

Chapter 74

Improving Learning Achievement in Science Education for Elementary School Students via Blended Learning

Ren-Hung Hwang

National Chung Cheng University, Minxiong, Chiayi, Taiwan

Hsin-Tung Lin

National Chung Cheng University, Minxiong, Chiayi, Taiwan

Jerry Chih-Yuan Sun

National Chiao Tung University, Minxiong, Chiayi, Taiwan

Jang-Jiin Wu

National Chung Cheng University, Minxiong, Chiayi, Taiwan

ABSTRACT

Blended learning—which combines online learning with traditional face-to-face classroom instruction—is currently held in high regard. In elementary schools, science and technology education aims to help children use technology tools and to learn how disciplines such as math and science are relevant to engineering. In this study, the authors examined what type of learning profile contributes to higher achievement in science and technology in a blended learning environment. The participants consisted of 106 elementary school students (grades three to six) from two different schools. The authors adapted the Online Technologies Self-Efficacy Scale (OTSES) and the Motivated Strategies for Learning Questionnaire (MSLQ) to measure students' computer skills and learning motivation, respectively, and to understand how the blended learning environment affected their learning achievement. The results were as follows: 1) Computer skills significantly improved for all students except sixth-graders. 2) The blended learning environment had no significant effect on learning motivation. 3) In grades four and five, students in the experimental group improved more in learning achievement than students in the control group, as reflected by their higher MSLQ and OTSES scores.

DOI: 10.4018/978-1-7998-8047-9.ch074

INTRODUCTION

Owing to the rapid development of computer network technologies, the Internet is widely used everywhere, including in the educational environment. In other words, learning activities are no longer restricted to inside the classroom. Numerous online courses are available for self-paced learners or training programs. Learning via the Internet provides flexibility and convenience through the personal learning environment. However, it is important to enhance students' motivation so that they can continue to learn in such an environment. Therefore, the purpose of this study is to combine online courses with traditional face-to-face classroom instruction, or blended learning, to improve students' learning achievement. In this section, we reviewed relevant studies in the fields of blended learning, e-Learning, massive open online courses, small private online courses, and learning motivation.

BLENDED LEARNING

Blended learning is a pedagogy that combines online teaching methodologies with traditional face-to-face instruction. As a form of e-Learning, blended learning is the most useful way to integrate technology into education (Kloos, Muñoz-Merino, Alario-Hoyos, Ayres & Fernández-Panadero, 2015). Norm Friesen defined four blended learning models: the rotation model, the flex model, the self-blending model, and the enriched-virtual model. The models later on the list depend more on online mediation (Friesen, 2012). The rotation model that we adopted in this study allows students to rotate between different learning situations on a fixed schedule. They spend most of the time learning from the teacher as usual but have a fixed portion of online courses.

Another popular blended learning approach is the flipped classroom. This approach also consists of online learning activities and traditional face-to-face instruction, but with a more explicit purpose for the two kinds of learning activities. Knowledge is often transferred from outside the classroom through the Internet, and then the students internalize this knowledge in the classroom via various interactions with the teacher or with peers (Sun, Wu & Lee, 2017). Compared to traditional distance learning, the flipped classroom environment could promote the students to higher learning achievements (Sun & Wu, 2016).

Although blended learning combines the benefits of both online learning and face-to-face education (Watson, 2008), it is not a cure-all. Students have more freedom to arrange their own learning process, so their ability to regulate the learning process becomes more critical (Sun & Rueda, 2012). Table 1 displays the advantages and disadvantages of blended learning (Pappas, 2015; Winstead, 2016).

e-LEARNING

e-Learning is a simple concept. Generally, it refers to learning activities that are assisted by electronic technologies. Defining e-Learning accurately is difficult due to its various forms of implementation and the various terms used to describe it, such as digital education, online learning, and Internet learning. In the past few years, the major progress of Internet technologies has strongly influenced education; many education organizations now deliver learning materials through the Internet.

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/improving-learning-achievement-in-science-education-for-elementary-school-students-via-blended-learning/271218

Related Content

Tackling Cognitively-Complex Collaboration with CoPe_it!

Nikos Karacapilidis, Manolis Tzagarakis, Nikos Karousos, George Gkotsis, Vassilis Kallistros, Spyros Christodoulou and Christos Mettouris (2009). *International Journal of Web-Based Learning and Teaching Technologies* (pp. 22-38).

www.irma-international.org/article/tackling-cognitively-complex-collaboration-cope/37501

Strategies for Efficient, Meaningful, and Inclusive Online Learning Environments: It's About Time

Naomi Jeffery Petersen (2021). *Research Anthology on Developing Effective Online Learning Courses* (pp. 434-473).

www.irma-international.org/chapter/strategies-for-efficient-meaningful-and-inclusive-online-learning-environments/271165

Leadership Characteristics of the Ideal School Superintendent

Ernest W. Brewer (2012). *Technology and Its Impact on Educational Leadership: Innovation and Change* (pp. 40-52).

www.irma-international.org/chapter/leadership-characteristics-ideal-school-superintendent/62909

Enhancing Personal Professional Development Through Technology Integration: The Need for Ubiquitous Learning

Özden ahin zmirli and Gökhan Çalkan (2020). *Managing and Designing Online Courses in Ubiquitous Learning Environments* (pp. 92-105).

www.irma-international.org/chapter/enhancing-personal-professional-development-through-technology-integration/236748

A Case Study of Ontology-Driven Development of Intelligent Educational Systems

Gordon Deline, Fuhua Lin, Dunwei Wen, Dragan Gašević and Kinshuk (2009). *International Journal of Web-Based Learning and Teaching Technologies* (pp. 66-81).

www.irma-international.org/article/case-study-ontology-driven-development/3023