ASSESSMENT OF THE EFFECTIVENESS OF BLENDED LEARNING

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Abstract

Blended learning refers to combining digital tools with the traditional teaching-learning process. The purpose of the study was to assess the effectiveness of a blended teaching-learning environment among senior secondary students by analyzing the relationship between students' attitudes and self-regulation and the learning outcomes. A survey was administered to 300 senior secondary students to gather data on their attitudes, self-regulation, and learning outcomes. The final examination results were used to measure performance as a learning outcome. An online self-regulatory learning questionnaire was used to collect students' self-regulation data, and a self-developed instrument was used to measure their attitude. Multiple regression analysis indicated that blended learning and students' attitudes and self-regulation predicted student satisfaction as an effective outcome. The results showed that students' attitudes and self-regulation are significant predictors for learning outcomes in blended learning.

Introduction

Blended learning is a pedagogical model that incorporates several learner-centered teaching and learning styles with integrated technology. The most critical commitment of blended learning is for students to spend some part of their learning time using digital tools and the rest in traditional face-to-face mode. Blended learning allows the teacher to create the learning time with the students, promoting their students' control over their learning pace, place, and time. Teachers have been using blended learning for quite some time now, but its implementation has faced challenges for many reasons.

The effectiveness of blended learning has several underlying factors that put forward many challenges. One of the biggest challenges in the effective implementation of blended learning is how users can successfully use the technology and ensure the participants' commitment given the individual learner characteristics and encounters with technology (Hofmann, 2014). Hofmann further stated that learners getting into difficulties with technology might abandon the learning, which eventually leads to the failure of technological applications. Learners are a

critical element in any learning process. Therefore, the backgrounds and characteristics of the learner affect their ability to learn effectively in any environment.

The present study aims to assess blended learning effectiveness, which has been investigated in previous studies considering grades, course completion, and retention. Still, no studies regarding effectiveness in view of learners' attitudes and self-regulation have been taken up in the senior secondary context. Also, no studies have been undertaken on how the characteristics of learners are predictors of outcomes in planning evaluation research (Guskey, 2000) to establish blended learning effectiveness.

Kenney and Newcombe (2011) compared to establish effectiveness in view of grades and found that blended learning had a higher average score in comparison to the non-blended learning environment. examined The transformative potential of blended learning was examined by Garrison and Kanuka (2004) and indicated increased course completion rates, improved retention, and increased student satisfaction. Finally, Demirkol and Kazu (2014) made comparisons between blended learning environments to establish the difference between grade dispersions, gender performance differences, and academic achievement, and no significant differences were found between these groups.

However, blended learning effectiveness may depend on many other factors and student characteristics, design features, and learning outcomes. Research reported that the failure of learners to continue their online education has been due to family support or increased workload, in some cases leading to learner dropout (Park & Choi, 2009) or little time for study. Additionally, the inability to continue online learning is attributed to learner interactions with instructors. As cited in Park and Choi (2009), in Greer, Hudson & Paugh's study, family and peer support for learners are vital for online and face-to-face learning success. Support from all areas is required for learners in web-based courses, and this may be from family, friends, co-workers, and peers in class. Greer, Hudson, and Paugh further indicated new learners were assisted in computer use and applications by peer engagement. The authors also stated that learners need time budgeting, appropriate technology tools, and support from friends and family in web-based courses.

The present study focuses on examining the effectiveness of blended learning, taking learners' attitudes, self-regulation, and learning outcomes into consideration, and finding out if these are significant predictors of the effectiveness of blended learning.

Morris and Lim (2009) have researched learner and instructional factors influencing learning outcomes in blended learning. Apart from the variables such as gender, age, study time, etc., this study considered background aspects of the students such as family and social support, self-regulation, and attitudes towards blended learning to find out their relationship to the effectiveness of blended learning.

Literature review

This review presents research about the effectiveness of blended learning from learners' attitudes, self-regulation, and learning outcomes. It also gives the factors that are significant for blended learning effectiveness. The selected elements result from the researcher's experiences concerning learner characteristics and blended learning features in adopting technology in teaching and learning. The value flow model of Loukis, Georgiou, and Pazalo (2007) was used to evaluate e-learning and blended learning services, explicitly considering the effectiveness evaluation layer. Using this, the extent of an e-learning system usage and the educational effectiveness was assessed. In addition, as cited in Selim (2007), studies by Leidner, Jarvenpaa, Dillon, and Gunawardena have identified three main factors that affect the effectiveness of e-learning and blended learning as an instructor and student characteristics as well as technology. Heinich, Molenda, Russell, and Smaldino (2001) examined learner characteristics for effective use of instructional technology and indicated that users' characteristics impact their behavior intention to use technology. This research has dealt with learner characteristics that contribute to their performance outcomes. It has also dealt with emotional intelligence, resilience, personality type, and success in online learning(Berenson, Boyles, & Weaver, 2008). The characteristics identified in this study give another dimension, especially for blended learning in learning environment designs, and add to the specific argument on teaching and learning using technology. Lin and Vassar (2009) indicated that learners' success depends on coping with technical difficulty and technical skills in computer operations and internet navigation.

Various studies have indicated that student characteristics such as gender play significant roles in academic achievement (Oxford Group, 2013). Still, no study examines the performance of males and females as a vital factor in the effectiveness of blended learning. It has again been shown that the success of e- and blended learning is highly dependent on experience in the internet and computer applications (Picciano & Seaman, 2007). Research agrees that e-learning's and blended learning's success can mostly depend on students' and teachers'

gaining confidence and capability to participate in a blended learning environment (Hadad, 2007). Shraim and Khlaif (2010) showed in their research that 75% of students and 72% of teachers lacked skills to utilize (Lin, 2009) (Picciano, 2007) (Hadad, 2021) (Shraim, 2010) ICT-based learning components because of (Rovai, 2003) (Lynch, 2004) (Coldwell, 2008) insufficient skills and experience in computer and internet applications, which led to failure in e-learning and blended learning. Therefore, it is significant that since the use of blended learning applies high usage of computers, computer competency is required (Abubakar & Adetimirin, 2015) to prevent disappointment in employing technology in education for effective learning. Rovai, (2003) noted that learners' time management and computer are vital in the context of distance learning and established that such factors are meaningful in online classes. This is further supported by Selim (2007) that learners should possess time management skills and computer skills for effectiveness in e-learning and blended learning. Self-regulatory skills of time management can lead to better performance, and learners' ability to structure the physical learning environment can lead to efficiency in e-learning and blended learning environments. Students seek helpful assistance from peers and teachers through chats, e-mail, and face-to-face meetings for effectiveness (Lynch & Dembo, 2004).

The attitude of learners towards blended learning might lead to its effectiveness and these further shape behavioral intentions, which generally results in persistence in a learning environment, including a blended learning environment. Selim (2007) noted that the learners' attitudes towards e-learning and blended learning are success factors for the learning environments. Furthermore, no significant differences were found between female and male students and different age groups in e-learning and blended learning (Coldwell, Craig, Paterson, & Mustard, 2008). This suggests that the potential for blended learning to be effective is not hampered by gender or age differences.

Objectives of the study

1. To establish a relationship between the effectiveness of blended learning and student satisfaction and performance

2. To establish a relationship between students' attitudes and self-regulation with the effectiveness of blended learning

Method

Research design

The study applied a quantitative design where descriptive statistics were used for the students' attitude and self-regulation, regression was used for the predictors of effectiveness of blended learning, and a t-test was applied for the gender difference to determine if they are significant in blended learning effectiveness.

Participants

To participate in this study, cluster sampling was used to select 300 senior secondary students of CBSE schools in the Meerut district of Uttar Pradesh. The study population comprised 150 male students representing 50% and 150 females representing the rest 50%.

Instruments

1. Learner Performance: Results of the final school examination
2. Students' Self-Regulation: Online self-regulated learning questionnaire (Barnard, Lan, To, Paton, & Lai, 2009)
3. Students' Attitudes: Self-developed instrument

Data analysis

First, descriptive statistics were applied. The data were tested for normality using the Shapiro-Wilk test for it to qualify for parametric tests. The test results for the normality of the data before the t-test resulted in significant levels (Male = .003, female = .000), violating the normality assumption. Therefore, skewness and kurtosis were used, which resulted between −1.0 and +1.0, and thus the distribution was assumed to be sufficiently normal to qualify the data for a parametric test (Pallant, 2010). Third, an independent samples t-test was carried out to determine the difference between male and female students' performance to explain the gender characteristics in blended learning effectiveness. Finally, multiple regression analysis was conducted between student variables with learning outcomes to determine the significant predictors for the effectiveness of blended learning.

Results

A t-test was conducted to establish the performance of male and female students in the blended learning setup. The aim was to determine if male and female learners perform equally well in a blended learning environment. It was found that male students performed slightly better ($M = 65.7$) than their female counterparts ($M = 64.8$). An independent t-test revealed that the

performance difference was not statistically significant ($t = 1.569$, $df = 228$, $p = 0.05$, one-tailed).

To report the findings of all the sub-scales in the learner attitude and self-regulation, average percentages of the items making up the self-regulated learning scale were used. Results show that self-regulation was good at 75.3% in all sub-scales. The scoring lowest was task strategies at 65.7%, and the highest was learner environment structuring at 78.5%. Learner attitude towards blended learning environment was 76.9% in the sub-scales of learner autonomy, course structure, quality of instructional materials, course interface, and interactions. The least score here was the attitude to course structure at 66%, and their attitudes were high on learner autonomy and course interface at 82%.

Learner *satisfaction* was reported at 85% primarily with instructors (87%) high percentage reported on encouraging learner participation during the course of study 95%, course content (84%) with the highest being satisfied with the excellent relationship between the objectives of the course units and the content (92%), technology (74%) with a high percentage on the adequacy of the platform for the online part of the learning (80%), interactions (82%) with participation in class at 79%, and face-to-face sessions (96%).

Learners' knowledge construction was reported at 80%, with initiation and discovery scales scoring 86% with 88% particularly for discovering the learning points in the course units. In addition, learners developed reports from activities (69%), submitted solutions to discussion questions (71%), and did critiqued peer arguments (73%). Mostly, learners performed well in blended learning in the final examination, with an average pass of 69% and a standard deviation of 7.5.

A standard multiple regression analysis was carried out, taking learner attitude and self-regulation as predictor variables and learning outcomes as the criterion variable. The data were first tested for meeting the linear regression test assumptions, and the results indicated the correlations between the independent and dependent variables (highest 0.54 and lowest 0.20) as not being too high, which indicated that multicollinearity was not a problem in the model. The VIF values ranged from 1.5 to 2.6, well below the cut-off value of 10, and indicated no possibility of multicollinearity. The normal probability plot lied as a reasonably straight diagonal from bottom left to top right, showing the data's normality.

The learner characteristics (attitudes to blended learning, and self-regulation) were significant predictors of learner satisfaction in a blended learning environment. The learners' positive attitudes with the capacity to do blended learning with self-drive led to their satisfaction.

Conclusion

An effective blended learning environment is necessary for undertaking innovative pedagogical approaches through technology in teaching and learning. Examining learners' attitudes, self-regulation, and learning outcomes as factors for effectiveness can help in designing effective learning environments that involve face-to-face sessions as well as digital/online aspects. Unfortunately, none of the independent variables were identified as significant predictors of student performance. These gaps are open for further investigation to understand if they can significantly predict the effectiveness of blended learning in a similar or different learning setting. Also, the study can be extended to university students where blended learning is extensively used.

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