

## PEER LEARNING IN AN INTERNATIONALISED PATHOPHYSIOLOGY COURSE

Kristína Repová, Comenius University in Bratislava

### The teaching-learning challenge

For a number of years, various student mobility programmes have opened the door for students to study abroad. That brings many positive experiences along with a range of challenges. The downsides typically include language barriers and cultural and academic differences to overcome. At the same time, interaction with peers and teachers of diverse cultural backgrounds contributes to students' personal and professional development and increases international awareness of global issues with the potential to connect institutions, research, and knowledge (Marinoni 2019).

Mobility can, however, only bring benefits to student learning if students do not learn isolated from their peers and if they are engaged instead of learning passively (Olivier et al. 2020). Assigning peer learning tasks to students combines these two pre-conditions. The literature on peer learning reveals that students are more engaged when learning as a group than when learning independently (Youngren 2021). Students in peer groups feel more comfortable and enjoy learning because of the lack of direct pressure from the teacher. Peer learning, moreover, fosters sharing of knowledge and ideas (Boud et al. 1999). The effectiveness of collaboration in peer groups rests on several pillars, including a sense of positive interdependence, meaning that students need to cooperate to achieve the learning goal (Scager et al. 2016). The learners have to be active, manage their learning and reflect on how they learn, and through sharing their learning experiences they develop communication skills that can increase their productivity in the future (Boud et al. 1999).

While teaching Pathophysiology to a culturally diverse group of medical students, I struggled with students not being engaged enough. Students also made little use of the diverse knowledge possessed as a group. I responded to this challenge by changing the seminar structure: I substantially increased the time devoted to peer learning activities, during which students were assigned to solve clinical case studies in small groups. In this study, I evaluate the outcomes of this teaching innovation.

### Pedagogical method

During the innovated seminars in Pathophysiology, I used small group activities to facilitate peer learning. At the beginning of each seminar, using Slido, an app that allows group interaction, I asked an icebreaker question, for example: Which superpower would you like to have? This was to make the students ready to learn in their groups. Then I briefly introduced the class topic and characterised the epidemiology of the disease under study. Following this, students individually used Slido again and anonymously completed a quiz that checked comprehension of the pre-class

reading and prepared them for learning in class. Subsequently, I delivered a 20-minute interactive mini-lecture explaining, for example, why iron deficiency leads to anaemia and may cause chest pain. During the mini-lecture, I repeatedly asked students questions to help them notice causal relationships between the origin, development, and treatment of a disease. Moreover, to prime students on what they can learn by considering information from different contexts, I pointed to variations in the distribution of diseases with a specific geographical or ethnic distribution.

I then assigned students to work in groups of three or four to solve a case study, which took 20–25 minutes. I chose a case study of a virtual patient that was suffering from a disease corresponding to the seminar's topic. For example, during the seminar on anaemias, I introduced a patient with general symptoms typical for anaemic syndrome who was also experiencing specific symptoms of iron deficiency (the aetiology of his anaemia). I added blood test results that should have guided the students to the correct diagnosis. The students were asked to deduce the cause of the patient's anaemia, explain its development, identify and interpret the patient's risk factors and clarify the pathomechanisms of the patient's symptoms. Next, students had to analyse the present abnormal findings and predict others they would expect to find. Finally, students were asked to propose further examinations to confirm the diagnosis and recommend a treatment.

This structure allowed students to integrate their knowledge from other subjects, the pre-class reading and the mini-lecture. Students were allowed to use any resources, including textbooks, pre-class material, their notes, and the internet. I made myself available by walking around the room, asking groups about their progress and offering to answer their questions. Afterwards, we reviewed the case together in a plenary. After a break, the quiz, mini-lecture, and group activity repeated again.

When designing this peer learning activity, I expected the students to become engaged in learning and to share and integrate their diverse knowledge to analyse the relationship between disorders of particular systems and their clinical manifestations. Based on the findings from the literature summarised above, I formulated two hypotheses: (H1) while completing peer learning tasks, students will be engaged, and (H2) when completing peer learning tasks, students will demonstrate the use of their diverse knowledge.

### **The course, the students, and the lecturer**

In the winter 2021 semester, I taught two seminars of the Pathophysiology I course covering the topics of atherosclerosis (in week 7) and anaemic syndrome (in week 12). The course is offered by Faculty of Medicine at Comenius University in Bratislava. It is a compulsory course for General Medicine students in their 5th semester. The course is divided into lectures and seminars that address the same topics. The seminar lasts for three hours and meets once a week for a period of 12 weeks. Various teachers are responsible for teaching different lectures and seminars based on their expertise. The course was enrolled by 190 international students from Poland, Austria,

Germany, Spain, Greece, Ukraine, Iran, Japan and other countries. For the seminars, they were divided into groups of 25 to 30 students. For two weeks, I taught all the groups. The language of instruction was English.

### **Collected sources of data and methods**

To test the hypotheses, I collected quantitative and qualitative data. First, at the end of the semester, students completed a voluntary and anonymous feedback questionnaire online. The questions focused on student perceptions of the effectiveness of various teaching and learning methods in the Pathophysiology I course, including peer learning, and how engaged students felt when learning via the different methods. The questions used 5-point Likert scales, where the score 1 meant 'not at all' and the score 5 meant 'extremely'. Altogether, I collected questionnaires from 37 out of the 190 international students (19%) present in the two seminars I facilitated. The response rate was rather low, which is a common phenomenon when asking student opinions at my university, and the results might not reflect the views of all General Medicine students. It may be that the more active students joined the survey and shared their opinion. I used descriptive statistics to analyse the quantitative data from the questionnaires.

Second, I used the feedback forms completed by two colleagues who observed the seminars I led. Each observed a session on the same topic but in a different seminar group. In addition, I had an approximately hour-long conversation with each observer in which we exchanged our observations regarding peer learning.

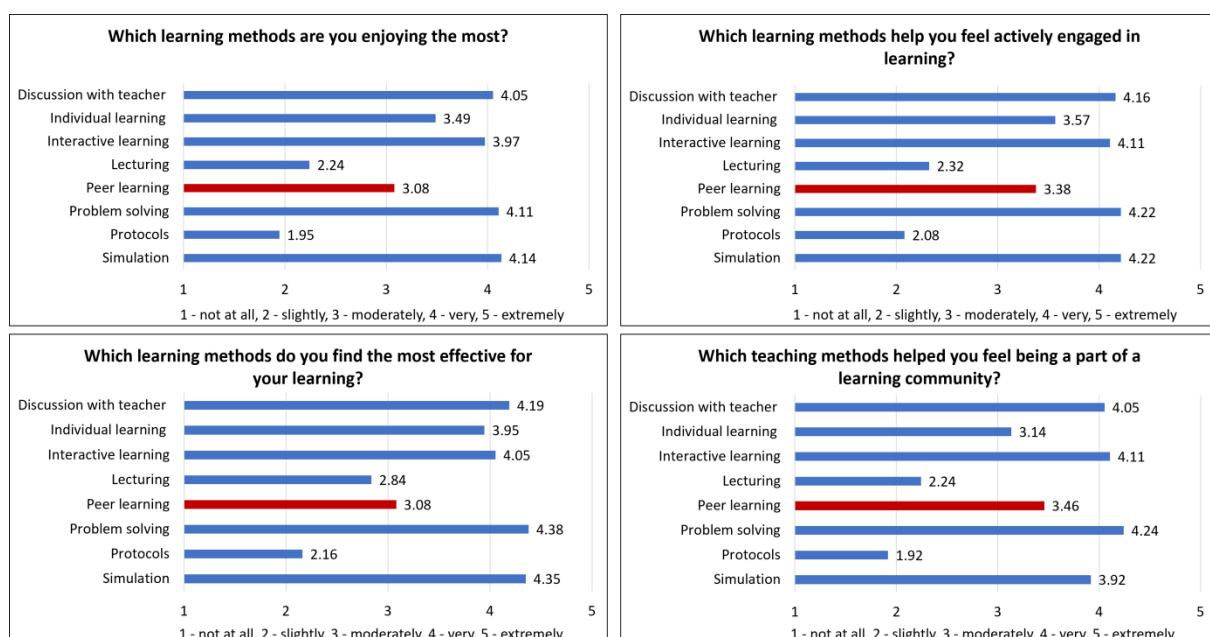
Third, another colleague interviewed two international students who attended the seminar she observed. Both students provided written consent before the interview. She chose the students because they were active in presenting the group work results. My colleague asked them about their perceptions of the effectiveness of the peer learning methods in that seminar session. The interview took 30 minutes, was completed online, and I used its full, anonymised transcript for the analysis. While the interview reveals how students who engaged most actively in peer learning perceived the tasks, their opinions cannot be considered representative of the 190 students. However, their answers do shed light on what features and characteristics of the activities appealed to the two students.

Finally, I wrote notes in a reflective diary after each seminar session I taught. The diary contained my own observations of student learning in class, focusing on peer learning, student engagement and students using diverse knowledge. I also noted what some students told me when I enquired about their preparedness for the seminar, together with some ideas on how to improve student learning in the future.

## Findings

As for the hypothesis on the level of engagement (H1), I had assumed that students would enjoy peer learning activities, and perceive them as engaging and effective. However, the data collected from the student feedback questionnaires are mixed (Figure 1). On one hand, their answers suggest a moderate preference for peer learning when compared with seven other methods of teaching used during their studies. In this, the students only found frontal lecturing and protocols—which is a laboratory guide describing experimental procedures—less enjoyable, engaging and effective than peer learning activities. Peer learning did a little better when it came to making students feel part of a learning community: after problem-solving, interactive learning, teacher-led discussions, and simulations, it was chosen as the fifth most useful method in this regard. On the other hand, when looking at the absolute numbers the picture is more positive. Students reported in the feedback questionnaire a higher-than-average preference for peer learning. Their rating of peer learning was 3.08 for its effectiveness and enjoying learning, 3.38 for engagement and 3.46 for making students feel a part of a learning community. Thus, peer learning did consistently better than two methods that have been used for a long time at the Faculty of Medicine (lecturing and protocols), and the above-average scores for peer learning in all areas are encouraging for the future, especially since working in peer groups in seminars is still not common in the General Medicine degree programme. Students lacking experience with group work naturally have underdeveloped group work skills. If students get more opportunities to learn in groups, I expect they will become more skilled and appreciate the benefits of group work.

Figure 1. Student perceptions of eight different learning methods used in the General Medicine programme (N=37).



Several factors can explain why peer learning was not perceived to be even more engaging. First, the environment in certain groups, where some students did not want to discuss with their peers. I asked some of these students during the seminar why they preferred keeping silent, and they admitted they had not completed the pre-class reading and did not have sufficient knowledge to discuss the case. These students remained quiet to avoid embarrassment.

Observer 1 noticed a high level of student engagement during the peer learning exercises, though he said it was not higher compared to other parts of the class. According to the first observer, in peer learning tasks, the students easily interacted with each other and appeared comfortable. Those more active and better prepared students typically initiated discussion in their group. Observer 2 reported a medium level of student engagement during the peer learning exercises, but she said it was higher than for the other activities. According to her, the students interacted with each other without any hesitation and seemed comfortable learning in groups. Most students spontaneously joined the group work, even if one group had to be stimulated by the teacher to engage in group work.

These observations are supported by the student interviews and my reflective diary as well. In the interview, the students self-reported that during group work they felt ‘involved in the discussion and also in the topic’, while working in small groups created a ‘discussing atmosphere’. Learning in groups was comfortable for them because students talked to peers they had already known for three years. They reported that the activity was ‘fun and exciting’.

Data regarding their actual sharing of knowledge (H2) is less robust, but very encouraging. Students appreciated that in small groups, they could share their knowledge and experience from hospital placement, and they could practice problem-solving via discussion and note-sharing because ‘everyone remembered different things’. Students considered this exchange of information ‘helpful’ and believed it improved knowledge retention: information ‘stuck’ in their minds. Overall, the two interviewed students believed peer learning via group work was effective for their learning.

I noted in my reflective diary that the students almost immediately started discussion when asked to work in a group. It was only interrupted when some students reviewed the notes they had prepared at home from the pre-class readings or the textbooks, but after comparing them with information from their peers, the students continued working on the assigned case. Indeed, checking and comparing was a crucial moment for sharing and augmenting their knowledge, as I noticed that they often discussed differences in detail and understanding and resolved these before applying the knowledge to the case. Some groups even initiated discussions with other groups. When certain groups finished earlier than others, I asked them additional questions or gave them hints, which helped to spark discussion. The plenary discussion offered another opportunity to share and combine knowledge and perspectives, this time across groups. Three

times, however, it occurred that one student (always a different student) did not want to join the discussion with their peers and preferred solving the case study alone.

### **Replicability in a different context**

This chapter showed that peer learning is an engaging method that encourages the sharing of students' diverse knowledge. It does not require any special equipment. This signals that peer learning via group work can be used in various courses with international students, and most probably also with home and mixed groups of students, no matter if these are large or small courses. To make this method effective, it is crucial to choose an in-class case study activity that will help to address most aspects of the problem being studied. In medicine, a patient case study should be characterised by typical risk factors (including age, gender or ethnicity). Symptoms guide the students toward the diagnosis, and at the same time students should be able to explain their development in regard to the disease. After considering the provided information, the students should deduce the correct diagnosis, interpret the laboratory and other examination results and recommend the principles of treatment.

Next, the assignment of students to groups needs to be purposeful. Ideally, each group should include more advanced along with less advanced students and students of various cultural backgrounds. This implies that the teacher must know the students beforehand, which may be challenging, especially in large courses, when a teacher facilitates only two or three course sessions. Also, a language barrier may obstruct group work as it often happens that in large courses enrolled by international students, several students do not speak the language well. Another critical aspect is allocating enough time for the peer learning activity. My experience from teaching this course revealed that each peer learning activity requires at least 30 minutes, including plenary discussion and debriefing. The teacher needs to be ready to assist the groups if they get stuck trying to solve their case. Finally, to make the method effective, the teacher needs to create a learning atmosphere in which students are not afraid to share their knowledge. This can be done, for example, by remembering and using student names, interacting with students as individuals, beginning the session with an icebreaker, arranging the seating in the classroom so that students can see each other's faces, appreciating student input and letting students know that mistakes should be seen as learning opportunities in this class. The goal is to create a safe place for questions, answers and discussion without any judgment by peers or teacher.

### **Conclusions**

The aim of my innovation, peer learning via group work, was to engage students and invite them to share their diverse knowledge. The student feedback questionnaire results showed a higher-than-average appreciation of peer learning, and the student interview, peer observers' views and my own observations support the hypotheses: peer learning via group work made students engaged and encouraged sharing of diverse knowledge.

The main challenge I faced during my seminars was engaging those students who preferred working individually. Because they will need to collaborate with colleagues in their future practice, I believe they should start training this skill during their studies. In future classes, I am considering verbally encouraging these students to cooperate with their small group or allowing them to change groups if they do not feel comfortable enough working in a particular group.

I am also thinking of assigning students so that groups include more and less advanced students and those from various cultural backgrounds. Students from the same country tend to sit next to each other and to form a group with their compatriots. In the future, I will ask students at the beginning of the first class session to change places and form groups with peers from different countries. This way the sharing of knowledge across cultures would be supported more strongly.

### References

Boud, D., Cohen R. and Sampson, J. (1999) 'Peer learning and assessment', *Assessment and Evaluation in Higher Education* 24:4, pp. 413-426.

Marinoni, G. (2019) 'IAU 5th Global Survey on Internationalization of Higher Education', *International Association of Universities. The Global Voice of Higher Education*, available at: [https://www.iau-aiu.net/IMG/pdf/iau\\_5th\\_global\\_survey\\_executive\\_summary.pdf](https://www.iau-aiu.net/IMG/pdf/iau_5th_global_survey_executive_summary.pdf).

Olivier, E., Morin, A.J.S., Langlois, J., Tardif-Grenier, K. and Archambault I. (2020) 'Internalizing and externalizing behavior problems and student engagement in elementary and secondary school students', *Journal of Youth and Adolescence* 49:11, pp. 2327-2346.

Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J. and Wiegant F. (2016) 'Collaborative Learning in Higher Education: Evoking Positive Interdependence', *CBE Life Sciences Education* 15:4, ar69.

Youngren, J. (2021) 'Impacts of Collaborative Learning on Student Engagement', *Dissertations, Theses, and Projects* 483.

### Summary

This chapter discusses the effects of peer learning via case study method in small groups on student engagement and their ability to use their diverse knowledge during seminars on Pathophysiology. To evaluate peer learning, I used a student feedback questionnaire, an interview with two students, feedback from two peer observers and my own observations. Student feedback collected from the questionnaire showed that students assigned a higher-than-average value to peer learning for engagement and learning as a community. The student interview, peer feedback, and my own observations signalled that the students were engaged during the peer learning sessions and shared their diverse knowledge. In conclusion, I can recommend peer learning via case studies solved in groups as an engaging method that encourages students to build upon each other's knowledge.



## Keywords

case study method, diversity, group work, student engagement



**Kristína Repová**, Doctor of Medicine, is a Senior Assistant Professor at the Institute of Pathophysiology, Faculty of Medicine, Comenius University in Bratislava, Slovakia. She completed her PhD in 2014 in normal and pathological physiology. Her research focuses on cardiovascular diseases, particularly hypertension, heart failure, novel trends in heart protection and cardiovascular drug-induced behavioural alterations. Her interests include innovations in teaching pathophysiology. [kristina.repova@uniba.sk](mailto:kristina.repova@uniba.sk)