

Guest Editorial Preface

Special Issue on Transforming Learning with Smart Technology

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Today's smart applications like e-texts and smart virtual learning environments offer broad possibilities to students and teachers. Smart learning spaces can be context aware, offer ubiquitous interactions and resources, and allow the learner to participate anywhere and anytime using supporting tools delivered in the correct format, at the correct time and place. At least that is the vision. This issue will illustrate the current state of smart applications in the educational environment and highlight some of the current problems that surround the use of these technologies, as well as the educational benefits. Revealing the current state, current successes, and current challenges provides a transparent path forward to the future inclusion of smart technologies in the educational environment.

IN THIS ISSUE

The first article is an interpretive literature review that provides a foundation and theoretical framework for using educational technology and smart classrooms in higher education and how the smart technology can make learning more effective. The authors present the role smart educational technologies play in reducing cognitive load as the amount of information continuously increases. They also discuss how smart educational technology allows efficient utilization of short-term memory which helps in turning large amounts of information into knowledge. The research synthesizes Gagne's conditions of learning and nine related instructional events, the ADDIE instructional design model, and smart technology for creating and delivering learning content. The knowledge from this research lays the groundwork and provides a framework for instructional designers and educators to successfully and purposefully evaluate and implement smart technology.

After laying the foundation and framework for smart technology in education in the first article, we begin to look at some specific smart technologies as they have been implemented in a variety of educational settings. The second article employs a mixed-methods pilot study, examined through a Facebook Capture the Flag gaming competition which offers an efficient, inexpensive approach to enhancing skill development and learning in cybersecurity undergraduate and graduate adult online students. The results show a positive, yet not significant, correlation between competition participation and improved skills and learning and supports continuing the research with a larger sample. The system operated at a very low cost during the competition, however, large amounts of faculty time were required in preparing the challenges. This study examined adult learner students participating in a gaming environment. It would be interesting to extend this study on a younger student group.

The third article, using a comprehensive literature review and exploratory case study, addresses this younger generation of students and examines the practicality of using virtual reality and mixed reality instructional tools for both K-12 and higher education. The authors discuss the expectations of millennial and Gen Z students for virtual reality to be present in an educational setting and how this expectation will be even stronger for future generations. The unique perspective of ethical issues when using artificial intelligence, virtual reality, and mixed reality for education is a highlight of this study. Some concerns revealed were questions as to who creates, controls, and monitors the educational content and the artificial intelligence algorithms in virtual reality education products. A new concern is presented regarding health issues related to virtual and mixed reality technology. The study explores the concept of cybersickness related to use of head mounted displays in virtual reality settings.

The fourth article looks at an active learning strategy of employing student response systems (SRSs) in the classroom, specifically one called TurningPoint. The study examined the perceived effectiveness of an SRS embedded curriculum in a middle school environment and found that both teachers and students found value in using SRS for learning. The authors point to the importance of embedding smart technology and active learning strategies into the curriculum. Like the article on virtual reality, an interesting perspective in this article is the importance of recognizing the ubiquitous nature of smart technology in the students' world and reaching the student in that world through a technology-embedded curriculum.

The final article addresses the use of interactive whiteboards in the classroom at all levels of education. What was most revealing in this preliminary qualitative narrative inquiry was the polarity in perception of the effectiveness of interactive whiteboards in the classroom between teachers and students. The literature review shows a focus on how much teachers like the technology and why they like it with little focus on student perception. This research was able to extract student perception as well. The article provides insight into the affect that bias may play in the divergent perceptions between students and teachers, and the study points to the need to develop objective measures for the effectiveness of smart technology for teachers and administrators to make educated decisions about purchasing this costly technology.

CONCLUSION

Such studies with a wide scope and broad diversity open a dialogue about how smart technology in schools is further explored. The studies offer an improved understanding of the factors that must frame any discussion related to evaluating educational smart technology. Based on findings in these studies, factors of this evaluation model include: reduced cognitive load through smart technology, improved learning outcomes through smart technology, ethical issues related to technology methods, cost/benefit analysis, inclusion of open source and proprietary options in evaluation, and bias assessment in decision-making in the highly competitive sales-oriented environment.

To achieve the full benefit of smart technology for learning, objective measurement of its effectiveness and informed administrators, teachers, and students is essential. The goal is to use smart technology effectively at a minimal cost and with minimal negative impact on our students.

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