

Challenges of Flipping a Course in Geomatics Engineering

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SUMMARY

In recent years, the flipped classroom teaching and learning approach has attracted the attention of many educators, but in general, its use remains obscure in engineering disciplines. The main goal of this new approach is to enhance and enrich students' classroom experience via transforming lecture modules or even individual lectures into online course content, and at the same time, to allow more opportunities for active face-to-face interactions between a teacher and students. Moreover, this approach ameliorates the main deficiency of online teaching in engineering, i.e., the missing benefits from the hands-on experience. At the same time, the flipped classroom approach may be suitable in project-based and design courses, where the expertise and self-example of the teacher form the foundation of teacher-student interactions in the traditional face-to-face classroom.

In this paper, we investigate the applicability of the flipped classroom model in geomatics engineering education through two third-year courses taught in the Department of Geomatics Engineering at the University of Calgary. These are a geodesy course and an engineering and geodetic surveys course. On the one hand, the content-heavy geodesy course is a good example of a geomatics course that can be remodeled to fit the requirements of flipped learning. On the other hand, the surveying course focuses on hands-on experience, project design, management and team work. All of these course outcomes make flipping the course a very challenging task.

Regarding content, a course may be flipped in both the time and space domain, so that what is normally done during scheduled class times within the classroom is instead accomplished on the students own time. Individual learning activities may include watching posted lecture videos, assigned textbook readings, review of project assignments, online tutorials, team-based work, etc. Face-to-face, classroom-based interaction between students and teachers centres around active learning events, problem solving, discussions, summaries of video lecture materials, feedback from

the teacher, and feedback from the students, among others. We also discuss the important, but often underestimated, role of student accountability in flipped classrooms. Examples of accountability activities include, but are not limited to, online quizzes, questionnaires, peer evaluation and self-assessment.

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