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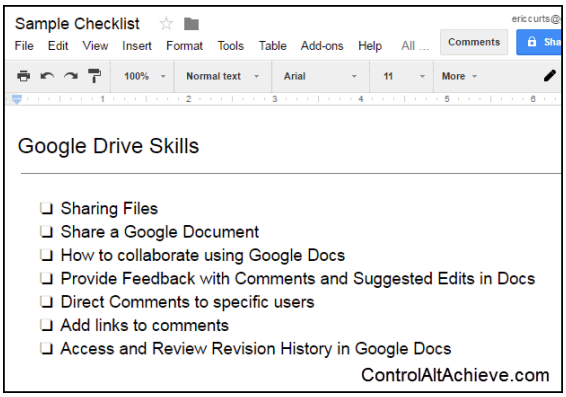

Category

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Title

3CI Model in "Learning Sciences" Course for Graduate Students

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Abstract

Using the method of design-based research, this study examines the five-year application of the 3CI Model(*three stages-Collaborative-Instruction Model)* in a postgraduate course on learning sciences. In the modified flipped classroom, students from learning communities in groups. Before class, they read literature, raise questions, and discuss material both online and offline; in class, in an innovative modification to the traditional flipped classroom, students in the teaching group deliver content to their classmates and organize classroom activities; and after class, students conduct empirical research and complete research reports in groups. Through qualitative and quantitative analysis, it is found that the modified flipped classroom can effectively bring out students' initiative and improve both their learning satisfaction and empirical research abilities. Group-based lesson design and empirical research are found to be the most rewarding activities for students. Finally, recommendations for the application of the modified flipped classroom to postgraduate teaching in the areas of learning platform, course content, teaching methods, and teacher–student interaction are proposed.

Introduction

Higher education should meet the growing needs for knowledge and skills through innovative pedagogical methods. Previous studies have shown that much of the postgraduate teaching in China still focuses on traditional modes such as lecturing, student presentation, and examination. In spite of the large-scale expansion of enrollment, teaching methods remain stagnant, and teaching quality has declined by limited measures (Xiong et al. 2010). Additionally, Yuan et al. (2007) note that Chinese graduate students perform poorly in terms of innovativeness, teamwork, social responsibility, and influencing skills. Thus, it is necessary to create new pedagogical and learning methods. The flipped classroom is a new instructional approach. In a typical flipped classroom, the teacher asks students to watch micro-videos or read materials prepared in advance so that they can be more interactive in higher-order activities (Davies et al. 2013; Kim et al. 2014). What we have tried to do is to modify the flipped classroom by allowing students to design the class themselves. This study examines the modified flipped classroom model employed in the ''learning sciences'' course for postgraduates. Learning sciences is a new interdisciplinary subject that is derived from cognitive science, pedagogy, psychology, and computer science, in addition to other, similar subjects. It focuses on the learning outcomes seen in different learning environments and explores the essence of learning in order to improve learning effectiveness. Learning sciences has become a specialized course at some universities for students majoring in educational technology. Its aim is to help students have a full understanding of the theory, methods, and research topics in order to improve their professional knowledge and abilities, such as independent thinking, cooperative learning, and scientific inquiry. The course analyzed in this study adopted the 3CI Model as an innovative teaching mode, then further modified the traditional flipped classroom model (Chiang & Chen, 2017). In the 3CI Model, students read materials and asked questions before class, ''taught'' other classmates in groups during class, and conducted empirical research after class, thereby maximizing both their participation and their initiative. In order to continually observe and modify this teaching mode, this study uses the design-based research (DBR) method to track the practice of the modified flipped classroom in the learning sciences course for five years. The purpose of the study is to: (1) Discuss the application and effects (including students' perceptions, academic performance, and abilities in collaboration and research) of the flipped classroom in the postgraduate course of learning sciences, (2) Improve pedagogical modes using design-based research, and evidence-based teaching.

Results

This study inquires into the systematic and innovative model of the modified flipped classroom by asking graduate students to read literature, ask questions, and discuss materials before class, make presentations in class, and conduct empirical study after class, so that they can learn and understand the important theories and research paradigms in the field of learning sciences. Data analysis of questionnaires, learning essays, interviews, and paper publishing finds that the model is helpful in improving student satisfaction and abilities in cooperative learning and empirical study. This study attests to the great application potential of the modified flipped classroom in pedagogy. In particular, the process of teaching design and classroom practice is helpful to the career development of normal school students. The five-year survey finds that students think the most rewarding learning activities are ‘‘final empirical research assignment’’ and ‘‘group design of classroom activities.’’ Such methods of ‘‘learning by doing’’ bring out students’ learning initiative. In addition, this study adopts the DBR method. The researchers adjusted the teaching and research design over the course of five iterations. The research was conducted in a naturalistic learning context (the learning sciences course for postgraduates) without too much presupposition or intervention. Through the continual adjustments made according to teaching effects and student feedback, our design and concept of the modified flipped classroom were kept up to date.

Recommendations

(1) Course Content: As learning sciences cover extensive fields and content, teachers should arrange course contents flexibly according to training requirements, students’ abilities, lesson hours, and other factors. It was found that teachers should pay attention to the selection of papers (their topics and research methods should be consistent with learning topics) and provide instructions for students on English literature reading skills. Students believe that they gain a lot from designing teaching activities, but that they require too much time and effort to prepare. To ensure the quality of learning activities in class, asking each group to teach once is advisable. Compared to other learning activities, students think that informal learning brings them few gains. This may be because informal learning activities are optional and have relatively little relevance to the theme of the course. Thus, extracurricular learning activities more closely connected to course content are recommended. (2)Teaching Methods: Students in mainland China are used to the teaching mode of ‘‘cramming,’’ so they may find it a bit difficult to adapt to the student-centered classroom. Some students still hope that teachers can deliver more content. Especially in the later stages of the course, the freshness of the new teaching mode fades away and students’ enthusiasm for classroom activities is diminished, requiring teachers to make adjustments accordingly. In the early stages of the course, teachers can gradually reduce the content they deliver in order to better acclimate students. As to literature reading, students may say that they do not know ‘‘how to ask questions’’ and ‘‘have no questions to ask’’ at the beginning, so teachers can provide some questions to get them started. With respect to evaluation, teachers should emphasize the quality of questions instead of the quantity. In addition, for new graduate students, it is still difficult to read large amounts of English literature, so teachers can provide instructions on English literature reading methods and skills. As most learning tasks are conducted by group-based learning communities, teachers should pay close attention to the organization of learning communities. When it comes to grouping, they should take into account intragroup heterogeneity and inter-group homogeneity, avoiding problems with the division of tasks caused by considerable differences in the abilities of students within the group. (3)Teacher–Student Interactions: In the process of classroom activity design and empirical study, students expect to get timely and sufficient suggestions and opinions from teachers. When applying flipped classroom models, teachers should provide adaptive feedback on individual and group work (Kim et al. 2014). In practice, however, the time for teacher–student communication outside class is limited. Therefore, teaching groups get a chance to talk to both the teaching assistant and the teacher. In addition to face-to-face communication, instructions on the process for the empirical study can also be provided via the online learning community and messaging tools.

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