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The effectiveness of using blended learning on learning outcomes and motivation

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Abstract

Blended learning is an educational model offered through traditional learning methods and digital networks to share knowledge and education resources between instructors and learners. Besides, blended learning provides learning courses accessed through digital platforms and gadgets utilizing online technologies such as smartphones, tablets, laptops, and personal computers. Denoted as e-learning, these platforms are important in teaching and training students through the internet and wireless technologies. In any course, offering online learning plays a great role because e-learning provides the students the opportunities of developing their capabilities, specifically in information science courses. In modern education, digital learning is becoming a gradually popular option. The classroom settings moved online from full digital courses to classes held remotely. However, effective communication in a digital learning environment may be hard, particularly when digital learning transition is unplanned or has been sudden. Making such massive overhauls are confusing and frustrating for the teachers, learners, and parents.

Nevertheless, digital learning communication can be made easier with the right resource. This research explores the blended learning environment effectiveness by evaluating the relationships between design features, student backgrounds or attributes, and learning outcomes. The paper's objective is to determine the important blended learning effectiveness indicators, taking learning outcomes as dependent variables and design features and learner background or attributes as independent variables. Results of multiple regression analyses indicated learner attributes such as self-regulation and attitudes and traits of blended learning designs such as one-on-one support, technology quality, and online tools forecasted students' satisfaction as an outcome. The findings show that design characteristics and student traits are important indicators for student learning outcomes in blended learning.

Introduction

Blended learning is a strategy to learning that integrates traditional place-based classroom approaches with online education materials and opportunities for online interactions. Blended learning needs the physical presence of both teachers and students, with certain aspects of learner control over speed, path, place, or time. The present period is characterized by speedy transformation originating from technological and scientific advancements, including IT (information technologies). In the education systems, keeping up with these transformations to cope with challenges that can originate from them, like growth in the number of students and big volumes of information, together with shortages of teachers. In science and technology, these transformations ushered in multiple learning and teaching approaches, like blended learning (BL) and e-learning, especially in IT revolutions and self-development and research domains that have nearly changed the universe into a global village.

Blended learning is a contemporary educational approach that has increasingly replaced online learning in many learning institutions. Blended learning is a scientifically acceptable and logical option to online learning. It integrates more sophisticated education types, has greater yields, and is less expensive. BL is a term that describes different attempts made by educators to integrate the technical elements into the traditional class environment, due to the efficiencies these arrangements bring. The objective of blended learning is to create interactive learning settings, leading to the mixing or blending of teachers' roles in traditional classrooms with those in e-learning environments. In blended learning, the technologies used are usually aimed at generating optimum performances by learners. BL systems are aimed at promoting education by enabling the incorporation of educational concepts and visual cues. While augmenting interactions among subject players, the applications of virtual environments act to capture the attention of the students.

While indirect learning simultaneously takes place within traditional classrooms, BL integrates indirect and direct e-learning forms and often involves the intranet and the internet.

Among other, components applied in BL are FAQ, web-based tests, simulations, and emails. Three major models, namely, competency-based, skilled-oriented, and attitude-based can be used in blended learning. Each model entails the overviews of topics to be covered. Also, they involve the announcements of the initiatives which shall be involved in the delivery of educational ideas during classroom sessions. While teachers and class training sessions offer intermediate fundamental education, learning programs that provide research resources and study materials directly on the internet would be an example of this blending type.

The learning and teaching environments are embracing various technologies (Ahmad and Al-Khanjari, 2011). Some of these involve the application of technological innovations via blended learning. Blended learning embraces these innovative pedagogical approaches. Part of these innovations is the introduction of blended learning initiatives (Arbaugh, 2000). Blended learning combines online and face-to-face learning and teaching. For blended learning to be a successful innovation in learning and teaching, its uptake faces challenges, especially in the emerging economies. The effectiveness of blended learning has various underlying aspects that pose problems. In any learning process, students are important partners. Thus the characteristics and backgrounds of students influence their abilities to continue with learning efficiently (Abubakar and Adetimirin 2015). The design instruments to be applied can interrupt the effectiveness of blended learning.

Considering graduation rates, retention, course completion, and grades, this research investigates the effectiveness of blended learning on learning outcomes and motivation (Anderson, 2008). The backgrounds and characteristics of students studied for blended learning effectiveness include age,

gender, attitude to blended learning, families and social supports, workload management, computer competencies, and self-regulation (Astleitner, 2000). While outcomes considered include knowledge building, intrinsic motivation, performance, and satisfaction, the researcher investigated technology quality's blended learning design characteristics, learning management system instruments, face-to-face supports, and learner interactions. Identifying the important indicators of blended learning outcomes will assist in informing planners of the education environment to set the essential foundation for developing blended learning as an innovative pedagogical strategy.

Society and technological advancements play vital roles in the transformations of learning approaches. Studies indicate that online and internet-oriented programs are well customized toward pedagogy-based changes (Mali & Lim, 2021). Investigations show that internet-based learning appears to be more collegial and information than learning based on face-to-face structural approaches. Therefore, the authority traditions have been challenged in the education systems. The study plan on blended learning methods is wide-ranging. Apart from strategies and styles, they refer to the management of sustainable transformations.

Subject

In the current globalization era, the education world is should prepare people to show their superiority that is independent, intelligent, and creative (Abubakar and Adetimirin 2015). Quality education should include two scopes, namely fundamental skills orientation and academic orientation. While life skills orientation offers learners with provisions to be capable of surviving in real-life, academic orientation concentrates on learners. In higher education, the learning systems must be capable of offering opportunities for learners to optimally develop and improve their potentials. It is worth noting that the methods used in blended learning can stimulate the

talents and potentials of learners to cover the technological development challenges and students' needs. Such situations encourage different universities, colleges, and schools to use different systems strategies in education approaches (Anderson, 2008). The approaches applied by using different techniques and media types improve the learning flexibility and effectiveness.

BL aims at utilizing modern technologies in education without doing away with the basic educational situations and class attendances (Anderson, 2008). Blended learning pays attention to direct interactions in the classrooms through the applications of modern communication initiatives, like internet portals, computers, and networks. Social presence provided in the learning settings encourages questions and thus offers media through which clarification can be made in an efficient and timely way. Such education can be explained as a manner of organizing educational experiences, information, and attitudes that are offered for the students via multimedia provided by information or modern technologies. This learning type is characterized by its ability to minimize costs, time and efforts, through the information delivery to students as fast as possible. While offering attractive learning environments, BL enables learning process control and management, the measurements and evaluations of students' performances, and the improvements of the overall educational attainment levels in a way.

Blended learning can play a vital role in increasing the education performances of students (Ahmad and Al-Khanjari, 2011). Blended learning has multiple benefits such as overcoming the lasting change problem in the contents of educational materials; having the ability to combine different potentials for different universities, colleges, and schools in productive ways; allowing learning groups to use all internet data collaborative software, virtual libraries, emails, and multimedia; developing educators' role as mentors and leaders to their learners regarding their knowledge in networks of domestic and global information and computers, in addition to being producers instead

of expertise importers; and making domestic and international networks of information and computers available for students.

Various learning institutions have implemented blended learning, especially during this COVID-19 pandemic period, to encourage interactive learning (Mali & Lim, 2021). Instead, only practical tasks determined by best practice studies are applied in the blended learning devices. Cultural factors are normally seen as critically significant among various matters currently investigated in ICT. When the learners are comfortable with blended learning technologies and culture, they positively contribute to learning activities (Sefriani et al., 2021). Teachers are the key to the success of online and blended learning experiences. Teachers play a role in ensuring positive experiences among students during e-learning and blended learning. The significance of management and technical functions and social and intellectual competencies of blended learning instructors are vital factors for the effectiveness of interaction and discussion in online learning settings. In implementing blended learning and applying online learning in schools and higher education institutions, technical support, lecture characteristics, information quality, and system quality play important roles (Mali & Lim, 2021). The learners are more accommodative toward online and blended learning. Lecturers should thus adapt their teaching styles to create more interactive learning for students.

In a tech-savvy world, blended learning is a natural consequence (Graham, 2013). Advancements in technology have removed the traditional mode of instructions as the sole means of education. Physical presence is inconsequential provided you have good connectivity and appropriate devices. The globe has incorporated digital and technology into traditional classroom learning (Barnard et al., 2009). Therefore, blended learning is an outcome of technology where students can access education globally. Blended learning alludes to a fusion of two systems of education.

It involves the incorporation of internet-based instructions and face-to-face to learning. Students are now enrolled in a hybrid system that alternates between in-person learning and online learning. The system has gained prominence in the wake of the Covid-19 pandemic (Beard, Harper, and Riley, 2004). In the educator sector, the integration of internet-based learning and face-to-face education is the new norm.

Synchronous learning mirrors blended learning. Under synchronous, students and instructors must be in the same place, at the same time, for learning to take place (Finol, 2020). It borrows from blended learning since it offers physical classes where online classes must be live. A distinctive feature is a session is a fixed, regular time commitment that cannot be rescheduled (Scheiderer, 2021). The system entails learning a holistic approach where students are instructed and given problems to solve guided by their teacher all at one go (Berenson, Boyles, and Weaver, 2008). The basis in a unified learning approach happens in a single sitting.

The flipped classroom is also a facet of blended learning. Its implementation is two-pronged. Therefore, this sums up the flipped classroom approach. Institutions should consider these methods of learning. On full application, the quality of education is more interactive and gainful to the learners. However, regard should be paid to individual circumstances of the school, teacher, and learner (Ahmad and Al-Khanjari, 2011). Ultimately, education is set to undergo transformational change fueled by technology.

The main objectives of blended learning proponents have not changed to a large extent (Abubakar and Adetimirin 2015). However, it is notable that the context of their actions has changed significantly. The study takes note of the fact that society is oriented towards technology and driven by knowledge. For this reason, it is important to tap into the immense possibilities that come with eLearning to enhance the effectiveness and outcome of the blended learning systems (Anderson,

2008). Moreover, studies reveal that blended learning technologies tend to improve learning quality, improve responsibility for learning, and increase collaboration on peer-to-peer.

Even though there are studies that have been done in an exaggerated and shadowy manner, it is not lost that the importance of the blended learning approach has been emphasized (Askar and Altun, 2008). Whereas it is a fact that there is still more research needed, nothing so far has been found out of the ordinary. For instance, there is the incorporation of technological digitization into an environment centered on the student and set up in a format anchored on promoting blended learning philosophies and strategies. Whereas the study presents great opportunities to delve into insights into blended learning approaches, the major limitations to the study are too many empirical and theoretical propositions that add to more complexity (Blocher and Tucker, 2001). This makes it difficult for one to receive guidance on issues central to carrying out an effective study based on a specific theoretical framework.

The teaching practice improvements have been traditionally left to individual educators working in isolation, maybe cooperating in lecture-based sessions, workshops, and seminars (Cohen 2012). But the results have been unpromising as hoped. The new blended learning presently being advocated attributes professional developments as intentional and systemic processes involving the communal learning members, with a precise concentration on the learner education improvements (Coldwell et al., 2008). Current expert development efforts have moved away from training skills to establish new practices of risk-taking, collegiality, and experimentations by fostering common vocabularies, open discussions of matters, and shared understanding to reach this end (DeLone and McLean, 2003). This development form is founded on the assumption that educators are responsible and productive professional community members who promote their renewals and the renewals of their schools through active community participation. Current

suggestions for accomplishing high-quality teachers' professional developments include establishing professional learning communities where all educational community members such as staff members, school administrators, communities, parents, teachers, and students are both teachers and learners (Eom, Wen, and Ashill, 2006). Effective ways of establishing professional learning communities, especially for the development of teachers, are to develop a blended learning process in schools.

One can conclude that the more consistent feedback obtained from the blended learning assists the teacher in incorporating methods into their teaching catalogs since cognitive coaching dyads accomplish greater proficiency in the targeted goals than those getting conventional supervision. The group on attitude measures where the control group made the least positive responses were associated with getting information about their instructional tasks. Blended learning fosters self-directed learning and autonomy and allows students to collaborate with their peers (Arbaugh, 2000). It offers learners more time to interact and learn from their peers. Additionally, they can feel more confident and less anxious when interacting with fellow students during debates.

The classroom physical components are applying teaching techniques and procedures that foster efficient and safe learning environments (Astleitner, 2000). Behavioral expectations and disciplinary approaches are central to this system. The instructors' managerial styles may change as students age to help them learn self-guided learning. Blended learning ensures that teachers remove all distracting and unnecessary objects from their classrooms. Also, it ensures that the class is free from hazards (Finally, 2020). In blended learning, the teachers embrace cultural diversity, enabling the children to acquire cultural care, which has a multiethnic and global view and is diversity sensitive. Using plants, screens, bookcases, and other furniture, the teacher can create both well-lit areas in the classroom. While visiting learning areas and another unique class center,

the educators offer opportunities for learners to move around (Garrison and Kanuka, 2004). Blended learning ensures that the teachers assist the learners to feel safe, and where possible, trusting. This helps to seek out positive bonds with other people and develop social intelligence. Teachers can only be individuals who assist these learners learn what supportive and healthy relationships feel like. Establishing and building positive relationships involve simple teaching practices like using oneself as a role model of a regulated and reliable adult, getting to understand the learners as individuals, and smiling (Kazu and Demirkol, 2014). The physical layouts and look of the classrooms can be utilized to establish positive emotions in blended learning. Creating positive quotes and visuals can motivate teamwork and creative thinking in the learners. Teaching strengths in classrooms can improve achievements and well-being (Graham 2013). All students need opportunities of identifying, recognize, practicing and use their character strengths such as bravery, creativity, humor, and kindness.

In blended learning, technology knowledge is an important element (Abubakar and Adetimirin 2015). Integrating blended learning would be hard for the teachers and students who are computer or technology illiterate. Before integrating blended learning technologies, the teachers and students would have to be trained and educated first. The learners and teachers are expected to be conversant with digital technologies such as chatting through the internet, using Zoom, and mastering the learning management systems (Ahmad and Al-Khanjari, 2011). Important sections of the blended learning settings are examinations and assignment submissions. Collaborative learning offers new opportunities and challenges in terms of supporting skills development and separation of the products and processes of collaborations (Anderson, 2008). Collaboration and cooperation among the teachers and universities allow learners to expand and enrich their understandings of blended learning. The blended learning setting should be designed so that

learners are provided with opportunities to choose what to learn, encouraged to interact with their peers and teachers, and given appropriate support (Arbaugh, 2000). The self-learning ideas are rooted in the philosophy that students' education is more effective when it occurs within practical experience contexts and when the learners understand the educational objectives.

Students have appreciated the opportunities offered by blended learning, how blended learning supports learning, accommodating their learning situations and requirements, and promoting communication (Askar and Altun, 2008). Blended learning has helped meet the demands of learning during this COVID-19 pandemic. However, there are some challenges Blended learning is facing that originates from the information diversity accessible via ICT. Improvements can be made through training, specialized staff, and planning. Most barriers to Blended learning arise from infrastructural weakness and lack of online learning acceptance (Kazu and Demirkol, 2014). Higher education institutions such as colleges and universities can deal with most identified problems in products and infrastructures as they work closely with the community and private sector.

In education sectors that use e-learning technologies, educators are the major players in an educational context (Mahalli et al., 2019). Thus, teachers' knowledge aspects need to be considered important and should be included in the technology acceptance models and implementation of online learning in schools and other learning institutions such as colleges and universities. The knowledge variables have been identified conceptually and tested empirically. Besides information validity and authenticity, inadequate support from school management and lack of training in applying online learning technologies are some reasons for failures to integrate e-learning (Scheiderer, 2021). The important incorporation integration of technology as a tool to facilitate teaching and learning has challenged most teachers globally.

Advancements in blended learning have made learning more collaborative and interactive (Ahmad and Al-Khanjari, 2011). Collaborative and cooperative learning activities effectively promote the enthusiastic exchange of important concepts and information among online students. Methods such as social media groups and video-conferencing can make online learning more interactive and enjoyable, thus improving equitable sharing of ideas, experiences, and skills in education (Anderson, 2008). Social media platforms enable students to access a wide variety of essential information and learning materials at all times. Because most of the information is available on the internet, online creation continues to simplify learning. Social media platforms have enhanced distancing learning because tutors can hold useful online classes (Abubakar and Adetimirin 2015). Media like social media platforms such as Facebook and YouTube continue to substitute the obligatory need to read textbooks and sit down for lectures, making learning more fun and convenient.

The blended learning approach can assist the teachers in engaging students in thought-provoking STEM fields needed for the future workforce (Astleitner, 2000). The implementation of blended learning at the early stages of education can help create a foundation for the belief in students in support of the technology and science approaches. The blended learning approach is used as a tool in the problem-based learning system. It assists in expressing the concepts of student teachers through the medium of technology using creative methods. The connection between learning knowledge and belief is evident in students' development and learning.

The absence of blending learning will retard missing gaps between actual achievement levels and demands (Graham 2013). Blended learning is student-oriented. As student-based learning and teaching, blended learning concentrate on learning styles, interests, abilities, and needs of the learners and have various implications for courses, curricula design, and course interactivity (Kazu

and Demirkol, 2014). Teaching and learning are customized to the maximum viable level to capitalize on this. In these programs, teachers can have more prospects through educator practicum courses to establish reflective learning communities; supervise or lead teachers and other staff members, and design need-based and customized curricula for special programs. The present teaching practicum course seems to execute more traditional, structural, and guided formats for the courses' types that involve feedback and faculty observations-supervisions (Scheiderer, 2021). Blended education, by its nature, prepares students with all they require for a lifetime of work in the classrooms.

Current suggestions for accomplishing high-quality students' professional developments include establishing professional learning settings in which all educational community members such as staff members, school administrators, communities, parents, teachers, and students are both teachers and learners (Mahalli et al., 2019). Effective ways of establishing professional learning settings, especially for the development of students, are to develop a blended learning process in schools. There can be more prospects for teachers in blended learning programs through educator practicum courses to establish reflective learning communities; supervise or lead teachers and other staff members; to design need-based and customized curricula for special programs. The present teaching practicum course seems to execute more traditional, structural, and guided formats for the courses' types that involve feedback and faculty observations-supervisions. The courses might aim to establish reflective learning settings considering recent development in blended learning practices in the field (Arbaugh, 2000). Teachers would also prepare as reflective practitioners through cognitive coaching because they afford special benefits that cannot be just coordinated in other kinds of experience. Carrying lecture room studies with other educators with similar interests to reflect on teaching practices is important for student development (Ahmad and

Al-Khanjari, 2011). Most students shall gain from utilizing models for communicating successfully when reflecting on enhancing education performances in thoughtful learning settings and initiating dialogues with colleagues.

One approach for student development in blended learning, especially well-matched to creating a contemplative learning setting, is cognitive coaching (Abubakar and Adetimirin 2015). Cognitive coaching is the process where two or more students cooperate out and in classrooms to watch each other work with teachers, plan instructions, and develop support materials. Cognitive coaching is based on classroom observations accompanied by feedback (Anderson, 2008). It is non-evaluative. It is purposed to enhance particular instructional methods. Also, mental coaching is a process where groups of students frequently observe one another to offer support, assistance, and suggestions introduced cognitive training as a tool for knowledgeable learners to apply the skills acquired during work-related coaching in their classes (Askar and Altun, 2008). Furthermore, studies showed wide reinforcement for cognitive training executions to offer training transfers to classroom practices, fostering the development of reflective learners and collegiality through feedback exchange of peers.

The use of blended education has many advantages in comparison to its disadvantages (Graham 2013). The use of blended education practices in the classrooms can help the teachers deliver a high level of education that supports the actual need for learning displayed by the students. The use of blended education lets the teachers explain all of their understandings through the interactive sessions that provide more insight and guidance about the study (Kazu and Demirkol, 2014). Blended learning has become more inclined to project-based learning rather than theoretical learning. Thus, the teachers have to prepare various projects that integrate students' mathematics, technology, science, art, reading, and engineering skills. They can precisely assess students'

performance based on the education provided by a teacher (Scheiderer, 2021). Training session of blended learning has been developed so well that now the sessions include training on key skills of student teachers where they are given lectures on proactive and critical thinking skills. Additionally, the sessions are more engaging and demonstrative than interactive and discussion-based. This way, the teacher can learn key and implement these skills in the classroom to get a qualitative outcome from learners (Scheiderer, 2021). Student teachers' abilities must include proactiveness and critical thinking as these skills give them an edge in delivering the best possible lecture. The rapid grasping ability of students has made the student teachers learn the knowledge of critical thinking and proactiveness.

Conclusion and Recommendations

Effective blended learning environments are essential in undertaking innovative pedagogical methods via the applications of technologies in learning and teaching. Investigations of design characteristics, backgrounds, and attributes of learners and learning outcomes as aspects for blended learning effectiveness can inform the designs of effective learning environments that involve online elements and face-to-face sessions. The majority of blended learning design characteristics and student attributes handled in this research are vital aspects for the effectiveness of blended learning.

Blended learning is described as education applying diverse methods linked together to teach a specific substance. These means can include combinations of direct lecturing in self-learning, auditoriums and online communications. BL adds online learning via the internet and blends different educational computer patterns. Together with traditional learning in which the teachers have the greatest roles, blended learning includes e-mail services. However, blended learning has various limitations such as insufficient technical accessibility that can lead to resource wastage.

Other concerns are technical challenges including high maintenance costs and poor internet connectivity. Also, blended learning can be challenging for teachers because it requires time for both preparations and evaluations. Credibility and plagiarism can also pose main challenges, particularly for the students. Schools offering blended learning can use the following approaches to enhance online learning in different courses.

Provisions of regular interactions and extensive learning resources to students

The schools and other higher education institutions should explain the goals, objectives and expected results of different courses to all learners enrolled in the online learning courses, such as computer and data science courses. Outlining the goals, objectives, and expected results will enable students to develop a precise understanding of the courses to be learned. Therefore, the students will be psychologically prepared to undertake the courses. The mental preparation will help the learners to set their education contracts. The schools and higher education institutions should focus on regular interaction between the lecturers and the students who use the e-learning sites. The should be regular and effective communications between the lecturers and learned to establish connections. Regular and effective communications among the teachers and students greatly improve their relationship and engagement. Thus, great contact and attention will enhance online learning, leading to the attainment of educational objectives and goals.

In e-learning education, various educational resources need to be provided to expose students to dynamic and suitable resources and sources. E-books, online lecture notes, online journals, published reviewed journals, and magazines are resources. Such sources will provide information for scholars accessing online learning abroad for different courses, offering the scholars a wide range of educational materials to improve their expertise and knowledge.

Integrating flexibility and visualization tools

The e-learning process and service flexibility like learner and teacher interaction sessions, class timetables, and access to resources need to be created to change the future. Today, the globe is driven by data dynamics. Therefore, online courses need regular revisions and modifications in ensuring their flexibility and consistency to the changes.

In online courses, words and texts deter the simplification of the course presented to the learners. The schools and higher education institutions should consider using visualization tools to avoid this and promote presentations of the course resources, including the learning objectives, goals, and results. Besides, it can improve the presentation of complex ideas and concepts to students by interpreting data and information through visual tools such as graphs, pictures, charts, animations, videos, and annotation.

Encouraging online group works among students and Enhancement of online assessment processes.

Collaborative and cooperative learning activities effectively promote the enthusiastic exchange of important concepts and information among online students. Methods such as social media groups and video-conferencing can make online learning more interactive and enjoyable, thus improving equitable sharing of ideas, experiences, and skills in education.

The learner's progress needs to be assessed to examine the levels of comprehension and measure the knowledge learners have as they learn. This ensures quality learning. This can be carried out through continuous assessment tests, mid-semester and end-semester exams. Besides, educators' assessments should provide the students are taught and trained in line with the outlined standards. This can be conducted through paper or online assessments.

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