Chapter 4

Student Engagement Practices for Computer Science Students in Online Learning Environments

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ABSTRACT

Online learning has many challenges, and student engagement is one of them. Computer science students differ from most other disciplines. As a consequence, students typically find it easier to adapt to the new learning environment, but at the same time, they are more demanding on the tools and services offered to enhance their learning experience and engagement. This chapter discusses the various student engagement practices used today and their applicability to computer science students in online learning. The investigation will refer to case studies published and their relation to the concepts presented in this chapter. Computer science student engagement in online platforms is directly associated with positive learning experience from the content and context to interface to the interaction design a course embodies. Finally, a framework of best practices for student engagement for computer science students will be provided.

INTRODUCTION

As the phenomena of online course enrollment rapidly surges, instructors and universities endeavour to design and develop curriculum with engaging content. The study of student engagement in online classrooms is of special interest as it is only soaring in an upward manner rather fast and it is here to stay. The principal aspect of effective pedagogy is student engagement. Modern day needs are not just limited to educational content, rather delivery and components. These days course content is available

at your fingertips to just about anyone with an internet connection at little to no cost, giving leeway to greater attrition rates in comparison to traditional classroom bound learning with penalties for lack of completion.

The capability of pausing video lectures and self-paced learning attaches a more qualitative nature to learning and teaching methodologies (Garrison and Cleveland-Innes, 2005). Teaching strategies must be developed to adapt to rapidly changing technological environment to create a good learning experience at higher levels of education. User experience becomes a vital aspect of student engagement more specifically a delightful learning experience in every dimension. The quality of layout, animation, video, audio, the synchronization, abstract context and interaction all play a part in the user experience. The focus has to be on user interaction through applied learning and high quality course material design.

Before delving further into the study of learning experience design, one first needs to establish what constitutes student engagement. The Student Course Engagement Questionnaire (SCEQ) endorses that the four factors that come into play for student engagement are: skills engagement (high activity in terms of watching video lectures, keeping up with reading, timeliness in information consumption); emotional engagement (interesting aspects of the course with background and emphasis to real-life applications and case studies); interaction engagement (active participation, motivation for group discussions, collaborations, peer reviews); and performance engagement (passing academic evaluation with flying colors in terms of quizzes, tests) (Handelsman, Briggs, Sullivan, and Towler, 2005). The factors may feel visceral but also are rooted in theories of subject mastery and motivation for catalyst in the process of learning (Dixon 2010).

In computer science, the student engagement is defined by how applicable the course content is. It is not a surprise that applied or practical learning is what most students find engaging as it is a reflection of what the industry is. This chapter includes two main sections. The first section provides a literature review of common practices encountered in online education environments. The second section explains the authors' proposed framework for best practices in online education for Computer Science students. Finally, the chapter ends with conclusions and future directions of online learning as well as with a list of useful references and key terms.

BACKGROUND

The rapidly emerging alternate form of education summons for the study of new modalities of learning by collecting a variety of data in enormous amounts from platforms such as Coursera, Udemy, and Udacity. The research that goes into studying and analyzing best practices for Massive Open Online Courses (MOOCs) and little cost learning platforms can seem daunting due to the varying multi-faceted effectiveness that determines the success of learning occurrence. The design of the course and discipline-specific factors complicate the study of what works for a student and what does not (Shrader et al., 2016).

Additionally, the quick process of registration and enrollment are not stringent like traditional classroom-bound processes allowing students to enter and leave according to their choice, participate or stay inactive. To contextualize online course learning, researchers use traditional evaluation techniques such as course enrollment and completion. Online courses enjoy a great initial turnout however, the mean course completion metrics are lesser than 10% (Breslow et al., 2013). It makes one think what is it that changes between the student coming across the course and registering to course completion for such a variation in statistics. Consequently, this has lead researchers to consider initial course intent. As one

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