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Pre-service Teachers' Use and Usefulness of Blackboard Learning Management Systems for Self-Regulated Learning

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ABSTRAK

Meskipun BLB memiliki banyak aplikasi yang digunakan siswa, tidak jelas aplikasi mana yang paling banyak digunakan dan dianggap paling berguna untuk Self-Regulated Learning (SRL). Tujuan dari penelitian ini adalah untuk membangun aplikasi guru prajabatan yang paling banyak digunakan dan dianggap paling berguna untuk SRL. Studi ini menggunakan desain survei cross-sectional dengan 120 guru pra-jabatan sarjana pendidikan teknologi. Kuesioner dibagikan selama periode Pendidikan Teknologi dan dikumpulkan setelah 45 menit. Analisis Komponen Utama (PCA) menentukan sebagian besar aplikasi BLB dan kegunaannya yang dirasakan, sementara uji-t memeriksa perbedaan laki-laki dan perempuan dalam penggunaan dan kegunaan aplikasi BLB untuk SRL. Kedua tes dilakukan dengan menggunakan SPSS versi 22. Hasil utama menunjukkan setengah dari semua aplikasi BLB yang dianggap bermanfaat adalah yang paling banyak digunakan dan memiliki asosiasi positif. Tiga dari delapan menyumbang 95,69% penggunaan, sementara empat aplikasi menyumbang 73,33% variasi kegunaan. Varian muatan komponen 1-3 untuk BLB adalah: isi mata pelajaran 80,9%, penilaian 11,2%, dan 3,55%, sedangkan varian kegunaan komponen 1-4 adalah: isi mata pelajaran 26,7%, penilaian 17,9%, tugas kelas 16,1%, dan grade center 12,6%. Ada perbedaan antara jenis kelamin dalam penggunaan dan kegunaan aplikasi BLB, dengan laki-laki memimpin keduanya. Dengan demikian, penelitian ini memperluas perdebatan tentang kesenjangan gender dalam penggunaan teknologi di pendidikan tinggi.

ABSTRACT

Although BLB has many applications students use, it is not clear which applications are used most and perceived most useful for Self-Regulated Learning (SRL). The objective of this research is to establish applications pre-service teachers use most and perceive as most useful for SRL. The study used a cross-sectional survey design with 120 technology education undergraduate pre-service teachers. A questionnaire was distributed during the Technology Education period and collected after 45 minutes. Principal Component Analysis (PCA) determined the most BLB applications and their perceived usefulness, while a t-test examined male and female differences in the use and usefulness of BLB applications for SRL. Both tests were done using SPSS version 22. The major result shows half of all BLB applications perceived as useful were the ones used most and had positive associations. Three out of eight accounted for 95.69% of the use, while four applications accounted for 73.33% variances in usefulness. Component loadings 1-3 for BLB use variance were: subject content 80.9%, assessment 11.2%, and 3.55%, while usefulness components 1-4 variance were: subject content 26.7%, assessment 17.9%, class task 16.1%, and grade centre 12.6%. There were differences between gender in the use and usefulness of BLB applications, with males taking the lead in both. Thus, this study extends the debate on the gender gap in technology use in higher education.

1. INTRODUCTION

Learning Management Systems (LMS) are online facilities used worldwide. LMS are top-tier e-learning because they offer assignments, discussion, tasks, and communication between learners across the globe (Fearnley & Amora, 2020; Motlhaka, 2020). These LMS foster Self-Regulated Learning (SRL) and increase student performance (Almoeather, 2020; Hyppönen et al., 2019). The use of BLB applications by South Africa's academic staff shows instructional conditions explaining the LMS usage (Moonsamy & Govender, 2018; Wang et al., 2022). SRL strategies encompass making plans, monitoring, controlling and reflecting on cognitive processes and minimising distractions to experience high performance. Different LMS, such as Blackboard, WebCT, Moodle, Sakai, OLS, and KEWLNG Varsite, can be used in teaching and learning (Bervell & Arkorful, 2020; Santiana et al., 2021). Unlike other LMS, Blackboard (BLB) use in universities has increased significantly recently because it provides a collaborative learning environment and flexibility that enhances knowledge transfer and improves SRL (Dashtaki et al., 2020; Tschand et al., 2020). For example, studies on academic staff

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in South Africa show that instructional conditions explained LMS usage (Moonsamy & Govender, 2018). To further explore pre-service teachers and LMS, the following concepts are discussed: BLB use, BLB usefulness, BLB and SRL, theoretical framework, research gaps and contributions, research objectives, questions and hypotheses (Rizal et al., 2022; Tran et al., 2020). BLB application use in technology allows students access to documents, student reports, assignments, and announcement submissions. It helps students to link with international students to learn their culture, skills, and experiences. Blackboard LMS permits posting live chats, documents, and questions among individuals. Many universities use BLB to enhance learning (Al-khresheh, 2022; Asokan et al., 2019; Phejane, 2022). Students can access the internet and study anywhere using computers and smartphones. Quick feedback is a major advantage of using BLB, which saves time learning more content. Previous study also, revealed that students rated BLB Assessment and Course content highly (Ituma, 2011). In line with other study that investigated undergraduate nursing students' perceptions regarding BLB use (Elbasuony et al., 2018). The results show that while 74% of the undergraduate nursing students had average knowledge of BLB, 75% perceived usage of BLB applications as unsatisfactory. Other research show that students and teachers perceived BLB as useful for engineering and business courses, and they found out that students frequently use the BLB for viewing their grades, doing and submitting tests/assessments, and assignments (Alokluk, 2018; Baburajan et al., 2019). The perceived BLB usefulness can support and enhance learning that recognised the usefulness of BLB application as engagement, flexibility and self-confidence. There is also study has identified potential benefits of the BLB e-learning system increased availability, rapid feedback, enhanced communication, tracing, and skills development (Alturise, 2020). In addition, perceived usefulness was theorised as a cause of attitude to technology use and in our case is the BLB e-learning application.

BLB use and usefulness are important for pre-service teachers because it enhances their SRL. According to previous study SRL is cyclic, involving introduction, performance, and reflection (). Hence, a need to recognize BLB as a pedagogical teaching tool (Tonsmann, 2014; Zimmerman & Pons, 1990). It suggests that incorporating technology into the learning environment can transform teacher-centred to student-centred learning. However, to gain self-regulating skills, students must adopt the correct learning habits and take on their learning responsibilities. As a social learning theory, SRL links well to individuals, behaviour, and the environment. Furthermore, SRL is positively associated with motivation, academic performance, and learning (Brady et al., 2021; Hromalik & Koszalka, 2018; Schunk & DiBenedetto, 2020). Pre-service teachers studying technology using BLB applications for SRL must improve their performance.

Although 'EdTech' or 'Edutech' e-learning tools are common in South African universities, students are defied to use digital for the SRL (Alenezi, 2020; Angiolini et al., 2020). Previous research reveals that previous studies focused on academic views and models, limiting students' pedagogical focus, like self-regulation (Alokluk, 2018). Many studies show that BLB enhances SRL, but there are many BLB applications and there is no consensus as to which one is used most (Albakri & Abdulkhaleq, 2021; Badaru & Adu, 2022; Liaw & Huang, 2013; Shine & Heath, 2020). For example, previous study contend that announcements are the most used, while announcements, class tasks, and grade centres are considered the most used BLB applications (Liao et al., 2018; Onodipe et al., 2020). Currently, no empirical study on BLB applications pre-service teachers use most for enhancing their SRL. It is a knowledge gap this study seeks to fill. Therefore, the objective was to establish which applications pre-service teachers use most and perceive as most useful for their SRL. The aims of this study is to establish applications pre-service teachers use most and perceive as most useful for SRL. The researchers used the following hypotheses: 1) there are differences between male and female pre-service teachers' use of Blackboard applications for self-regulated learning; 2) there are differences between male and female pre-service teachers' perceived usefulness of Blackboard applications for self-regulated learning.

2. METHOD

The researchers adopted a theoretical framework to explain the findings regarding pre-service teachers' use and usefulness of BLB. The researchers used the Technology Acceptance Model (TAM) as the theoretical framework to explain the use and ease of technology to motivate people to use it for specific purposes. TAM postulates that individuals can decide on study content based on their behavioural intention (Granić & Marangunić, 2019; Liao et al., 2018). An individual must perceive the usefulness of the technology, in this case, the Blackboard, to predict the intention to adopt it. Technology acceptance model is show in Figure 1.

A quantitative approach was adopted to get quantifiable information to establish pre-service teachers' most use and perceived usefulness of Blackboard applications (Fox & Bayat, 2007). A cross-sectional survey design was used to gather information because the design provides a quick summary of respondents' thoughts at that given time (Setia, 2016; Sindiani et al., 2020). To determine the sample, the researchers used the Raosoft Software formula below with a population of 174 pre-service teachers to get a sample of 120: males 64 and females 64 and their ages ranging from 18 to 22 with a mean of 19.

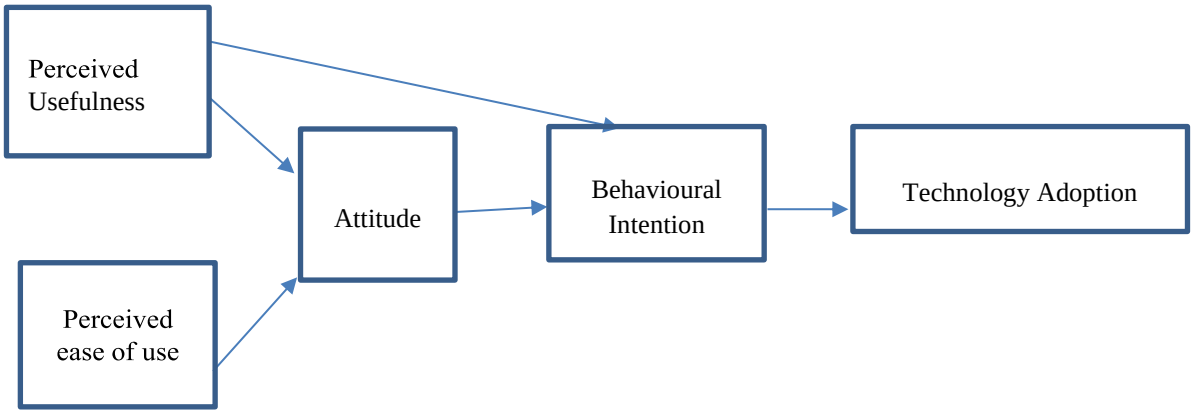

Figure 1. Technology Acceptance Model

A questionnaire was designed by the researchers using the literature. The questionnaire had four sections. The first section contained questions about students' gender and age, and the second section had 9 items dealing with students' frequent BLB applications. Each item was rated as 1 = used every day; 2 = used once a while; 3 = rarely used. Similarly, the third section comprised 9 items that deal with the perceived usefulness of various BLB applications in supporting SRL. Each item was rated as 1 = very useful, 2 = somewhat useful, and 3 = not useful. Two experts from the University checked the questionnaire's face validity, and their comments were considered before piloting. The questionnaire was piloted on 35 students who did not join the study, and a Cronbach Alpha of .87 was obtained. The questionnaire was considered reliable since its value was greater than 0.70 and was suitable for the study (Hair et al., 2019).

Data was collected using a survey questionnaire distributed to pre-service teachers studying BLB to enhance their SRL. During their study, BLB was used to initiate SRL among pre-service teachers, teaching them how to teach themselves (Miller, 1956; Shine & Heath, 2020). To achieve SRL, the second author used strategies the enhance SRL: chunking, where incremental bits of concepts and themes were posted to enhance attention span and retention; flipped learning (Zarrinfard et al., 2021), which involved outside the classroom reading materials, videos, online lectures posted on blackboard, which improves students' critical thinking skills (Hart et al., 2021; Tegeh et al., 2022); and microlearning where students learnt course content gauged at their cognitive level to enhance SRL (Major & Calandrino, 2018). In addition, pre-service teachers needed this course which offered the practice of all applications to become competent teachers. Data were analysed using a Principal Component Analysis (PCA) to determine the most used BLB applications for questions one and two and a t-test to identify gender differences in the use and usefulness of Blackboard applications for SRL. The Statistical Package for Social Sciences (SPSS) Version 22 was used as a tool.

3. RESULT AND DISCUSSION

Result

The major result were half of all BLB applications perceived as useful were also used most and had positive associations. The PCA show seven components: three for use and four for usefulness, accounting for 95.69% and 73.33% variances, respectively. Based on component loading for BLB use applications, subject content accounted for 80.9%, component 2, assessment, was explained by 11.2%, and component 3 accounted for 3.55. For the usefulness of BLB applications, the first four components had a total variance of 73.33%. The four components and their variance contribution are Subject content 26.7%, assessment 17.9%, class task 16.1%, and grade centre 12.6%. For question three, the results show differences between males and females in the use and usefulness of BLB. Considering the use of BLB applications, eigenvalues greater than 1 explaining a scree plot and a 3D.

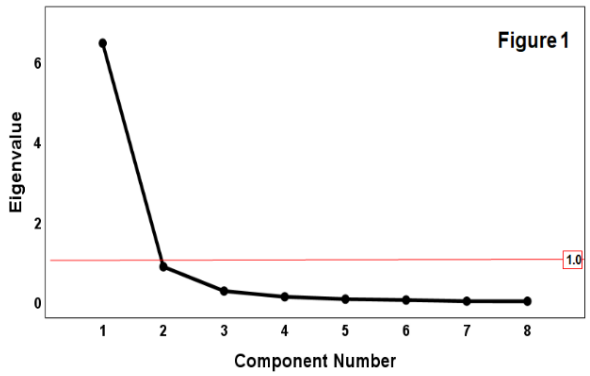

Figure 2. Blackboard Applications Used for Promoting Self-Regulated Learning

Figure 2 shows three components from the factor loading and appears with high values on the scree plot before flattening at eigenvalues 0.6. Then the other component of Blackboard applications is show in Figure 3.

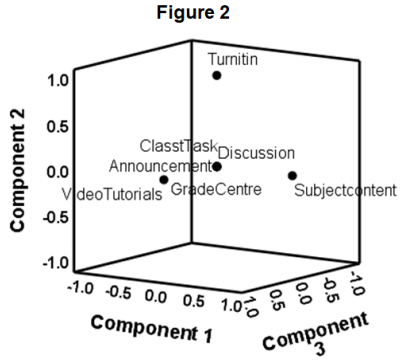

Figure 3. Components of Blackboard Applications Used for Promoting Self-Regulated Learning

Based on Figure 3, the components like discussion and announcement show association, whereas subject content had the highest values in component 1. Considering the usefulness of BLB applications, eigenvalues greater than 1 explaining a scree plot and a 3D are presented in Figure 4.

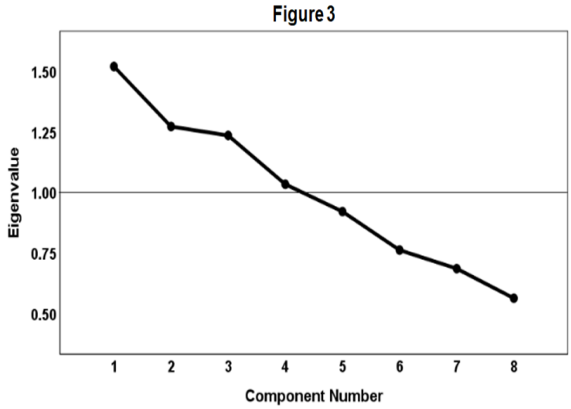

Figure 4. Blackboard Applications Usefulness for Promoting Self-Regulated Learning

Figure 4 shows the usefulness of BLB applications. The first four factors have variances (eigenvalues) greater than 1: Subject content, 26.7%; Assessment, 17.9%; Class task, 16.1%; and Grade centre, 12.6%). There was an association between discussion and grade centre as show in Figure 5.

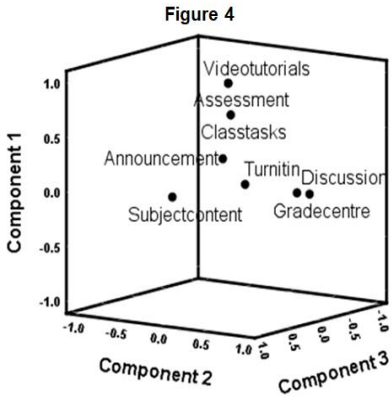

Figure 5. Association Between Discussion and Grade Centre

A t-test was conducted to answer research question 3, dealing with the use and usefulness of BLB among male and female pre-service teachers as show in Table 1.

Table 1. Gender Difference in the Use and Usefulness of Blackboard Applications for Promoting Self-Regulated Learning

Item	Gender	No	M	SD	t	df	p-alue	Hypotheses
Use	Male	64	1.75	.41	-6.180	14	0.000	Reject
	Female	56	1.14	.38		13.92	0.000	Reject
Useful	Male	64	1.36	.21	-7.048	14	0.000	Reject
	Female	56	1.33	.34		11.48	0.000	Reject

Base on Table 1, T-test results show significant differences amongst male students (M = 1.75, SD = 0.41) and female students (M = 1.14, SD = 0.38; which were identified on the scores for the use of BLB applications. Similarly, significant differences amongst male students (M = 1.36, SD = 0.21) and female students (M = 1.33, SD = 0.34), with males leading in the use and the perceived usefulness. Hence, the null hypothesis is rejected in both cases.

Discussion

The objective was to explore pre-service teachers' most used and usefulness of BLB applications and gender differences among males and females in enhancing SRL. The major result were that half of all BLB applications perceived as useful were the ones used most and had positive associations. The major result shows that the most perceived usefulness BLB applications were the ones used most frequently. Out of 8 BLB applications, Announcements, Class tasks, and Grade centres were used most, accounting for 95.69% of the variance. It means that announcements from lecturers are vital for the coursework, and it implies that BLB applications should benefit the lecturers and the students since they are co-participants in LMS (Fioletov et al., 2022; Kwon et al., 2021). Class tasks help students better plan, manage their learning activities, manage their time effectively, and adopt different learning styles. These results agree with TAM (), which posits that adopting technology depends on Perceived Use (PU) and intent of use (Davis, 1985; Granić & Marangunić, 2019).

Similarly, previous study stated that the announcement BLB application is used most because it reminds students of what to accomplish and the due dates of the assignments to manage their workloads (Onodipe et al., 2020). Grade centres accessed on the BLB application are similar to virtual learning, which has been reported to improve academic performance (Baker et al., 2020; Kerr-Sims & Baker, 2021). Hence, students enhance their SRL and improve their performance (Almoeather, 2020; Hyppönen et al., 2019). Four dominant BLB applications in usefulness were announcement, class task, grade centre and discussion, explained by 73.1% of the variance. It implies that four out of eight BLB applications are useful in promoting SRL. Again, the scree plot trend shows that other BLB applications were useful to a limited extent. These findings are consistent with assertion that interactions among students and the usefulness of technology forecast enhanced SRL and mirror TAM in that one's perceived usefulness of technology predicts the intention to adopt it. Similarly, discussion, grade centre, and video strongly correlate. Interestingly, announcements, class tasks, and grade centres were dominant in their use and usefulness. It signifies that perceived usefulness influences the use of these BLB applications for SRL. These findings agree with previous studies who contend that the perceived usefulness and use of the technology, in this case, the Blackboard applications, predicts the intention to adopt it (Baburajan et al., 2019; Liao et al., 2018; Ofori et al., 2020). Also, agree with other study which have shown that 5 BLB

applications were used most by the university academics in Taiwan, where assessment and administration were accessed most, but factors for their being most used are not yet known, and the authors recommended further studies (Whiting et al., 2021). The results show an association between subject content and assessment. Subject content featured strongly in component 1 but with no association with announcements and class tasks, suggesting that students use BLB applications to enhance their content knowledge. This observation suggests that subject content provides learning materials based on assessment for the student's course grade. This observation parallels with study who found that most students use BLB Subject content and Assessment applications because the content is what they study and is the same assessed content (Araka et al., 2021). It means that students spend time on specific applications, which is in line with other study who contends that there is a link between the time students spend using LMS and their grades (Darko, 2022). It is no wonder students use both applications. Since students focus on acquiring content, our findings can be generalised to other students from different parts of the globe seeking to learn content. Also, the Assignment and Grade centre was used frequently. It implies that after learners post their assignments, they look forward to receiving feedback.

The association between discussion and grade centres suggests that students engage in discussion when they see trends in their grades from the grade centres. It is not surprising because different authors reported similar findings among students (Eldridge, 2014; Liao et al., 2018; Motlhaka, 2020; Ofori et al., 2020). Similarly, other study in Kentucky in the United States of America has shown that student discussions improve their grades. It implies that these applications enhance SRL (Albakri & Abdulkhaleq, 2021). Most pre-service teachers improved their SRL when studying the module, suggesting that materials posted on BLB applications were within their cognitive level not to lose interest. This observation agrees with other study that using some applications impacts pre-service teachers' behaviour in self-regulating their study patterns, and this change in the pattern will improve human resources in the workplace (Alkhasawnh & Alqahtani, 2019; Dishon & Gilead, 2020; Major & Calandrino, 2018). The study established differences in the use and usefulness of BLB applications for promoting SRL among male and female pre-service teachers. Therefore, we accept hypotheses one and two. These results suggest that pre-service teachers' gender differs significantly in the use and usefulness of BLB applications. These results are similar to previous studies who reported that technology use was found to exhibit differences among gender (Al-Naibi et al., 2015; Al Shammari, 2021; Zimmerman & Pons, 1990).

In contrast, previous study found that male students used more BLB applications than females, and this may be due to the gender-biased instructors, and hence the contrast reported (Ofori et al., 2020). Nevertheless, this needs further study. This study enriches the literature by responding to previous study state that there is a need for an empirical study to determine which BLB applications are used most for SRL (Al-Dawood, 2022). This study established that the most used BLB applications are also the ones that are perceived to be useful. It extends the debate on the gender gap in technology use in higher education. Finally, the novelty of this study is that few BLB applications are used most and not others for SRL. The implications are that lecruers need innovative ways to motivate students to use all BLB applications for SRL development.

4. CONCLUSION

This study established that BLB applications perceived as useful are the same applications pre-service teachers used most for SRL. It implies that pre-service teachers' perceptions of BLB usefulness determine the use. While the current research findings highlight gender differences in the use and perceived usefulness of BLB applications, it is difficult to establish whether the differences result from their attitudes or experiences in engaging the BLB applications. However, what cannot be ignored is the digital gender divide, which still exists and needs to be addressed. The limitations are the few samples and the lack of qualitative data; therefore, a large sample could be used using a qualitative study.

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