

## Guest Editorial Preface

# Special Issue on Trends and Research Issues of Emerging Technologies to Enhance Learning

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## INTRODUCTION

Educational research has endured since ancient times, for finding and creating effective learning strategies is a never-ending topic. Many research areas are often incorporated into education, such as pedagogy, educational psychology, anthropology, statistics, information science, and neuroscience. Technologies, as well as area expertise, have also been applied to prompt educational development and enhance learning motivation, encourage active learning, and creative thinking.

In particular, with the rapid development of computer and information technologies, research and educational practices have changed greatly. In the field of Computer-Based Education, personal computers were first used to support education for individual learners in the 1980s. World Wide Web (WWW) technologies were later used to support e-learners in the 1990s, along with mobile devices and wireless technologies used to support education for mobile learners in the 2000s. These changes in the way that learners carry out their studies (e.g. e-learning or mobile learning) were a result of the development of such computer technologies.

Our lead guest editor, for example, developed a search engine named “Milky Way Research Trend (MWRT)” that assists students in recognizing the progression of trends and keyword transitions for educational technology (Yin et al., 2013). Yin et al. found that important keywords will always change with new mobile technologies in mobile learning-related topics. This means that a technology-driven research trend in mobile learning exists. They found that in 2005 illustrates two technology-related keywords that emerged as possible research trends: “phones” (which refer to mobile/smart phones) and “PDAs” (which refer to personal digital assistants [PDAs]). In 2016, the keyword “wireless” came to light, and, in 2008, the keyword “devices” (which refers to smartphones, pocket personal computers [PCs], PDAs, or mobile phones) appeared as a research trend. Lastly, in 2011, “Android” first surfaced, as a reference to the Android smartphone operating system (Yin et al., 2013).

Another example of the development of computer and information technologies is computer technologies that support language learning. In the 1980s, technologies such as film, radio, and television were applied in language classrooms (Cunningham, 1998). In the 1990s, Computer-Assisted Language Learning (CALL) became more popular (Pusack & Otto, 1990). In 2000, with the development of mobile technologies, many mobile-based language-learning systems were developed. For example, JAPLEAS is a mobile learning system that can support learning Japanese polite expressions (Yin et al., 2004). In 2010, with the popularization of SNS, some researchers paid attention to developing SNS-based language-learning systems that allowed learners to share and

correct their diaries, which were written in foreign languages (Uosaki, Yonekawa, & Yin, 2017; Yin, Tau, Hwang, & Ogata, 2017). Recently, educational data mining has become a hot topic; therefore, many researchers focus on applying data mining technologies to support language (Hwang, Hsu, Lai, & Hsueh, 2017).

## ARTICLE OVERVIEW

In this special issue, six qualified articles were accepted for publication. In the study conducted by Flanagan and Hirokawa, based on previous methods for identifying writing errors, they investigate the difference in writing errors between five native language groups by comparing the clustering results of sentence errors and error categories. They use error prediction vectors for native language identification by using SVM classifiers.

In the study conducted by Hwang, Chen, and Huang, by using the EMCUD method, they find an enhanced multi-expert knowledge integration system can be designed to assist teachers in creating learning activities in a context-aware, ubiquitous learning environment. The system allows users to mitigate the problem of material provided by experts being redundant or inconsistent when it is integrated. The results of empirical analysis have been provided and are discussed.

In the study conducted by Li, Cheng, Maesako and Li, a “multilingual teaching assistant system” was developed to facilitate the audience’s multilingual learning based on knowledge map data, personal actions through the map levels, and the comparison between their personal perspectives and a data map validated by experts. This system allows for the visualization of foreign language knowledge, particularly taking into account the system’s function through teaching practices. From the point of view of language learning, this kind of attempt is very interesting. The results based on a test group and control group after the learning session tend to show the interest of such a learning tool.

Chang and Yu address the use of augmented reality (AR) for learning in a particular scientific domain. AR has drawn much attention from not only researchers, but also teachers, instructors, and practitioners. Chang and Yu aim to explore the impact of AR on the learning outcomes of college freshmen and their knowledge about their biology lab course. Exploring the impact of AR this application in higher education represents positive progress for AR application in the field of pedagogy.

Ullmann, Ferreira, and Camilo-Junior proposed a group formation method to balance the dichotomy that exists between the collective, which involves the formation of an online learning community (on a massive scale), and individuals (who have different interests, previous knowledge, and expectations). They carried out a case study with sixty-six undergraduate students and applied discourse analysis to two code schemes to measure critical thinking underneath the students’ online discussions and to evaluate socio-cognitive aspects of group interactions. The results provided evidence that the groups formed by the proposed method achieved better scores in most categories when compared to the randomly-formed groups. The contribution of this research is an automatic group formation method applying the Particle Swarm Optimization (PSO) algorithm to boost the quality of students’ online interactions in Massive Online Open Courses (MOOCs).

Nuninger and Chatelet show that Work Integrated Learning (WIL) could be enhanced through video or general multimedia-based training offered to tutors. The results also indicate a new scenario to improve the skills of tutors through the design of new proposed pedagogical approaches and meaningful evaluation using comparisons with Nuninger and Chatelet’s previous literatures.

## CONCLUSION

Advances in information technology contribute to a wide spectrum of directions for future education (such as Education Big Data, MOOCs, and AR for learning), and most of the above-mentioned issues have received many acknowledgements from researchers in the past years. It is not difficult to see that researchers (or educators) attempt to enhance learning activities by incorporating theory and

emerging technologies using past research and articles such as those accepted in this special issue (Kirkwood & Price, 2014).

From this special issue, we find new research trends that employ emerging technologies to prompt the development of online learning environments, such as text mining, visualization, knowledge integration, and augmented reality. We do believe that “Emerging Technologies to Enhance Learning” is an important topic in the field of online learning and hope that this special issue can contribute to the application of emerging technologies to enhance teaching and learning.

We extend sincere gratitude to all the authors for submitting their manuscripts for this special issue. We would also like to express our appreciation to all the reviewers for their invaluable time, constructive suggestions, and thoughtful suggestions. Finally, we thank the IJDET Editor-in-Chief, Professor Maiga Chang, for providing us the opportunity to organize and edit this issue and for his support and guidance throughout the preparation of this issue.

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