

What factors facilitate the engagement with flipped classrooms used in the preparation for postgraduate medical membership examinations?

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Background: The “flipped classroom,” a pedagogical model where typical lecture and homework elements are reversed, is being advocated in medical education to support the teaching of a large curriculum. However, research into the use of this model in postgraduate medical education, which requires the application of acquired knowledge, is limited. The aim of this study was to explore the barriers and facilitators to engagement with the flipped classroom model in preparation for the written element of postgraduate membership examinations.

Methods: Three focus groups (n=14) were held between February and June 2016. Participants were drawn from a membership examination preparation course, run by the University of Sheffield. Two of the groups (n=10) involved “students” (public health registrars) while the other focus group (n=4) was held with “tutors” (experienced registrars and consultants). The focus groups were audiorecorded and transcribed verbatim. Transcripts were thematically analyzed by using both predetermined and emergent themes.

Results: Key themes that emerged from the data included variation in learning and teaching styles of individuals as well as the feasibility and flexibility of the overall course design. However, management of students’ expectations was found to be the fundamental factor, which underpinned the engagement.

Conclusion: The complex interaction of factors affecting engagement in this study highlights the need to consider the appropriateness of the flipped classroom model. However, this must be balanced by the potential benefits of the approach for delivering a large curriculum. Recognizing the central importance of managing expectations at the outset would be useful when considering this model in postgraduate medical education.

Keywords: flipped classroom, membership examination, postgraduate

Introduction

Postgraduate membership examination remains a core component of medical training across specialties in the UK. Preparation for these examinations is often challenging for candidates as they balance professional and personal commitments against the time needed for exam preparation. The cost of these examinations, the limit on the number of attempts, and their integral role in facilitating career progression are motivating factors for candidates to adequately prepare for the examinations.^{1,2} However, frequently, the only options for candidates are to either do this preparation alone or bear the cost of private courses.³

There is a marked contrast between undergraduate and postgraduate medical education in the UK in terms of the provision of formal teaching.⁴ Although this is a historical difference, the majority of undergraduate teaching is funded through tuition fees and

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delivered via the infrastructure of universities. In contrast, postgraduate medical education is far more heterogeneous; membership preparation in particular is largely ad hoc, and formal courses are delivered by a variety of both public sector (National Health Service/higher education) and private sector providers.⁴ There are also practical challenges to scheduling postgraduate courses around the very limited time available to doctors in training. Furthermore, postgraduate medical examinations by their nature cover large curricula, which add further complexities to the offer of formal teaching. Therefore, there is a need to find alternative models to the traditional didactic taught courses in postgraduate medical education.⁵⁻⁷

Recent research has focused on the need to rethink traditional teaching methods, which have also been criticized for not addressing the core skills for the “real world” such as critical thinking, written communication, and complex reasoning.^{8,9} Evidence supports the use of active learning exercises such as teamwork, self-reflection, and case studies that prompt students’ engagement, thereby enhancing their learning outcomes and improving motivation and attitudes.^{9,10} Based on this idea of active learning, a radical, yet intuitive educational model has been developed: the flipped classroom.

The flipped classroom essentially involves the reversal of the traditional classroom and homework elements.¹¹⁻¹³ The responsibility for the acquisition of knowledge lies with the students (eg, through pre-reading, use of videos, and online resources), whereas the classroom is dedicated to student-centered activities such as the application of knowledge, analysis, and synthesis and evaluation, which are directly supported by both peers and tutors. However, despite the evidence supporting the use of the flipped classroom,^{8,14,15} the model has yet to be widely adopted.⁸

Across specialties, the availability of postgraduate membership preparation courses is variable, and few are formally offered through Health Education England (the body overseeing postgraduate medical education) or delivered by the university sector. However, one example is the Membership of the Faculty of Public Health (MFPH) Part A examination course, led by the University of Sheffield and supported by regional branches of Health Education England in Yorkshire and Humber and East Midlands. Like the written examination component of many other membership examinations, the Part A MFPH curriculum is broad with a strong focus on the application of knowledge which was one of the drivers for the University of Sheffield course to adopt a largely “flipped classroom” model.

Given the interest in the use of flipped classrooms in postgraduate medical education,^{5,6,16} the authors felt that the

course students and tutors could provide an understanding of the factors affecting engagement with this teaching model.⁸ Although this particular course was designed for UK public health specialty registrars (StRs), it was considered that the findings may be transferable to other medical education settings, in particular for postgraduate doctors more broadly. The aim of this study was to explore the barriers and facilitators to engagement with the flipped classroom model in the preparation for the written element of postgraduate membership examinations.

Methods

Study design

A qualitative approach, as appropriate to the explorative nature of this study, was employed, which was also undertaken in a natural setting. Ethical approval was obtained from the University of Sheffield Research Ethics Committee for this study. The COnsolidated criteria for REporting Qualitative research (COREQ) checklist was followed to report the methodology and findings from the study.

Research setting

The study was conducted with both course “students” (public health StRs) and “tutors” (senior StRs and consultants in public health) at the University of Sheffield. The MFPH Part A examination course runs over 12 weeks and involves 1 half-day of “classroom” teaching per week. The “homework” element of the course involves students gaining the knowledge covered by the MFPH Part A curriculum in a self-directed way. Following the introductory session in week 1, each subsequent weekly teaching session focuses on the application of a different core area of the MFPH Part A curriculum.

The course was not purposefully designed to follow the flipped classroom pedagogy, but, for the most part, naturally adopted this format for pragmatic reasons. These include the vast curriculum, the need for efficiency and flexibility given other priorities and training needs of the StRs, and the applied nature of the examination. Notably, a couple of the sessions within the course employed more traditional didactic teaching methods allowing comparison of the relative perceived effectiveness of different approaches.

Participants

Public health StRs from East Midlands and Yorkshire and the Humber enrolled on the most recent Part A examination course were chosen as the pool from which to draw participants for the student focus groups. For the tutor focus

group, senior StRs and consultants in public health who either currently or have previously taught on the course were invited to participate in the study. All recruitment took place via email. Participants were asked to attend a focus group lasting 90 minutes. Lunch was provided and travel costs were reimbursed, but no other incentives were used. For the student focus groups, all the 20 students enrolled on the most recent course were invited to participate with capacity to hold focus groups to include all who were interested in joining the study. Among the tutors, purposeful selection was used to recruit a mix of StRs and consultants in public health. All participants gave their written informed consent before the commencement of data collection for this study (Table 1).

Data collection

Focus groups were used rather than individual interviews to determine the students' and tutors' perceptions and collective understanding as well as eliciting individual views on the research topic. Predetermined themes were considered and were used to devise a topic guide (see [Supplementary material](#)), but the focus groups were semistructured and emergent themes were captured and used to develop the data collection for the focus groups. Focus groups took place in a private seminar room within the university campus. Sessions lasted ~90 minutes with a 10- to 15-minute break. The focus groups

were audiorecorded, anonymized, and transcribed verbatim. None of the participants dropped out, and recruitment for each focus group took place over 8-week periods, with data transcription and analysis occurring concurrently.

Analysis

Deductive and inductive thematic content analysis was used as it allowed predetermined categories to be applied (participant characteristics, topic characteristics, and structural characteristics) but also allowed for the emergence of new themes. The data were coded into raw data themes, which were allocated to the predetermined categories and emergent themes for analysis. Coding was an iterative process, and further codes were added as data collection progressed. Microsoft Word and Microsoft Excel were used to manage the data.

Results

Students and tutors described many perceived barriers and facilitators to engagement with the flipped model. Four key themes emerged from the analysis (Figure 1). Course design identifies both perceived limits to the feasibility of the course and potential flexibility which may be able to accommodate a range of teaching methodologies. Individual teaching style considers the variation in tutors' teaching styles and prefer-

Table 1 Participant characteristics

Focus group	Number of participants	Male	Female	Age range (years)	Educational background					
					Secondary schooling		Undergraduate		Masters in public health	Doctoral degree
					UK	Other	Medical	Other		
1 (Students)	5	3	2	29–45	5	0	2	3	5	1
2 (Students)	5	1	4	27–39	4	1	3	2	4	1
Overall	10	4	6	27–45	9	1	5	5	9	2
3 (Tutors)	4	1	3	38–53	N/A		1	3	4	2

Abbreviation: N/A, not applicable.

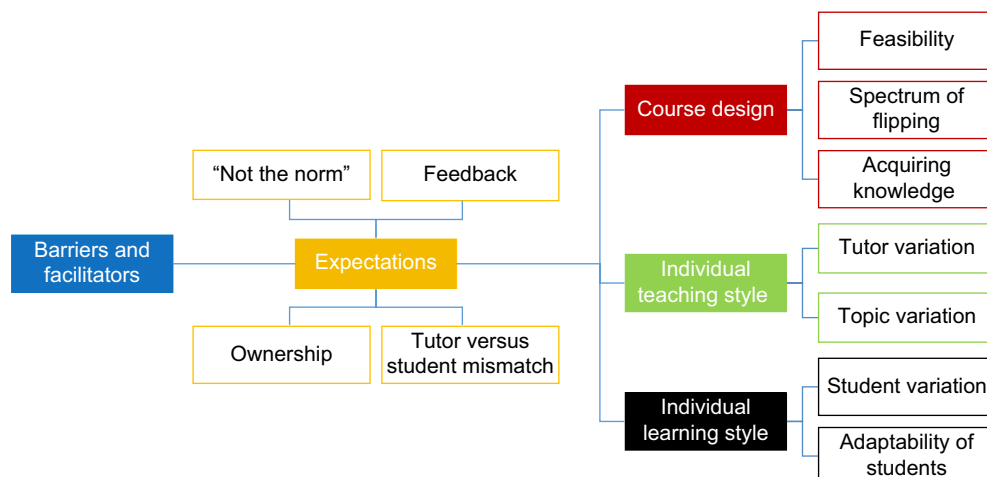


Figure 1 Themes (and subthemes) identified as barriers and facilitators to engagement with the flipped classroom model.

ences as well as the influence of the topic being taught on engagement with the flipped model. *Individual learning style* similarly acknowledges the variation between different students' preferred learning styles and their willingness to adapt to new ways of learning as a potential limiting factor. Finally, *expectations* highlight that the flipped model is a new teaching method, different to a traditional classroom, and therefore "not the norm." This was felt to be a barrier at the outset if students' expectations are not accurately informed.

Course design

This theme considers the practicalities of delivering the flipped classroom model. Students in particular described the limitations of larger class sizes.

And I think the reality of a big group is that people are going to differ about what they want to spend time going over. So I suppose it needed a facilitator actually having an idea of what the important bits are to cover. [Student E, Focus Group 1]

They also emphasized that competing priorities for postgraduate learners are a constraint with respect to the "homework" elements, that is, knowledge acquisition needed to support the course.

I think it's a realistic expectation for the delivery of the course. Whether it's a realistic expectation, given all the other stuff we've talked about you know. [Student D, Focus Group 1]

...I don't know about everybody else but having a pretty busy life it's quite hard to find the time to do that preparation for a teaching session outside of the actual allotted time. [Student C, Focus Group 2]

Students considered that challenges to acquiring knowledge in a flipped classroom model might be easily overlooked, especially in relation to the sources of knowledge and reliability of the content.

I think what would be useful is if they gave you reading that was useful to the area because I think the idea of having them come to teach you is that they are the expert in that area. So actually I think what we were talking about was that actually it can be difficult sometimes to find the stuff to revise from. I certainly found that quite difficult to know what is a good source of information for this particular area, so if they can recommend some stuff around that. Not to say this is obligatory reading to prepare for the session, but here

are some resources that could really help you to prepare this particular area for Part A, I think would be useful. [Student C, Focus Group 1]

Both tutors and students felt that the degree to which the classroom is "flipped" could vary, leading to a potential spectrum between didactic and flipped models. However, tutors expressed concerns that a mixed approach could inadvertently shift the students' sense of responsibility away from preparing adequately for the classroom. They suggested that any content should be brief and covered at the end of the session rather than as an introduction.

I think there is a time to have a bit of traditional teaching and then you go into your flipped thing. It would be helpful. [Student B, Focus Group 1]

And I think often you do a bit of an overview session after they've done the questions. I mean I know I've certainly done a bit of that and then you sort of you know tackled the questions they've done and how it all fits together. [Tutor B, Focus Group 3]

Individual teaching style

Both students and tutors recognized that there was variation in tutors' approaches to delivering the flipped classroom model. This variation was felt to relate partly to the differing teaching preferences of tutors, but also to the nature of the topic being taught.

I don't know how the variation was due to one organiser. To me it was from my experience it was very variable based on the tutor rather than the organiser... [Student B, Focus Group 2]

But I much prefer the idea of going in and being quite open, given that we've expected everyone to give a reading, and actually because it is such a huge subject, I would never have been able to cover it, so I just wanted to be able to talk about the things that had come up as they were doing them. [Tutor C, Focus Group 3]

I think it varied depending on the topics because there were some topics that were treated almost like a bit more of a traditional revision course like a lot of the statistic stuff was done. [Student C, Focus Group 1]

However, despite this variation, students identified some general approaches to teaching that most engaged them in the flipped classroom model.

I think the most useful sessions were the ones where in the afternoon [the] facilitator... used the questions to spring-board into stuff generally about the topic. So we maybe make reference to them but actually discussed themes and useful stuff that you could take away about how to answer any question on sociology whatever [Student D, Focus Group 1]

And that's different approaches but it was nice for people to say what do you want? You've got me for a few hours, what do you want out of this, which is always nice [Student E, Focus Group 1]

Individual learning style

A similar degree of variation in the learning styles of individual students was acknowledged and identified by both students and tutors.

That's just life isn't it? You are going to have people in an exam that have different approaches to it. I don't think that was anything to do with the classroom. That was just the fact that we were a group of people doing it. [Student C, Focus Group 1]

Well I think actually if I was left to my own devices, I'd probably be quite last minute on revision. [Student E, Focus Group 1]

Because presumably it just doesn't suit some people. It depends on the way that you are learning. [Tutor E, Focus Group 3]

Students also noted, however, that their learning styles could be adaptable. They observed that the model of teaching itself could influence and shape the approach to learning for some of them and that group dynamics influenced their engagement with the flipped classroom model too.

It is quite interesting. I am normally a lone reviser and I do my own thing and I found it quite useful going through examples with the whole group in the afternoon. [Student E, Focus Group 2]

And it changed and evolved over several weeks. But I think we were also at a stage where a lot of us weren't entirely sure how our own styles meshed with those of our colleagues... And there were certainly 1 or 2 weeks where actually the mold of the people was wrong and actually that made the group much more stressed. [Student C, Focus Group 2]

Of note, some students voiced concerns about the limits to which individuals may be able to adapt their learning style

to this teaching method and that it will not necessarily suit everyone.

... I finished my notes about 2 days before the exam. So that felt like I had 2 days to revise. Which felt oh it just felt like all in the wrong order. But I suspect if I'd started off writing my notes, they would still have taken the same amount of time. So I am not quite sure what the equation was with that but it didn't quite fit me. It definitely didn't fit with how I'd done revision before. [Student B, Focus Group 1]

... at the same time it was a rather frustrating experience and gave you more stress than knowledge... I think it has got opportunity to just be the ideal point of contact for group work if you are a lone worker and you can do the rest of the time on your own. But the reality of it sometimes is going to be good. Sometimes it's not. [Student D, Focus Group 2]

Expectations

This theme largely underpins all the other themes, and both students and tutors echoed its central importance. The primary issue for students centered on the need for explicit acknowledgment, at the outset, of the novelty of the teaching model, and that consequently "traditional" learning methods would not be appropriate.

I think at the beginning I was approaching it like a traditional revision course, so I was expecting that you would be, you wouldn't necessarily be as thoroughly read up as might have been advisable. [Student D, Focus Group 1]

This need to clearly set expectations at the outset appeared to be a key potential barrier as it not only caused confusion for the students, but also misaligned the expectations of the students and tutors. Consequently, this risked frustration, a lack of ownership, and disengagement with the model of teaching from both tutors and students.

Am I right in thinking that was the session where there was almost a bit of frustration from the facilitators back at us? [Student B, Focus Group 2]

I think it's good when it works. I think certainly being in situations where people haven't done their work beforehand... then it's really, really difficult because it is absolutely dependent on people doing work beforehand... So I think when that works, that's really good because you can have a really constructive discussion. But when it doesn't, then it's kind of difficult to use the time constructively because

actually what you thought you were going to do completely changes. [Tutor C, Focus Group 3]

As a key principle of flipped classrooms is to aid students in their application of knowledge, prompt feedback on work done becomes a central expectation of students. This was highly valued by students, but class size was an important factor affecting the feasibility of offering individualized feedback.

And he marked them all individually at lunchtime and then gave them back to people with individual comments. And I think people found that very useful because it was very individual feedback. [Student C, Focus Group 1]

And so clearly that is a time issue for how long it would take for them to review answers that were done in the morning. And if it's variable, then they won't really know each week how many people are providing answers that they will need to review... [Student B, Focus Group 2]

To overcome this potential hurdle, both students and tutors suggested several possible solutions. These included setting learning outcomes for the sessions and preparing students as far in advance as possible for the format of the course, and the tutors advocated the need for a "learning agreement" between students and tutors in order to inform and align expectations.

Actually it would be really useful probably then if it came out as a pack at the start of the course because it gives you, it's just giving people as much time as possible to think about it beforehand... But I sort of felt like it was all a blur and then I started and hadn't really thought about it very much in advance. [Student C, Focus Group 2]

But you know I think you have to have a bit of a learning agreement don't you with what you expect and what they expect and deliver. [Tutor D, Focus Group 3]

Discussion

This study demonstrates that while engagement with flipped classrooms is influenced by a complex interaction of factors (including variation in learning and teaching styles of individuals as well as the feasibility and flexibility of overall course design), the success of the flipped model is primarily underpinned by managing students' expectations. When expectations were not clearly informed at the outset of the course, the consequence was both confusion on the part of the students and potentially frustration on the part of the tutors.

It was evident that this fundamental principle of managing student expectations can easily be overlooked and to do so is to the detriment of the course. However, both students and tutors recognized that it could be relatively straightforward to overcome this critical hurdle through explicit and timely explanations of the nature of the course.

It is perhaps more challenging to avoid the temptation of seeing flipped classrooms as a panacea to the difficulties of delivering a large curriculum. Therefore, this study supports the findings from other examples of postgraduate flipped classrooms which advocate a clear recognition that constraints still exist on both the "classroom" and "homework" elements.^{6,16-18}

A growing body of literature highlights many complexities of flipping and demonstrates that there are varied outcomes – "not all flipped classrooms are created equal".¹⁸ In addition, consideration must be given as to the appropriateness of the flipped classroom model; concerns about the model include negative student perceptions prior to undertaking flipped classrooms, "homework" being set to the appropriate level, and haphazard implementation.¹⁹

In order to assess the suitability of the flipped classroom model, the full picture should be considered. The use of flipped classrooms in postgraduate medical education remains under-researched.^{8,11} For postgraduates, there may be potential benefits with the flipped model. Postgraduate medics often have limited time available for "classroom" teaching, are expected to gain knowledge of broad and diverse curricula, and are considered to be "adult" learners – judged to be capable of managing their time effectively and employing deeper, strategic learning techniques.²⁰

Conversely, it was hypothesized that postgraduate learners may find the flipped classroom model more challenging than students who are at an earlier stage of their education. As the findings of this study demonstrate, some students expressed concerns about the limit to which individuals could adapt their learning style to the flipped classroom method. Postgraduate students may have long-established learning behaviors, and some may find that a flipped classroom feels less natural, as though they need to unlearn previous habits and start again.

Another factor to consider is whether traditional didactic models of teaching for membership examinations are even feasible.^{3,4} There is a dearth of formal postgraduate medical education courses to prepare candidates for the written element of membership examinations, especially ones offered by the university sector.^{3,4} In part, this relates to the lack of time doctors can commit to courses taught formally. This

study highlights the potential feasibility of offering a flipped classroom course to prepare candidates for a postgraduate membership qualification.¹¹

Strengths of this study

This study provides a unique insight into the use of a flipped classroom model in the preparation for a postgraduate medical membership examination. The flipped classroom model specifically facilitates the delivery of large curricula; a challenge faced across all medical specialties. It is in the interests of all parties (health service employers, postgraduate education authorities, junior doctors in training, and their supervisors) to adequately prepare doctors for the compulsory hurdle of membership examinations and to be competent senior clinicians of the future.²¹ Therefore, this study suggests that, so long as students have appropriate expectations and understanding of the approach, similar courses may be a useful addition to the support available within postgraduate training programs.

A further strength of this study came from capturing both student and tutor perspectives. This allowed us to consider aspects for which there was a consensus of opinion, but also aspects where the views of tutors and students diverged. Together, the findings of this provide a global perspective on the factors affecting engagement with flipped classrooms.

Limitations of this study

The University of Sheffield MFPH Part A examination course was not purposefully designed to follow the flipped classroom model, and, as a consequence, the format of some of the sessions employed a more blended model of teaching. Potentially, this may mean that some of the issues students and tutors experienced may be unrelated to a strictly flipped classroom model. However, numerous flipped classroom designs exist, and, therefore, translating learning from one example to another will often require careful consideration of the context of each classroom.^{8,19} Furthermore, as the authors were conscious that the course had evolved in this way, they focused on the guiding principles for flipped classrooms when conducting the focus groups.²²

A further limitation of this study could be the unusually large class size of the most recent MFPH Part A examination course. Again, this is likely to have influenced some of the barriers experienced by the participants who were drawn from the most recent cohort. However, variation in class size is not only an ongoing possibility for this course, but the authors felt that explicit consideration of the impact of class size

would be of use for transferable learning, given that flipped classrooms do not have a specific limit for class size.

Finally, unlike most medical specialties, public health StRs come from a mixture of medical and non-medical backgrounds. This introduced the possibility that perspectives of the students could be influenced by non-medical educational and professional experiences, thereby limiting the transferability of the findings. However, this was explored explicitly, and no clear distinctions between medical and non-medical public health StRs in their perspectives on engagement with flipped classrooms were found. Conversely, students seemed to have a shared identity as postgraduates preparing for membership examination.

Implications

This study explores barriers and facilitators to engagement with flipped classrooms for postgraduates preparing for membership examinations in public health. Universities and postgraduate medical education authorities could provide key roles in offering preparation courses for membership examinations across medical specialties. Flipped classrooms may help to navigate some of the difficulties of offering such courses. Future research could evaluate and explore the use and effectiveness of flipped classrooms in other postgraduate medical specialties, particularly to prepare candidates for the written component of membership examinations.

Conclusion

A complex interaction of factors affects engagement with flipped classrooms, and the constraints of the model for postgraduate students must be acknowledged. However, engagement with flipped classrooms is underpinned by accurately informed and aligned student and tutor expectations at the outset of the course.

Acknowledgments

The authors would like to thank all the volunteers (both students and tutors) who participated in the focus groups for giving up their time and providing their views on the use of the flipped classroom. The project was funded by Health Education England – East Midlands Research Facilitation Fund and Health Education England Yorkshire and Humber School of Public Health. However, neither body was involved in the design of the study, data collection, analysis, interpretation of data, or in writing the manuscript. The data sets analyzed during the current study are available from the corresponding author on reasonable request.

Author contributions

AJ, KM, and HJ co-designed the study with input from EG. AJ and KM jointly obtained funding for the study. During the focus groups, AJ gave an introductory presentation and then silently observed and took field notes. KM facilitated the focus groups. AJ took the lead role in writing the final manuscript and KM also made major contributions to the final manuscript. All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

Disclosure

AJ has previously been both a student and a tutor on the Part A examination course; however, she was not involved in the most recent cohort, from which the participants for this study were drawn. HJ coordinates the organization of this course. AJ, KM, HJ, and ECG are all currently working at the School of Health and Related Research, University of Sheffield, where this course is run from. The authors report no other conflicts of interest in this work.

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