suggested that time should be allocated for self-study in the timetable:

'You learn much better with the flipped classroom, and then you can study the syllabus and some things in advance, but you need to have the time for it. So I think some hours could have been cut to allow time for preparatory work, which would help us learn more effectively and lead to good discussions in the classroom. But you can't then have such long days.' (Participant 4, Interview 1)

The students called for access to the preparatory tasks at least one week in advance and preferred short videos, podcasts and summaries rather than journal articles. They also emphasised that specific tasks, such as questions with links to relevant sources, made it easier to prepare.

'It makes a huge difference how much there is. If there's a lot, it's like, "Oh, I can't be bothered," you know. If there's just a little, for example, one of the instructors usually had three to four questions with links to where we could find the answers. It's like, "Okay, I can do this in 20 minutes." Then I do it. And it worked really well.' (Participant 1, Interview 2)

Perspective 2: Active incorporation of preparatory tasks into lessons promotes engagement

The students reported that their motivation to prepare increased when the preparatory tasks were actively incorporated into teaching sessions. Several noted that active participation gave purpose to their preparatory work and increased their engagement during lessons. This was particularly true for learning activities such as quizzes, Mentimeter (web-based student response system), case studies and discussions, where students felt they were challenged and involved.

'As mentioned, we've also had a number of quizzes. Things like Mentimeter. You get to test yourself. But also some more creative variations. We had some of those Post-it notes and some kind of relay to come up with as much as possible.' (Participant 7, Interview 1)

The students preferred lessons where preparatory tasks were incorporated into varied, interactive activities. They described the flipped classroom as dialogue-based and safe, particularly because it took place in small groups. Several felt they learned more when they had the opportunity to explain, discuss and receive feedback. One participant expressed it as follows:

'It depends on the instructor. But if we get the chance to explain or answer questions or receive feedback. Being asked after we've responded, like "why that?" and so on. Then it becomes a conversation. It's not a one-way thing; it's a proper discussion.' (Participant 6, Interview 2)

Perspective 3: Flipped classroom enhances students' academic confidence and self-efficacy

Several students reported that the flipped classroom helped them prepare more effectively for exams, allowing them to learn through multiple approaches and consolidate their understanding through peer discussion. Many also noted that some topics required more prior knowledge and that the flipped classroom was the best method for complex topics, where discussion and reflection were encouraged. The students felt that they gained a deeper understanding of the material and retained knowledge more effectively, which in turn improved their learning outcomes compared with traditional lectures. They attributed this to the combination of preparatory activities, active participation in lessons, the use of varied sources and peer discussions.

'I feel like I retain the information much better. This is the first exam I've done very little extra studying for, because what I learned in the lessons really stuck with me.' (Participant 4, Interview 1)

Several students reported being motivated by clearly expressed expectations and academic standards. This was a contrast to previous experiences, where they felt there were very few explicit demands on them as medical students. One participant described it as follows:

'It's been quite nice in the flipped classroom situation to be put to the test a bit. That's something you also experience in the workplace. It feels good to realise that now I want to improve, because I see that someone is placing some demands on me.' (Participant 1, Interview 2)

The students found that the flipped classroom strengthened their academic confidence and self-efficacy, which in turn motivated them to continue studying and to pursue a career in medicine. However, several noted that the flipped classroom was not necessarily suitable for all subject areas.

Discussion

In this study, we examined medical students' experiences with preparatory tasks in the flipped classroom model and how these impacted on their motivation, engagement and learning outcomes.

Several students indicated that it was crucial that the preparatory tasks were not overly extensive. Their motivation increased when their preparatory work was actively utilised during teaching sessions. There was also variation in students' perceptions of the teaching, and some felt that the requirement for extensive preparation could be demotivating. Many felt that the flipped classroom approach better prepared them for examinations and future clinical practice.

Time-consuming preparation was associated with reduced engagement, and several students expressed a preference for short videos, podcasts and summaries instead of lengthy journal articles. This is consistent with previous research suggesting that an overwhelming volume of preparatory work can lead to demotivation and burnout (12). A previous study reported that students frequently failed to complete preparatory tasks when these were not accessible at the times they had set aside or were too extensive in relation to their timetables (12). This indicates that preparation for the flipped classroom is most effective when it is properly adapted to students' time constraints (4, 6, 8). Students' preference for alternatives to traditional research articles may reflect the fact that today's students belong to a digital generation that has spent less time reading and more time engaging with screens than previous generations (13).

Some students considered the flipped classroom to be the best approach for complex topics. Prior knowledge gained from preparatory tasks enabled more in-depth discussion and reflection during teaching sessions. In contrast, more straightforward topics could be taught effectively through traditional lectures. This is supported by studies recommending a flexible approach to learning, in which the flipped classroom is the preferred approach for promoting engagement and enhancing learning outcomes (4, 6).

Students expressed a desire for their knowledge to be tested during teaching sessions, for example through quizzes, so they could assess whether their preparation had been effective and whether they remembered the material. A similar finding was reported by DeVaul and Goldman: students were more

motivated to undertake preparatory work when instructors clearly expressed expectations, while classroom sessions focused on key concepts rather than repeating the preparatory material (12). However, the contrast between a desire for clear expectations and the resistance to time-consuming preparation was not explored further in our study. This may be a relevant area for future research on self-study and curriculum overload.

'Curriculum avoidance' can potentially impede deeper learning, but it may also reflect a need for better organisation and prioritisation of preparatory tasks, rather than a lack of willingness among students.

Several students also expressed a desire for interactive elements, including case studies and discussions, to stimulate critical thinking and reflection on the topics in their preparatory work.

Research shows that learning through practical application, particularly when students actively participate, strengthens motivation, promotes deeper learning and supports lifelong learning (6, 10). In cognitive load theory, learning can be impeded when cognitive loads exceed a student's available capacity, whereas structured and targeted support can allow students to devote cognitive resources to learning and comprehension (14). Our results suggest that clear and well-defined preparatory tasks can help reduce unnecessary cognitive load and thereby facilitate active participation during teaching sessions. The findings align with self-determination theory, which suggests that fulfilling students' needs for autonomy and competence strengthens intrinsic motivation and promotes learning.

Many participants gained a deeper understanding of the material using the flipped classroom approach compared with traditional lectures, as it allowed them to discuss and actively use the materials they had studied beforehand. A majority also felt better prepared for the challenges they would face in exams and in clinical work. Although this is an interview study, the findings are consistent with several randomised studies showing that active learning strategies, such as the flipped classroom, can result in better learning outcomes than traditional lectures (1). This is likely because students actively engage with the material before class and apply their knowledge during classroom activities. The approach encourages deeper understanding, in line with cognitive theory for multimedia learning, which describes how the use of sounds and pictures in technology-enhanced learning tools can improve learning (4, 15).

Higher levels of competence and self-confidence are important for developing a professional identity, which can have long-term benefits for students in their future work. A randomised study comparing the flipped classroom with traditional lectures (control group) in geriatrics found that, two years after the study, medical students in the flipped classroom group scored higher in empathy and knowledge than those in the control group (16).

The relatively small sample of medical students from Campus South was a limitation of our study. This may have introduced bias if these students were particularly receptive to new teaching methods. Focus group interviews can also entail a degree of social desirability bias, where participants tailor their

responses to the majority view or to what they think the interviewer expects. To mitigate this risk, the interviews were conducted by the author who had not previously met the students (HETM).

The study does not explore students' perceptions of the teaching when they have not undertaken preparatory work, or when the extent of preparation varies within the group. This issue did not arise in the two focus groups. Nonetheless, such scenarios can be important, as they could potentially impact on participation, academic confidence and group dynamics. This topic may be of interest for further research.

To strengthen generalisability, future studies should include a broader sample of students across different years and institutions, and could combine qualitative and quantitative methods, such as individual interviews, observations and surveys.

Our findings may also be relevant to other healthcare study programmes and institutions seeking to implement the flipped classroom. In summary, our results show that the flipped classroom was welcomed by medical students at Campus South and that it can enhance engagement and foster a sense of deeper clinical learning. However, the findings indicate that the quality and scope of preparatory tasks are central to realising the potential of this approach.

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