International Journal of Online Pedagogy and Course Design
Volume 12 • Issue 1

Using Flipped Classes to Develop Scientific Communication and the Attitude Towards Technology Acceptance in Science Learning in Intermediate Schools

Sahar Mohammed Yousef Ezzeldin, Prince Sattam Bin Abdulaziz University, Saudi Arabia

ABSTRACT

This study aimed for using flipped classroom to develop scientific communication and the attitude towards technology acceptance in science learning among intermediate school students. For this purpose, the quasi-experimental design with the experimental and the control group method was used. The sample involved 49 third intermediate stage students from two different schools in Wadi Al-Dawasir Governorate, Riyadh, Saudi Arabia. A list of written scientific communication levels suitable for intermediate school students and a procedural model for learning with flipped classes were presented. The study applied the scientific communication test and the technology acceptance in the science learning scale. The statistical analyses revealed that there were statistically significant differences between the means of the scores of the experimental and control group students in the scientific communication scale and the technology acceptance in the science learning scale in favor of the experimental group. Recommendations and suggestions were presented.

KEYWORDS

A Model of Technology Acceptance, Flipped Classroom Learning, Science in Intermediate School, Scientific Communication

INTRODUCTION

Communication is a significant component in teaching as it reflects the process of interaction between the teacher and the learner. Besides, language plays an essential role in achieving this communication as it is a mediator for thinking that is used to convert observations into ideas. Developing a learner's communication skills helps him to express his ideas and opinions, formulating them to convey ideas and information to others. Therefore, it should be developed to achieve effective learning.

Communication is also an essential part of scientific practices. It is stated that it has become a basis for scientific knowledge in both scientific studies and science education. However, it is a negligent component that must be treated as a central component of science nature without which there would be no science. Mainly, it has a role in gathering facts and theories, and it is a resource for preserving, making, and expanding the scope of knowledge (Nielsen, 2013). Scientific communication means

DOI: 10.4018/IJOPCD.2022010101

striving to create knowledge, acquire information, share ideas with others, and coexists with scientific changes (Muslim, 2011). Developing learners' scientific communication is one of the main objectives that must be focused on to be aware of the language of science. The more opportunities are provided to the learner to integrate him into effective educational activities, the more his ability to explore the meanings of the scientific concepts and structures that he deals with (Salem, 2001), therefore many studies have been concerned with developing scientific communication in science education through utilizing various strategies and all of them have demonstrated the effectiveness of different strategies in its development (Fadly & Andaria, 2021; Kolber, 2011; Muslim, 2011; Rizk, 2014; Salem, 2001). Furthermore, some studies aimed to develop scientific communication in laboratory activities (Malik & Ubaidillah, 2021; Widanski et al., 2020).

Today, human society lives in the era of the technological revolution associated with advanced information technology. Within the framework of the Kingdom of Saudi Arabia's interest in e-learning, all schools in the Kingdom will transform into an interactive digital environment, and paper textbooks will be disposed of as soon as possible (Ministry of Education of Saudi Arabia, 2017). Consequently, there is a need to use teaching models that employ technology, such as flipped classroom that is concerned with technological applications in teaching and learning.

Flipped classroom (FC) is a contemporary method that concentrates on taking the advantage of technology to activate students' participation and interaction. This method provides learners with opportunities to communicate with the teacher and to create a kind of learning ownership because they feel responsible for their learning (AlJaser, 2017). Flipped classroom helps learners greatly to communicate because students do homework and assignments after completing presentations outside the classroom. Students also may be asked to write a report and a summary of what they have been learned, and thus helps in developing scientific writing skills and their ability to communicate (Deri et al., 2018). The idea of the flipped classroom is based on active learning and participatory learning thus the value of this type of learning lies in converting class time into a training workshop, through which students can discuss what they want about content and enable them to communicate with each other while performing class activities (Prud'homme et al., 2017). Besides, Ramlo (2015) confirmed that flipped classroom is a method based on individual learning where students are asked to read and study a part of the textbook by using the learning resources prepared by the teacher, then they display all their thoughts and ideas about the lesson hence they can develop their communication skills.

Many studies have concentrated on flipped classroom in science to develop achievement, maintain the impact of learning, and discuss students' perceptions about it (Lee et al., 2021; Stratton et al., 2020; Jeong et al., 2016). Other studies concentrated on investigating the effectiveness of using the flipped classroom on developing biology achievement (Heyborne & Perrett, 2016; Leo & Puzio, 2016; Son et al., 2016). Moreover, Ramlo (2015) used it in physics education, while Liou et al. (2016) used it in teaching science in general, and Deri et al. (2018) in general chemistry.

Reviewing the literature on the role of the learner in e-learning and blended environments showed that the learner is the most important factor that must be considered when developing such environments. Hence, the learner's positive attitudes and acceptance of new technology is a major factor in the success of flipped classroom (Al-Fraih & Al-Kandari 2014). This attitude is formed before the age of 14 years. The Organization for Economic Cooperation and Development (OECD) revealed that there is a decrease in the number of students in the field of science and technology, and this is evidenced by the reluctance of students to enroll in programs that integrate science and technology, engineering, and mathematics (STEM) due to the weak acceptance of technology (Ardies et al., 2015).

In this context, Davis (989, 1993) introduced the Technology Acceptance Model (TAM) to predict and justify the level of technology acceptance within learning environments. This model indicates how perceived usefulness and perceived ease of use affect acceptance of new technology. Accordingly, developing technology acceptance is a necessary process for qualitative improvement in education, as the learners' acceptance determines when and how it will be used in the classroom (Govender, 2012). Acceptance of technology in science learning implies behavioral patterns that

Collaboration + Integration = A Library Program Greater Than the Sum of Its Parts

Michelle L. Maniaci (2014). *Collaborative Models for Librarian and Teacher Partnerships (pp. 216-233).*
www.irma-international.org/chapter/collaboration--integration--a-library-program-greater-than-the-sum-of-its-parts/82623