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GOOD Flipped Classroom CASE

Flipped Learning and Teaching Initiative

23

Instructor
Professor Jeffrey Leung

Department
School of Optometry (SO)

SO4005
Clinical Binocular Vision

Class size
63

Students
BSc (Hons) in Optometry / SO

Details of Flipped Classroom IMPLEMENTATION

Why did the instructor use the flipped classroom approach?

Jeffrey adopted a partial flipped classroom approach for the "Clinical Binocular Vision" course. This meant that traditional lectures remained unchanged, whilst the flipped approach was applied specifically to the project component. Conventional teaching methods often fail to provide sufficient practical experience or inspire innovation. By flipping the project tasks, students engaged in self-directed learning before class, and they could focus on practical application during sessions. This effectively transformed their theoretical knowledge into practical skills. As a result, this method boosted their ability to work independently and as part of a team, helping them develop crucial skills needed for future clinical practice.

How was the flipped teaching approach implemented?

Preparation of materials

For the project component of this partial flipped model, Jeffrey did not provide students with a standard set of learning materials. Instead, he encouraged them to independently find and organise relevant resources. At the beginning of the course, he outlined the primary task: to redesign a vision training tool. Students were motivated to collect materials from diverse sources, including academic papers, clinical cases, and the latest technology news.

Pre-class activity

Students were required to independently search for relevant materials outside of class to understand existing vision training technologies, the principles behind these tools, and their clinical applications. Through this self-directed learning, they acquired the necessary background knowledge for the project, preparing them for the subsequent in-class discussions and design work.

In-class activity

During the class sessions dedicated to the project-based segment, students were organised into nine groups, each comprising approximately seven members, enabling them to establish their own teams. Jeffrey facilitated group discussions where students could share their ideas and insights.

Midway through the semester, a dedicated consultation session was arranged for students to deliver detailed reports on their project work. These reports included their chosen technologies, design concepts, and any challenges encountered. Jeffrey assisted students in analysing the feasibility, innovation, and clinical value of their designs, highlighting potential risks or shortcomings, and providing suggestions for improvement.

Following this feedback, students continued to refine their designs, ultimately producing a prototype. They were not confined to designing hardware tools; they also had the option to develop software applications.

Post-class activity

At the end of the semester, a mini exhibition was organised, inviting faculty members, clinical experts, and professionals from the healthcare industry to participate. Students showcased their design outcomes at the exhibition, explaining their concepts, technical implementations, and potential clinical applications. Experts offered valuable feedback on each project, providing professional advice to help students enhance their designs. This process not only improved students' presentation skills and confidence but also created opportunities for the practical application and promotion of their project work.

What was the impact on student learning?

Jeffrey collected student feedback through questionnaires, and the vast majority of students reported positive feedback for the course. Formal evaluation via a 5-point Likert scale survey in the 2023 cohort confirmed the students' positive perception of this innovative activity. Over 90% of students agreed or strongly agreed that the project had significantly deepened their understanding of core course material through practical application and enhanced their engagement with the learning process. By focusing the flipped model on the project component, students felt their understanding of relevant background knowledge was significantly enhanced. Students generally expressed that the theoretical foundation was essential for completing the prototype design. Consequently, they gained a much clearer understanding of the concepts related to vision training throughout the learning process.

In addition, the partial flipped classroom approach brought about several positive effects. Firstly, students became much more proactive in their learning as they searched for information and worked on their designs, which broadened and deepened their theoretical knowledge. Secondly, the learning approach encouraged innovation, prompting students to apply new technologies such as AI and 3D printing to the development of vision training tools. When faced with technical challenges, they actively sought solutions, which helped to foster independent thinking and teamwork. Thirdly, through activities such as the mini exhibition, students received professional feedback from experts and improved their skills in presenting, communicating, and applying their work in real-world clinical settings. These practical experiences were highly valuable for their future clinical practice and career development. Finally, several outstanding outcomes demonstrated significant potential for further development beyond the course. Jeffrey encouraged students to apply their designs during internships or in their future careers and to facilitate patent applications or clinical trials.

What are the good practices that can be learnt from this case?

Applying the Partial Flipped Model to the Project to Enhance Students' Self-Directed Learning

- The project component was centred around actual clinical needs in the field of vision training, requiring students to redesign training tools based on real-world demands. With the partial flipped classroom approach applied to this segment, the delivery of project-specific knowledge was transitioned to pre-class activities, encouraging students to independently search for relevant materials and prepare in advance. Classroom time for this unit was primarily devoted to discussions, analyses, and real-world problem-solving. This method not only stimulated students' interest in learning and their motivation for innovation, but also prompted them to actively explore both theoretical backgrounds and practical applications. The partial flipped model effectively shifted the focus from passive reception of knowledge to enhanced self-directed learning.

Facilitating Professional Communication and Feedback through Mini Exhibition

- At the end of the semester, a mini exhibition was held, inviting faculty members, clinical experts, and professionals from the healthcare industry to participate. Students presented their project work at the exhibition, articulating their design concepts, technical implementations, and potential clinical applications. Experts provided feedback on each design, offering valuable professional advice for further improvement. This process not only enhanced students' presentation skills and confidence but also created opportunities for the practical application and promotion of their work. Through direct interaction with experts, students gained insights from multiple fields, broadening their perspectives and increasing the real-world value of their outcomes.

Establishing Continuity Mechanisms to Extend the Impact of Flipped Project Outcomes

- Jeffrey actively encouraged students to develop further the prototypes created during the flipped component by applying for patents or pursuing clinical trials. This mechanism provided valuable support for students' career development, proving that the partial flipped model could generate viable, real-world solutions. Some students continued to refine their flipped project designs, ensuring that the practical skills and innovations gained in the course had a lasting professional impact.

What were the challenges encountered during the implementation and what solutions were used?

The Challenge of Increasing Student Workload

- The partial flipped model required students to balance self-directed prototyping with the unchanged schedule of traditional lectures. This dual workload caused considerable pressure, particularly around academic deadlines. To address this, Jeffrey structured the project into manageable stages with clear milestones and feedback points. He also promoted teamwork to distribute tasks effectively, ensuring students could navigate the specific demands of the flipped component without feeling overwhelmed.

Challenges for Students with Insufficient Technical Competence

- Some students faced technical challenges because their proficiency varied in skills like 3D printing and AI programming. To address this issue, Jeffrey collaborated with the Industrial Centre to provide targeted technical training and necessary support. He also encouraged students to utilise university AI courses and self-learning resources to enhance their skills. Through focused technical training and collaborative teamwork, students gradually overcame these technical challenges, resulting in improved quality of their outcomes.