Student Directed Learning for CS2 Course

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ABSTRACT

Student-directed learning (SDL) is considered to be useful for fostering engagement, autonomy, freedom, and decision-making skills among students. However, incorporating SDL is a challenging task. Several learning strategies are implemented based on SDL. In this paper, we have implemented and studied a question-posing-based learning strategy, SQDL, with CS undergraduate students in the data structure and algorithm (CS2) course. Preliminary results show positive impacts of the strategy on various constructs of SDL.

KEYWORDS: Student-directed learning, Question posing, CS2

INTRODUCTION

Student-driven learning (SDL) is primarily discussed in relation to student engagement, autonomy, freedom, and ownership of the learning process. Student engagement allows students to take ownership of their learning and pursue topics of their interest. Improved engagement supports and is supported by the motivational, cognitive, and social aspects of students. Adapting SDL approaches can be a challenging task for students and teachers. Watkins [2017] [1] proposed a set of self-questioning strategies to facilitate the SDL process. When students become aware of what they know and what they don't know, their engagement and interest in the learning context tend to increase. Questioning skills are recognized as a high-level cognitive strategy that enables students to reflect on their thought processes and decision-making abilities while learning within a specific context.

IMPLEMENTATION

We aim to achieve this by implementing a Student Question-Directed Learning strategy (SQDL) [2] in the data structure and algorithm of the CS2 course. Student question-directed learning strategy (SQDL), consists of three phases. In the first phase, the teacher delivers a face-to-face lecture. In the second phase, the teacher allows students to pose their questions using Padlet tools, from the seed knowledge. Then the teacher allows students to prioritize their own and peer questions. In the third phase, the teacher collects all questions and answers them according to the priority assigned by all students. SQDL was implemented on second-year computer engineering undergraduate students at a private engineering college affiliated with AICTE and Mumbai University, India. Among 82 students in a second-year class, 40 students were selected randomly from the data structure and algorithm (CS2) course. Twenty students for the control group and twenty students for the experimental group. Experimental group students participated in all three phases of SQDL and filled out all pre-post questionnaires and feedback forms. Control group students interacted with teachers in the traditional routine way and filled out pre-post questionnaires. Consent forms are filled out by every participant. To measure engagement, autonomy, freedom, and decision-making ability, we use pre- and post-questionnaires for control and experimental group students. The questionnaire is based on a 5-point Likert scale. The whole experiment is video recorded. We collected feedback from the experimental group students at the end of the experiment.

RESULT

We find that the SQDL group students show significantly more engagement as compared to the non-SQDL group. SQDL group students show increased interest in the topic covered and their decision-making ability toward prioritizing the topic of interest are higher than the non-SQDL group student. When we looked deeper, we found that pre-post test scores of SQDL group students on perceived autonomy are higher in expressing their preferences and choices than non-SQDL group student's pre-post test scores.

DISCUSSION

The study indicates that students exhibit significant interest in utilizing SQDL. We have received responses from experimental group students such as: "This procedure was helpful for me to get my doubts clear even if it is a very silly one. Didn't get nervous to pose questions. Learned what I want to learn!" from an experimental group of students. This underscores the importance of scaling up this project to a larger student population over an extended duration. In the future, we aim to gauge students' levels of autonomy, ownership, and purpose in their CS2 learning, as these attributes hold particular relevance for undergraduate computer science students, given the abstract nature of the field.

REFERENCES

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