

Self-Flip: How Learning through Making Can Flip the Classroom

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ABSTRACT

We present a pedagogical model built on the synergy between the concepts of *flipped classroom* and *learning through making*. We share observations on student attitudes towards elements of this pedagogy and describe an example of its practical application. Our preliminary findings suggest that computer science students can become fully-functional “prosumers”: producing as well as consuming teaching materials for their own learning. This work lays the basis for the practical utilization of the proposed model.

1 INTRODUCTION

In recent years, and increasingly so, success in the modern world of *prosumerism* [1] (portmanteau of *producing* and *consumerism*) requires of students to develop skills on collaboration, communication and content creation. Educators react to such a demand by developing pedagogies to help students in acquiring these skills. Our pedagogy, that we call *Self-Flipped Classroom*, is based on the reuse of student-generated content and flipped classroom approaches, aiming at training learners in these skills [2].

Learning by making, grounded on constructionism theory, has been proven highly effective in previous work [3,4], justifying the introduction of content creation into curriculum [5]. The self-flip approach takes learning-through-making further by using student-created materials as resources in flipped classroom modules, with ample benefits for students and instructors alike.

2 ATTITUDE TOWARD SELF-FLIP

As part of the approach evaluation we conducted a survey among STEM undergraduates in Newcastle University, UK. Among a total 121 participants, 61% (n=74) were computing science students. We asked the participants about their attitudes towards learning through creation of instructional materials for other students.

Results suggest that respondents learn best by doing practical exercises (67%) and watching instructional videos (52.9%), implying that learning through making artefacts, together with a flipped classroom approach are aligned with students’ preferences.

When asked about intentional creation of learning materials for someone else, however, 37.2% of students said they would like this idea, whereas 38.8% didn’t liked it, with 24% being neutral. Nevertheless, most participants reported that this type of coursework would help them learn the course material better (53% replied ‘yes’, only 19% replied ‘no’). Moreover, 65% of respondents believe it would help them to develop skills necessary for future career. Furthermore, 85.2% of the respondents think that sometimes students are able to explain parts of course subjects to fellow students more clearly than the instructor. The general attitude toward using some materials previously produced by other students was more positive (57%), than negative (18.5%).

3 CASE STUDY

To illustrate the self-flipped classroom in practice we describe a scenario where it is incorporated into two related modules. The first phase of the self-flip cycle, *production*, occurred in Newcastle University on a 3rd year undergraduate module on Ubiquitous Computing. As part of module assignments students created two-minute video tutorials based on practical exercises. The tutorials explained how to work with Raspberry Pi kits in various setups (e.g. switch on an LED; detect proximity). This introduction of video-making into the curriculum has been successful [6].

The second self-flip phase, *reuse* of the student-generated content is currently planned to be deployed on a Master level module on Human-Computer Interaction Principles and Methods at the University of St Andrews. There students will study the videos produced in Newcastle as part of a larger coursework.

4 CONCLUSION

The preliminary results of this study suggest that the self-flipped classroom approach has a potential to be both beneficial and appreciated. Student preference for learning by doing practical exercises could be used for activities resulting in creation of useful materials, such as video tutorials. This, coupled with their preference to learn from instructional videos and positive attitude to using materials produced by other students, means that instructors could start to effectively experiment with introduction of student-generated videos into their pre-class teaching in flipped classroom courses. It is worth investigating whether the gains observed in the undergraduate course can be seen in the MSc too.

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