



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Qin, H;Vaughan, B;Morley, P;Ng, L

Title:

Peer teaching and Pecha Kucha for pharmacology

Date:

2022-04-01

Citation:

Qin, H., Vaughan, B., Morley, P. & Ng, L. (2022). Peer teaching and Pecha Kucha for pharmacology. *Clinical Teacher*, 19 (2), pp.150-154. <https://doi.org/10.1111/tct.13456>.

Persistent Link:

<https://hdl.handle.net/11343/336353>

Peer teaching and Pecha Kucha for pharmacology

Helen Qin
Peter Morley
Louisa Ng
Vaughan, Brett

Corresponding author's contact details:

Helen Qin
The Royal Melbourne Hospital Clinical School, University of Melbourne
300 Grattan Street, Parkville
3050 Victoria, Australia.
E-mail: qinyan.94@gmail.com

Author Manuscript

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as doi: [10.1111/tct.13456](https://doi.org/10.1111/tct.13456)

ABSTRACT

Background

Peer teaching involves learners at the same level in their academic career aiding each other's education. In medical education, it has had success in clinical and procedural skills; we set out to design a pharmacology peer teaching initiative and evaluate its acceptability and value as a learning tool.

Approach

Second-year medical students (n=62) were invited to participate in a peer-led pharmacology educational initiative over 2 months. Students created PowerPoint presentations on medications using Pecha Kucha principles (automatic slide advancement which emphasizes concision through time and content limitations to sustain the audience's attention). Presentations occurred over eight, 1-hour sessions, facilitated by senior academics.

Evaluation

The evaluation consisted of an anonymous questionnaire with ten Likert-scale questions and two open-ended questions on the learners' perceptions of feasibility, acceptability, and effectiveness in improving knowledge, teaching and independent learning skills.

Fifty-three students presented at well-attended sessions. Twenty-nine students completed the Kirkpatrick level 1 evaluation with largely positive perceptions, including improved pharmacology knowledge (n=21, 72%), teaching skills (n=23, 79%), and independent learning skills (n=22, 76%). Satisfaction with both the quality of peer teaching (n=21, 72%) and presence of expert facilitators (97%, n=28) was high. Three found the initiative burdensome, and 23 reported information overload. Nevertheless, 23 deemed the experience valuable. Facilitator reflections were also positive.

Implications

Our peer teaching initiative appeared useful to our learners, but in this process we gained valuable information to improve the next iteration. We plan to use this format either for revision material or reduce session length and increase interval time between sessions to address the perceived information overload.

Background

Pharmacology is traditionally a content-heavy component of medical programmes, often leading to learner dissatisfaction and disengagement.¹ To address this, pharmacology teaching has moved towards active learning approaches, including team-, problem-, and case-based learning.^{2,3}

Peer teaching, another active learning strategy used in health professions' education, is underpinned by the social and cognitive congruence concepts⁴ in which learners of similar academic level work together to develop knowledge and skills. Utilisation of peer teaching may alleviate faculty preparation and teaching burden, help learners develop teaching skills and confidence, encourage self-directed learning and reduce competitiveness amongst peers.⁴

Whilst current evidence supports the use of peer teaching in areas such as clinical skills,⁵ few studies have explored peer-taught pharmacology.⁶ Although it is suggested that peer-taught pharmacology is as effective as conventional faculty-led teaching in terms of improving student knowledge,⁷ learner acceptability of peer teaching may be affected by perceived increased workloads and scepticism towards peer-tutor credibility.⁸ At our institution, existing second-year pharmacology teaching consists of optional, self-directed online tutorials and

discussion of pharmacological management included in lectures on specific medical conditions. Previous student evaluations suggested this teaching could be improved. This pilot initiative integrated theories of peer teaching into pharmacology education and evaluated its value to students and faculty as a learning opportunity.

Approach

Second-year medical students (n=62) at Royal Melbourne Hospital Clinical School (University of Melbourne, Australia) were invited to participate in the peer teaching initiative and the project was approved by the university's Human Ethics Committee (ID 1955257.1).

Using a Pecha Kucha format,⁹ students chose one or two medications to present, from a 'core' list of 235 commonly-used medications (across 20 medication classes), which had been developed by senior clinicians at the university to guide students in their learning. Students were asked to independently research their chosen medication(s) from reputable sources as directed by the University and to present using a faculty-developed PowerPoint template (Box 1). The original Pecha Kucha format consists of 20 slides, advancing automatically after 20 seconds each, and emphasises simplicity, concision and the use of visuals to sustain the

audience's attention.¹⁰ Given the complexities of pharmacology learning, we modified this format to 12 slides, shown for 30 seconds each, with headings detailing the most pertinent information to be included. We hoped the clear structure and time restrictions would guide students' independent research and encourage conscientious editing. Students were familiar with the Pecha Kucha format having used it previously to present on medical conditions. Additionally, a demonstration was provided (HQ).

INSERT Box 1 here

Fifty-three students participated and of these, 36 presented once and 17 presented twice on different medications. Students submitted their slides to a senior clinician a week before their scheduled presentation. Content was checked for accuracy and written feedback provided for students to refine their presentation. Students then presented to the cohort during one of eight, 1-hour sessions (8-9 presentations in each session) over a two-month period. Although originally planned for a face-to-face format, all presentations were conducted online using Zoom due to COVID-19 disruptions. Attendance was optional and approximately 50 students attended each session. Self-directed study on medications prior to attending was not requested. Sessions were facilitated by two senior academic clinicians, one with specific content expertise. For example, an endocrinologist facilitated the session

on diabetes and thyroid medications. After each presentation, the clinicians addressed questions, provided important teaching points and corrected any misunderstandings. All students were encouraged to ask questions through the Zoom chat function or verbally. Slides were then uploaded to a learning management system as an enduring resource.

Evaluation

Following the eight sessions, students were invited to complete a survey developed by the authors (HQ, LN) comprising of Likert-type questions and open-text responses. Survey questions explored the feasibility (Likert-scale questions 1-4), acceptability (Likert scale questions 5-7) and perceived value of the initiative (Likert-scale questions 8-10) (Table 1).

Student perspective

Twenty-nine of the 36 students (47.5%) completed the evaluation. Findings and responses suggested the program was feasible and acceptable from the learner's

perspective, and effective for learning (Table 1). Three respondents indicated the program added to their workload. 97% (n=28) agreed the involvement of subject expert facilitators was useful. Over two-thirds of respondents were confident in their abilities to teach their peers (79%, n=23).

INSERT Table 1 here

A thematic content analysis of open-text responses¹¹ was undertaken (HQ, LN) where common themes from the students' qualitative responses were identified and descriptively analysed and presented. These mostly reinforced the feasibility, acceptability, and value of the initiative, with many commenting on the breadth of knowledge gained and improvement in student engagement (Table 2). However, a common area of improvement highlighted by students was to reduce the volume of information in each session.

INSERT Table 2 here

Faculty (or facilitator) perspectives

Seven clinicians (all with specific content expertise) volunteered to be facilitators and provided verbal feedback on the initiative. Additionally, one provided written

feedback pre-presentation to students on their “draft,” and attended all presentations. Clinicians reported that the quality of the drafts was variable. Common challenges included differentiating common and critical side effects from the lists published in resources and formulating a plausible patient case where the medication might be indicated since this required cognitive reasoning. Students were also often advised to reduce their content.

However, the clinicians also noted that students were receptive to feedback, modifying slides accordingly and the final presentations were of high quality. There was consensus that these sessions were valuable for the time spent by the clinicians and that this was a resource-wise feasible and cost-effective initiative. The opportunity for students to practice presentation skills was considered beneficial and student preparation of slides reduced clinician preparation time. The opportunity for clinicians to emphasize ‘take-home’ messages was felt to be important as these might otherwise have been lost amongst the volume of presentations. Attendees appeared engaged based on questions and comments made through the chat function. It is possible that pre-existing familiarity with one another as well as the facilitators and the request for zoom videos to be turned on facilitated the engagement.

Implications

Outcomes evaluated at level one of the Kirkpatrick's framework¹² suggest that the peer teaching in pharmacology is feasible, acceptable and valuable to junior medical students. Additionally, there were several "lessons learnt" which should be considered when using Pecha Kucha student presentations in teaching.

Although students led the construction and delivery of the content, a significant factor in the initiative's value was the involvement of experienced faculty. Students appreciated the support provided during content checking and the assistance with answering questions or clarifying content. This contrasts with most peer teaching scenarios where a 'senior' is typically not present. Therefore, consideration should be given to the role of these 'seniors.' Further, the 'content' check appeared to ensure student confidence about information appropriateness and accuracy. We therefore plan to continue to engage faculty in this initiative.

From the faculty perspective, assurance regarding content accuracy was important given the relative lack of the students' pharmacology knowledge. Faculty were also able to highlight key learning points without devoting preparation time..

Learning by teaching

Peer teaching provides students with an opportunity to experience and learn about teaching – an important skill for future professionals.¹³ Our evaluation suggests that even minimal exposure within a teaching context in a supportive environment may improve confidence to present, and potentially to teach. This is consistent with the social congruence concept underpinning peer teaching⁴ whereby a positive learning environment is created from the students learning from one another.¹⁴ However, we also acknowledge the limitations of measuring confidence in that students could be confident even when presenting inaccurate information.

A bit too much?

The volume of learning was identified as a potential opportunity to improve the teaching approach. Students appeared to undertake preparation with a degree of vigour, resulting in their peers finding it challenging to process the volume of information. Further, the Pecha Kucha-based structure may have been too rigid and fast-paced for both the content and teaching inexperience of the learners.¹⁵ That said, the Pecha Kucha approach was generally well-received and found to be “stimulating”, consistent with previous work.⁹ Making the PowerPoint slides an enduring resource also likely mitigated this issue. It is possible that the Pecha Kucha structure would better suit content students are already familiar with and is

used for revision rather than to teach new content. The consistent formatting of the presentation also appeared to be useful in reducing the cognitive load both for the presenter and the listener – everyone knew what information to expect and in which order. To address this feedback, we will use this format primarily for content revision in the future, or when presenting new information, we would shorten each session and increase the interval between sessions.

Our short-term peer-taught pharmacology program appeared to be feasible and acceptable to our learners. However, a limitation of our study is the reliance on self-reported measures. We have identified some issues with the teaching approach used, including the issue of information overload. However, these are not insurmountable.

This experience has demonstrated that having learners engaged in teaching delivery is a supportive and potentially empowering approach. As we continue to develop our peer teaching initiatives, we hope to explore how and why this approach appeals to learners and to investigate its longer-term impact in developing independent, life-long learners.

Conflicts of Interest

None

Acknowledgements

We would like to thank the students for their participation and Drs Citroni, Seymour, Barmanray, Hogan and Muhi for their assistance as academic clinicians in the teaching sessions.

Funding: Not applicable

Ethical Approval: Ethical approval was sought and approved from the University of Melbourne Human Ethics Medicine and Dentistry Sub-committee (ID 1955257.1).

REFERENCES

1. Gill M, Andersen E, Hilsmann N. Best practices for teaching pharmacology to undergraduate nursing students: A systematic review of the literature. *Nurse education today* 2019;7415-24.
2. Zgheib NK, Simaan JA, Sabra R. Using team-based learning to teach pharmacology to second year medical students improves student performance. *Med Teach* 2010;32(2):130-5.
3. Liu L, Du X, Zhang Z, Zhou J. Effect of problem-based learning in pharmacology education: A meta-analysis. *Studies in Educational Evaluation* 2019;6043-58.
4. Ten Cate O, Durning S. Dimensions and psychology of peer teaching in medical education. *Medical teacher* 2007;29(6):546-52.
5. Shenoy A, Petersen KH. Peer Tutoring in Preclinical Medical Education: A Review of the Literature. *Medical Science Educator* 2020;30(1):537-44.
6. Carstensen SS, Kjaer C, Möller S, Bloksgaard M. Implementing collaborative, active learning using peer instructions in pharmacology teaching increases students' learning and thereby exam performance. *European journal of pharmacology* 2020;867172792.
7. Matthes J, Marxen B, Linke RM, Antepohl W, Coburger S, Christ H, et al. The influence of tutor qualification on the process and outcome of learning in a problem-based course of basic medical pharmacology. *Naunyn Schmiedebergs Arch Pharmacol* 2002;366(1):58-63.
8. Sukhlecha A, Jadav SP, Gosai TR, Balusamy D. Student-led objective tutorials in Pharmacology: An interventional study. *Indian J Pharmacol* 2016;48(Suppl 1):S83-S8.
9. Abraham RR, Torke S, Gonsalves J, Narayanan SN, Kamath MG, Prakash J, et al. Modified directed self-learning sessions in physiology with prereading assignments and Pecha Kucha talks: perceptions of students. *Advances in physiology education* 2018;42(1):26-31.
10. Ramos-Rincón JM, Sempere-Selva TS-S, Romero-Nieto M, Peris-García J, Martínez-de la Torre G, Harris M, et al. Pecha Kucha presentations by medical students in Spain. *International journal of medical education* 2018;9244.
11. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & health sciences* 2013;15(3):398-405.
12. Kirkpatrick JD, Kirkpatrick WK. Kirkpatrick's four levels of training evaluation: Association for Talent Development; 2016.
13. Rubin P, Franchi-Christopher D. New edition of Tomorrow's Doctors. *Med Teach* 2002;24(4):368-9.
14. Ten Cate O, Durning S. Peer teaching in medical education: twelve reasons to move from theory to practice. *Medical teacher* 2007;29(6):591-9.

15. Klentzin JC, Paladino EB, Johnston B, Devine C. Pecha Kucha: using “lightning talk” in university instruction. *Reference Services Review* 2010.

Box 1: PowerPoint template for student presentations - Information about medications by slide number

Slide 1: Name of medication
Slide 2: Class (and subclass) of medication
Slide 3: Examples of medications (include medication and some brand names)
Slide 4: Indications for use
Slide 5: Mechanism of action
Slide 6: Pharmacokinetics - medication doses and dosing regimen (most common medications)
Slide 7: Medication interactions
Slide 8: Common and serious adverse effects
Slide 9: Monitoring required
Slide 10: Case-based scenario where the medication might be used
Slide 11: Key education/counselling points to inform patients
Slide 12: Example of a prescription (on a sample medication chart) for the "patient" in the case

Table 1: Results of the post-initiative evaluation questionnaire.

Item	Mean (SD)	Median
Feasibility		
1. I was confident in my abilities to present pharmacology information to my peers.	3.93 (0.84)	4
2. The presence of senior academic clinicians to pre-check my presentation and as facilitators during sessions was useful and conducive to my learning.	4.69 (0.54)	5
3. Participating in the sessions was burdensome to my existing workload.	2.17 (1.00)	2
4. The timing of this program during the 1st rotating term is optimal for my learning.	3.97 (0.68)	4
Acceptability		
5. I found content being delivered by my peers a good way of learning.	3.86 (0.95)	4
6. The time I have spent preparing for and participating in these sessions has been worthwhile.	3.93 (0.84)	4
7. If given the opportunity I would choose to do these sessions again.	3.86 (1.03)	4
Effectiveness		
8. The presentations have been useful in my learning and improved my confidence in pharmacology.	3.72 (0.75)	4
9. The presentations are a more stimulating way of learning about pharmacology compared to lectures.	3.66 (0.97)	4
10. These sessions improved my independent learning skills.	3.83 (0.89)	4

Table 2. Themes identified in the analysis of open-text responses provided in the evaluation questionnaire.

Positive Themes	Quotes
Breadth of learning	"Good summary of a wide range of medications" "Felt I retained facts better when they came from friends"
Engagement	"Both [presenting and listening] were very engaging" "It was fun learning about this one drug really well and being able to share that with peers"
Enhanced presentation skills	"Good to get practice presenting in front of people"
Sustainability of resources	"[Liked the] standardised information for each drug class so it's easy to compare" "The sessions gave me allocated time to develop my notes on frequently used drugs, which I can continue adding to"
Negative Themes	Quotes
Learning volume	"I felt inevitably overwhelmed by the information covered in each session" "Bit difficult to engage for the entire session" "Too much information too fast"
Delivery method	"Giving out the slides beforehand [with the] additional notes by the consultants would be beneficial" "Maybe it would have been better if it was live but that is the unfortunate aspect of life in COVID-19" "Could be more interactive, but given the COVID-19 crisis, it couldn't really be done"
Template amendments	"Pharmacokinetics didn't feel as applicable at this stage of my learning" "Would be good if each presenter could make a quick summary slide (1-2 sentences) about their drug" "Could have been better if put in context of a clinical scenario or just was more tailored to what needs to be known for each medication"