

A thematic analysis of the feedback given for medical
school teaching on the spine and proposed future
improvements.

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Ethical Approval Not Required

Abstract

Since 2015, Cardiff Medical School has used a 'Case-Based Learning' approach to teaching pre-clinical students, where 17 different cases are taught over the first 2 years. This study analyses feedback from 9 years of teaching on the back-pain case. A thematic analysis was performed using Chat GPT software to identify common themes and progressive changes in the feedback over time. This will allow for future improvement and modification of the case. Results revealed high student satisfaction, due largely to hands-on and active learning methods used throughout the years, with positive comments on engaging and passionate lecturers enhancing their learning. There were frequent concerns about the volume of material and releasing lecture slides after lectures, as students felt that this impacted their ability to concentrate. Suggested changes to be made going forward includes addition of 'gapped' notes and implementations to prevent content overload, alongside the continued employment of active learning methods.

Background

Since 2015, Cardiff Medical school have used the research proven 'Case Based Learning' approach to teach preclinical (Years 1 and 2) students (Thistlethwaite et al. 2012). This involves 17 separate cases, each taught over a 2-week period. They all have a specific topic focus, guided by learning outcomes covered in small group facilitated case discussion sessions, plenaries, practicals and clinical skills (Hassoulas et al. 2017). This study focuses on feedback given by 2nd year students with regards to Case 14- the back-pain case, led by Mr Michael McCarthy, a consultant spinal surgeon. This case was developed from 2013-2014 and includes various lectures on spinal pathology, nerve physiology, bone health and radiology, as well as a guest lecturer who speaks about his personal experience with spinal cord injury. Additionally, there are two CBL sessions, clinical skills teaching, pharmacology and anatomy sessions.

In the last 9 years, Case 14 has evolved in line with feedback and external factors. In 2015-2020, its components remained the same. However, following the pandemic, some changes were made such as stopping the use of real patients in clinical skills and the transition to online lectures. Methods of teaching differ to some of the other cases. For example, in some lectures a 'no laptop' approach is recommended and detailed lecture notes are given after instead, with a view to creating a more interactive and engaging environment. Modified pre-lecture slides are given every year to those with additional learning needs. The content itself has remained broadly unchanged and the reading list has remained the same. The GMC guidance for medical students states that "*As a medical student, you'll be asked to give feedback on the quality of your placements and teaching. You must give this feedback when asked, as it will help your medical school to improve the overall quality of the education it provides* (pg31)." Feedback is integral in order for medical schools to continue to meet students' learning needs, ultimately providing the best education for future doctors.

Objective

The objective of this study was to identify common themes in feedback over 9 years of teaching Case 14, enabling teachers to improve the way they deliver their cases in future years. The thematic analysis also provided an insight into any changes in attitudes or preferred learning styles of medical students over time.

Method

Chat GPT 3.5 was used to analyse 9 years of feedback from 2015 up to and including 2023. There was feedback included from a total of 1,752 students, collected using a link given following the teaching period each year. Whilst the feedback forms have been adapted through the years, all had questions to gauge which parts of the case enhanced learning the most and least. A thematic analysis was requested from each year's feedback individually, and from both all the positive and negative feedback through the years. Individual feedback comments were also hand-selected in order to provide context to the results.

Results

From the 1,752 students who have responded over the years, there were a total number of 3,996 positive feedback comments and 1,639 negative comments extracted. Upon performing a thematic analysis on the positive and negative feedback, there were some common themes throughout the years which were identified:

Lectures

Every year, many students remarked on the quality of teaching in this case; saying the lectures were clear, comprehensive and engaging with a good structure. The detailed lecture notes, given after lectures were greatly appreciated, meaning students could focus on the lecture itself and review the notes afterwards e.g. *"I personally benefited a lot from having lectures being delivered and then notes being sent out afterwards. It allowed me to listen to the lecturer rather than spend the hour trying to frantically document what they said"*. In earlier years there were requests for lecture recordings, these were given from 2021 onwards. With the exclusion of 2018, where slides were provided, there was consistent and increasing concern about the lack of access to lecture slides prior to lectures and subsequent difficulty for those with different learning styles. They found it to be *"overwhelming"* and *'hard to concentrate'* without slides. The guest lecturer continued to receive positive feedback throughout the years, providing personal experience.

Method of teaching

Many students enjoyed active learning methods and the suggestion to close their laptops and actively listen. For example, *'I feel that I learnt a lot more from in person lectures by not using my laptop at all'* and *'constant reiteration of the main, important points, and consistency throughout the workshops and practicals, made them extremely useful'*. Although this teaching style was praised by many students, some disagreed with this method e.g. *'forced to adopt a specific type of learning'*. Small group CBL sessions, tutorials and interactive lectures were a highlight for many of the students, allowing them to apply their knowledge to real life scenarios. Overall, the teaching method has been effective, demonstrated in multiple comments such as *'more cases should be run like this'*, despite some persistent comments requesting consideration of diverse learning preferences. Furthermore, the use of single best answer questions in lectures was seen as a good way to monitor understanding for students *'I really liked having the SBAs before and after the lectures so that we could see what we have learnt or need to look over again'*.

Clinical skills and examination teaching

Clinical skills teaching was consistently mentioned throughout the years as enhancing student's learning. Before the COVID-19 pandemic, the opportunity to practice on real patients with spinal pathology was vastly appreciated. Despite the discontinuation of this, opportunities have been equalised, with a positive response to hands on learning- "*Quite possibly the best clinical skills session that has been delivered to date*". Many students said having the ability to practice on real patients or peers was extremely useful. Requests in the earlier years to standardise the teaching of neurological and musculoskeletal exams between practitioners, and desire for leaflets providing information needed for future assessment have been addressed in recent years. The addition of pre-session videos in 2021 demonstrating examination technique was seen as 'invaluable'. There were, however, some requests to make clinical skills longer as it seemed rushed.

Content

Overarching themes throughout the years included genuine interest in the subject matter, which could potentially lead students into a related career path. Students said that learning objectives were clear and content was well organised. However, consistent feedback related to "*overwhelming*" amounts of material taught in a short period has become more prominent over the 9 years. There were references to lectures having too many slides or requests for less plenaries in a short time frame. The number of comments about the content's lack of relevance have decreased over the years, indicating that it has been successfully modified. The reading list was described as '*incredibly useful*', with comments about its congruity to the material taught and requests to highlight the 'spine dragon' website at the start. However, there were comments about it being 'extensive' and 'unachievable', others were unaware of its existence.

Learning environment

Learning environment has been important over the years. Teachers, in particular the case lead, are described as '*excellent*', '*enthusiastic*' and '*engaging*'. Students felt well supported, especially in small groups and that teachers took an active interest in their learning. Although, reference was made to patronising lecturers or teachers creating an uncomfortable atmosphere to learn in, where students were worried about being picked on for answers- '*I constantly felt on edge*'. Also, some mentions of the case leaders allowing personal experiences to influence their teaching of the case. However, overall feedback showed students had an increasingly inclusive learning environment through the years.

2023 Feedback

Looking at the thematic analysis of the most recent year of teaching, many remarked on the comprehensive lecture slides and delivery methods. This allowed students to focus on understanding the information rather than memorisation alone using questions, examples and repetition. Feedback examples include: "*I liked the idea of not having the lecture slides and just listening to the lectures*", "*I found it a lot easier to take in what was taught in lectures when I forced myself to listen rather than take notes*". Praise was given to clinical skills teaching in keeping with the other years, as well as the standardisation of teaching methods by use of information booklets and the same teacher. Lecturers were again seen to have a passionate and knowledgeable approach. Despite many positive comments on the no laptop recommendation, e.g. '*Not using my laptop during the lectures allowed me to not stress as*

much and just enjoy the learning process'; again, students showed continued concern about this being incompatible with their learning style.

Overall, factors which enhanced the learning the least included lack of slide availability before the lectures, the timetabling of lectures and the overwhelming amount of content, similar to other years. Finally, requests for more effective anatomy teaching were given. Consistent positive themes with the other years were interest in the case, praise of the guest lecturer, good practical teaching and knowledgeable case leads. Negative themes which are consistent with other years are concerns about teaching styles, lack of access to slides and content volume.

In summary Case 14 has remained popular throughout the years. The main issues that arose from the feedback were lecture slide access, more suited teaching styles, comfortable learning environments and a comprehensive but not overwhelming curriculum. However, many students expressed their overall enjoyment of the case and felt they had learnt a significant amount, with many mentioning it as their favourite.

Discussion

So, what can be inferred from the feedback of this case to help understand how the educational experience of Cardiff medical students can be optimised in the future?

Students seemed to have consistent concerns about the no laptop recommendation in some of the lectures, coupled with the lack of slides prior to the plenaries. The use of laptops in lectures leads to worse short term recall of lecture information and helps to avoid distraction, but does not affect performance in an assessment 5 days following the lecture (Fletcher and Stanzone 2021). Another study showed concerns from professors about students becoming 'passive spectators' rather than 'active learners' with the use of slides, (Craig and Amernic 2006). Many students over the years said they were surprised how they enjoyed learning this way and actually retained the knowledge better. However, despite providing students with detailed plenary notes after, there is evidence to show that the ability to annotate slides during lectures helps student's concentrate and addresses the balance of listening to the lecture with note making (Sambrook and Rowley 2010). Furthermore, in line with some of the feedback, we can learn that the desire for slides before lectures is an attitude of not just the 2nd year students at Cardiff, but more a universal opinion. Sambrook and Rowley's study also found broadly negative student opinions on not providing pre-lecture slides, especially for those with additional learning needs.

Although, since many people enjoyed this new style of learning, considering it more effective and engaging, whilst taking the pressure of notes off, it suggests that ongoing changes should compromise to meet the learning preferences of everyone. There is evidence to show effectiveness in using 'gapped slides' or 'guided notes'. This is where one is able to fill in details whilst being provided with an outline of important concepts, as many students are unable to take adequate notes in lectures (Sambrook and Rowley 2010). 'Guided notes' have also been shown to increase recall of information in university students (Austin et al. 2002). The introduction of these type of notes would curtail student concern, whilst still encouraging active learning, catering to many different learning needs. This could be used as a middle ground for future delivery of Case 14 lectures.

The majority of people had favourable opinions on the active learning techniques used in this case. The current clinical skills 'flipped classroom' method, involving students watching a video of the examination before and then demonstrating clinical exams in the

group sessions from memory (Zhang et al. 2022) , had overwhelmingly good feedback. This type of pedagogical learning has shown to be very effective in medical education; research involving 5th year medical students showed that using the ‘flipped method’ improves self-confidence on performing examinations (Uchida et al. 2022) and could allow more time to cover wider material in teaching sessions (Moraros et al. 2015). Student feedback and the literature would favour the continuation of this teaching method and potential implementation into other areas of the medical school curriculum to prepare students effectively for practical exams.

Active learning via the use of SBA questions at the start and end of lectures should be pursued, providing a consistent way for students to test their understanding. Research shows that SBAs in lectures improves student performance in formative assessment (Bhatt and Dua 2016) .

The concerns of ineffective anatomy teaching in recent years could be addressed by replacing the lecture with an interactive module, such as a power point with audio recordings alongside the dissection session. This would allow students to learn at their own pace and grasp the difficult concepts that come with anatomical teaching, minimising passive learning and aiding future revision (Lochner et al. 2016). On the whole, the Cardiff Medical School course continues to implement active engagement in learning through the pre-clinical curriculum with the a CBL approach (Hansen et al. 2005).

There were increasing concerns about Case 14’s content overload through the years, despite no change to the curriculum. The question is, does it reflect the changing attitudes of medical students? Whilst it is less viable to change the amount of content required, methods could be employed to make the content seem less overwhelming. Going forward, a checklist of learning material could be given at the start of the two week period to improve organisation and allow students to feel more confident they have covered all the content (Makram et al. 2022). Condensing the reading list to keep it relevant but more manageable, as well as shortening some lectures could also be valuable. Unfortunately, timetabling issues are often unavoidable but ideally lectures could be spread out rather than packed into one day.

This cases’ learning environment appeared comfortable for many students and the access to question answering was well received. However, there were still students with concerns in recent years. As such, every effort should be made in the future to continue to cultivate a comfortable learning environment to maximise achievement and professionalism (Karani 2015).

A clear advantage of this study was the large number of students included. However, since this feedback was from 2nd year students alone, one could argue that they have not fully matured their learning style nor gained enough experience in medical school to give representative feedback. Medical student’s learning styles can change significantly over the course of the degree, with many shifting from a ‘abstract-passive’ learners to ‘abstract - active’ learners (Bitran et al. 2012) and teaching methods should be used to foster more flexible approaches to future training. It would be an idea to retrospectively revisit these students’ opinions on the learning methods used in Case 14 as they progress further through the course.

The main learning points from this study:

1. Students argue having lecture slides before the lecture aids learning and concentration, but many appreciate the suggestion of the no laptop method. Gapped slides could be a good compromise to preserve active learning.

2. The effective 'flipped classroom' method used in clinical skills could be implemented into other medical school examination teaching
3. Interesting lectures, passionate teachers and a comfortable learning environment have a positive impact on student perception of a case.
4. Despite the quantity of content remaining the same over the years, students have found it to be increasingly overwhelming, which may be an indication of shifting views among medical students.

Conclusion

In conclusion, Case 14 had overwhelmingly positive reviews with its interesting, well organised and engaging approach to the teaching of the spine. However, feedback shows a rigidity in some 2nd year medical student's learning styles meaning not all respond well to some forms of active learning and content volume. It should continue to evolve in the future via the use of student feedback and encourage the use of research-based teaching methods.

REFERENCES

- Austin, J. et al. 2002. Effects of Guided Notes on University Students' Responding and Recall of Information. *Journal of Behavioral Education* 11, pp. 243-254. doi: 10.1023/A:1021110922552
- Bhatt, M. and Dua, S. 2016. Use of multiple choice questions during lectures helps medical students improve their performance in written formative assessment in physiology. *National Journal of Physiology, Pharmacy and Pharmacology* 6, p. 1. doi: 10.5455/njppp.2016.6.0514029062016
- Bitran, M. et al. 2012. Medical students' change in learning styles during the course of the undergraduate program: from 'thinking and watching' to 'thinking and doing'. *Can Med Educ J* 3(2), pp. e86-97.
- Craig, R. J. and Amernic, J. H. 2006. PowerPoint Presentation Technology and the Dynamics of Teaching. *Innovative Higher Education* 31(3), pp. 147-160. doi: 10.1007/s10755-006-9017-5
- Fletcher, K. A. and Stanzione, C. M. 2021. A mixed-methods approach to understanding laptop-free zones in college classrooms. *Computers & Education* 172, p. 104253. doi: <https://doi.org/10.1016/j.compedu.2021.104253>
- Hansen, W. F. et al. 2005. Attitudes of faculty and students toward case-based learning in the third-year obstetrics and gynecology clerkship. *American Journal of Obstetrics and Gynecology* 192(2), pp. 644-647. doi: <https://doi.org/10.1016/j.ajog.2004.10.595>
- Hassoulas, A. et al. 2017. A case-based medical curriculum for the 21st century: The use of innovative approaches in designing and developing a case on mental health. *Medical Teacher* 39(5), pp. 505-511. doi: 10.1080/0142159X.2017.1296564
- Karani, R. 2015. Enhancing the Medical School Learning Environment: A Complex Challenge. *J Gen Intern Med* 30(9), pp. 1235-1236. doi: 10.1007/s11606-015-3422-3
- Lochner, L. et al. 2016. Combining traditional anatomy lectures with e-learning activities: how do students perceive their learning experience? *Int J Med Educ* 7, pp. 69-74. doi: 10.5116/ijme.56b5.0369
- Makram, A. M. et al. 2022. Is checklist an effective tool for teaching research students? A survey-based study. *BMC Medical Education* 22(1), p. 561. doi: 10.1186/s12909-022-03632-z
- Moraros, J. et al. 2015. Flipping for success: evaluating the effectiveness of a novel teaching approach in a graduate level setting. *BMC Med Educ* 15, p. 27. doi: 10.1186/s12909-015-0317-2

Sambrook, S. and Rowley, J. 2010. Student attitudes towards and use of webnotes. *The International Journal of Management Education - IJMIE* 8, pp. 31-41. doi: 10.3794/ijme.82.252

Thistlethwaite, J. E. et al. 2012. The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Med Teach* 34(6), pp. e421-444. doi: 10.3109/0142159x.2012.680939

Uchida, S. et al. 2022. The flipped classroom is effective for medical students to improve deep tendon reflex examination skills: A mixed-method study. *PLOS ONE* 17(6), p. e0270136. doi: 10.1371/journal.pone.0270136

Zhang, W. et al. 2022. The effect of flipped classroom in multiple clinical skills training for clinical interns on Objective Structured Clinical Examinations (OSCE). *Med Educ Online* 27(1), p. 2013405. doi: 10.1080/10872981.2021.2013405