

REVIEW ARTICLE

Evaluation of Hybrid Instructional Learning for Effective Academic Achievement among University Students: A Case Study of Educational Technology Students at Federal University Oye-Ekiti, Nigeria

Stephen Olanrewaju ONI*, Sunday Alechenu OBIABO, AFOLABI Anthony Oladele, Audu Godwin

Department of Science Education, Federal University, Oye-Ekiti, Ekiti State, Nigeria

ABSTRACT

Students' learning experiences have become more flexible both domestically and internationally in recent years as socioeconomic constraints on higher education sectors have tightened. We just started a Blended Learning Initiative to provide greater freedom and better learning support to our students. Thus, the focus of this research was on integrated learning resources for university students' academic achievement using a case study on students pursuing educational technology at the Federal University of Oye-Ekiti. The study's specific goals were to identify the various information sources that students have access to; determine the purpose of information for academic effectiveness; assess how frequently respondents use different information sources; and identify the barriers that limit respondents' access to sources of information about agricultural science education. The study's population consisted of all 134 students from the Educational Technology unit of the Department of Science Education at Federal University of Oye Ekiti. The data collected were evaluated using frequency counts, simple percentages, and weighted mean scores. The survey found that respondents mostly rely on lecture notes ($\bar{x} = 4.53$), the Internet/online ($\bar{x} = 4.42$), and lecturers ($\bar{x} = 4.36$) for information. The study revealed that information variation and adoption contribute significantly to the improvement of academic standards at the tertiary Federal University of Oye-Ekiti, and that students are more satisfied with electronic sources of information. The study found limitations such as insufficient current/relevant reading materials and poor guidance/assistance from librarians as limiting students' access to agricultural science-based knowledge. The study recommended that: continuous training on the use of the library and information be embarked by the University librarians as part of the students' orientation program; that the learner make use of user-friendly and accessible technology that enhances its simplicity in usage; and those individuals and other corporate organizations are enjoined to provide information-resource centers, as functional ICT/internet facilities to enhance students' academic development in education.

Keywords: Hybrid instructional learning; Effective academic achievement; University students

INTRODUCTION

Hybrid learning, also known as blended instructional media, combines traditional in-person education with

online or digital elements, including interactive videos, learning management systems (LMS) like Moodle, multimedia resources, and asynchronous activities. This strategy seeks to improve customization, flexibility, and

*Corresponding Author:

Stephen Olanrewaju ONI, department of Science Education, Federal University, Oye-Ekiti, Ekiti State, Nigeria. E-mail: stephen.oni@fuoye.edu.ng

Received: 27 March 2025; Revised: 1 April 2026; Accepted: 2 August 2026

<https://doi.org/10.67229/stemer.26080005>

 This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which allows others to copy and redistribute the material in any medium or format non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

participation in higher education, especially for college students. Its effectiveness in fostering academic achievement—defined as enhanced information mastery, test scores, and skill application—has been the subject of more and more scholarly investigation. Turner (1988) and Thammanna (2017) argued that information is a critical resource for bringing about social change and improvement. Okeke, Oghenetega, and Umeji (2014) felt that information is a widespread and necessary component of our society and life. It is a valuable resource for any organization, particularly educational institutions.

Anandaraja (2012) claimed that humans are basically information processors and consumers. People have traditionally used knowledge to help them make decisions. Thammanna (2017), citing Bhattacharya (1997), defined information as the message that a systematized collection of ideas conveys or is intended to express. According to Regha (2016), information is increasingly considered a basic resource for personal development. He claimed that information serves as the foundation of a competitive advantage. Varshney (2011) defined information as that which is conveyed thru the act or process of communication; it can be a message, a signal, or a stimulus; it elicits a response in the receiving organism and thus has response potential; its motivation is intrinsically utilitarian; it is instrumental; and it is typically communicated in an organized or formalized pattern, primarily because such formalization increases potential utility.

A person must have a need that drives them to seek information. An information need refers to a person's innate desire to seek out information. Undergraduates' desire for knowledge is motivated by their diverse information requirements (Adebayo et al., 2015). These demands develop, according to Thammanna (2017), when an individual encounters a challenging scenario that he cannot handle with his current level of knowledge. According to Thammanna (2017), Talja (1992) classified information needs into four categories: social or pragmatic information needs (information needed to deal with day-to-day life), recreational information needs (information satisfying an individual's recreational and cultural interests), professional information needs (information required to operate competently within a business or professional environment), and educational information needs. According to Adebayo et al. (2015), undergraduates seek knowledge from a variety of sources. According to Akinola et al. (2009), information sources are the resources or procedures utilized to locate information for a certain purpose. This is consistent with Varshney's (2011) definition of information sources, which include anything that could enlighten or educate someone. According to Varshney (2011), information sources can in-

clude observations, speeches, documents, photographs, and organizational charts.

Today's world is information-rich, with numerous data and information sources covering a wide range of human pursuits (Hong & Jo, 2017). Every second, new information is created and made available, and anyone can quickly access a diverse range of knowledge in whatever format they like (Oyegbami et al., 2013). This information is available online, in print, at libraries, and in both electronic and non-electronic versions. According to Aiyebelehin (2012), with so much information available, students today have more options for their preferences. As a result, while choosing information and sources to fit one's needs, various factors must be taken into consideration. According to Hong and Jo (2017), these variables include language, comprehensiveness, currency, accuracy, credibility, coverage, accessibility, simplicity of comprehension, portability, efficiency, and ease of use. One's information needs determine the extent to which information sources and resources are used; most importantly, the use of information to satisfy one's information needs is dependent on one's awareness of these sources and resources. Several social factors can influence information needs, including age, educational background, personal characteristics, family dynamics, motivation, professional orientation, the local economic system, a person's social position, teaching and research experience, and the variety of information sources available (Chen & Lu, 2019).

BLENDED LEARNING PROJECT

In 2022, the institution implemented blended learning as a strategic goal to connect course delivery to its main campus at the Federal Institution, Oye-Ekiti. The main goals were to improve students' educational experiences and give them more flexible and engaging delivery methods. Two courses were chosen to begin testing the delivery of blended learning. Ongoing activities, course materials, and student comments were found to be advantageous when provided online. Online practice tests were designed in place of traditional paper assignments. The quizzes were distributed following the presentations on each topic. The questions were chosen from a pool of online multiple-choice questions (MCQ) generated and randomly assigned using Chalk and Talk or Blackboard. Students could try each online assignment more than once and had a week to complete it. The goal of this method was to get students to practice more and become more familiar with the applied ideas. Because MCQs were used in the traditional mode of distribution, assignment marking was automated, allowing students to receive immediate feedback on their understanding of the subjects. Additionally, computerized marking relieved academics of the ongoing stress.

STATEMENT OF THE PROBLEM

The post-COVID era saw a paradigm shift away from traditional teaching methods and toward digital learning. In digital education, information and communication technology are used for both teaching and learning purposes. This is accomplished via online teaching and learning tools including Zoom, Microsoft Teams, WhatsApp, and Google Classroom. Despite the benefits of using digital learning platforms, the majority of tertiary education students still struggle to use them, and some teachers and students lack digital learning gadgets, giving rise to challenges like technological difficulties in the digital learning environment, skepticism about the digital teaching and learning approach’s capacity to achieve learning goals, and skepticism about the proficiency of educators and learners in using the digital learning gadgets.

RESEARCH OBJECTIVE AND METHODOLOGY

The purpose of this study is to assess professors’ and students’ perceptions of blended learning at the university level. This inquiry will provide a better understanding of the aspects and difficulties to consider while implementing blended learning. The academic perspectives survey on blended learning was undertaken at the start of the implementation process. The survey was administered to a focus group. The survey sought to investigate academics’ understanding and identify the types of support they require while implementing blended learning. The survey was divided into two portions, qualitative and quantitative. The quantitative section included four Likert items graded 1–4 (“Strongly Disagree” to “Strongly Agree”). In contrast, students’ views were explored to analyze their learning experiences in blended learning activities. The survey was administered at the end of the semester. Motivation, technical support, flexibility, and preparation time were all factors considered for determining student happiness. The students’ perceptions survey, like the academics’ perceptions survey, was divided into two sections: qualitative and quantitative, and was scored on the same Likert scale ranging from 1 to 4 (“Strongly Disagree” to “Strongly Agree”).

RESULTS AND DISCUSSIONS

Academics’ perceptions of blended learning

Although technological advancements allow academics to create and deliver their courses in ways that support and enhance a teacher’s function, the incorporation of technology into blended learning has also altered teacher and student role expectations. According to Norberg, Dziuban, and Moskal (2011), teachers took on a new po-

sition as facilitators, while pupils gained access to seemingly endless sources of informational assets via the internet. Educational leaders, on the other hand, face challenges in meeting the needs for meaningful learning results. As a result, Garrison and Kanuka (2004) underlined the importance of having a clear institutional direction when implementing a blended learning effort effectively. According to the results of the academic attitudes survey, the majority of academics stated that they were new to blended learning and had never conducted a blended learning initiative in their unit. The deployment of blended learning presents a new challenge for most instructors since they must adapt their delivery approach to accommodate the use of technology. As a result, it is not surprising that some academics have highlighted concerns regarding the application of blended learning.

Aside from academics’ awareness of blended learning, the survey revealed additional characteristics that influence the successful implementation of blended learning. The majority of academics considered themselves to be beginners when it came to using digital tools in teaching and learning activities. Some lacked technological abilities and that it would be difficult to use the technique in their unit delivery. Thus, academic support is required while using technology to implement blended learning. Table 1 shows the many sorts of support that academics seek when implementing blended learning. They need a dedicated person to help them gain experience with technology. Apart from this, they would also like to have professional development training and workshops in designing blended activities and the use of technology.

Table 1: Descriptive statistics for the many forms of assistance used in blended learning implementation

S/N	Items	Mean	Standard Deviation
1.	Educational support group	4.00	0.93
2.	Educational technology tutors/academics	4.13	0.64
3.	Professional development and training/workshop in designing blended module and technological use	4.13	0.99
4.	Demonstration/sharing/lesson session	4.13	0.99

Learners’ perceptions of blended learning

Learners showed positive responses to the blended learning initiative applied in the two trial units identified in 2014. The components identified as beneficial to be delivered online were ongoing assignments and tutorials. Due to these blended learning activities, learners were able to pace their own learning as they had flexible access to the learning resources they required. Besides that, they were also able to review and test their understanding of a topic whenever they needed. As automated marking on Blackboard was used, learners were also able

to get feedback and grades on their assignments immediately. In 2015, the blended learning approach was introduced to the whole faculty, and three additional units were selected to participate in the delivery method. The participants were undergraduate degree students who enrolled in the respective units in the faculty. The type of blended learning activities implemented in the units includes online quizzes, videos, online forums or discussions, online peer feedback, and the use of technological tools such as iPads and Clickers. The descriptive statistics for items (mean and standard deviation) with regard to the blended learning activities in the three units are shown in Table 2. It is essential to obtain learners' feedback on their learning experience from the aspect of resources, content, and design of the blended learning activities to identify areas for future improvements.

Table 2: Descriptive statistics for blended learning activities

S/N	Items	Mean	Standard Deviation
1.	Accessibility and flexibility	4.00	0.84
2.	Self-directed learning	3.88	0.87
3.	Motivation	3.42	0.91
4.	Content	3.75	0.90
5.	Resources (technological tools and access to study	4.30	0.72
6.	Technical ability	3.83	0.85
7.	Preparation time	3.60	0.89
8.	Preference for face-to-face instruction	3.07	0.95
9.	Overall satisfaction with Blended Learning Activities	3.93	0.76

With an overall satisfaction mean score of 3.93, the survey indicates that most students responded favorably to the blended learning initiatives implemented in the units, as indicated in Table 2 above. Through blended learning activities, students could readily access educational materials and get online feedback. Given that students dominated the classes, this is extremely beneficial. In class, pupils hardly ever offer to ask or respond to a teacher's question.

University's blended learning initiatives

It is shown in the study that to facilitate blended learning in the university, academics and learners ought to have a shared vision, understanding, and expectation in the adoption of the approach. Specifically, there is a need to have a clear definition of blended learning. There are many different models of blended learning found (Regha, 2015), but the model adopted by the university was developed by Abidin et al. (2020).

In their model, three distinct design approaches were identified:

- (1) Low-impact blend: adding extra activities to an existing course;
- (2) Medium-impact blend: replacing activities in an existing course;
- (3) High-impact blend: building the blended course from scratch.

Low-impact blend: adding extra activities

The low-impact strategy incorporates additional online activities into a typical face-to-face training. Kaleta et al. (2007) discovered that most professors developing blended courses incorporate online components into their regular courses without deleting any current activities. They referred to this occurrence as "the course-and-a-half syndrome" (p. 127). Kaleta et al. proposed that adding more online activities to an already established course is common when inexperienced teachers create their first blended learning course. By merely adding to their courses, these teachers hope to reap the benefits of blended learning without having to rethink the entire course objectives within the context of a blended learning model. In other circumstances, however, the supplementary activity is motivated by a pedagogical need and serves as a helpful supplement to the standard course. McCarthy (2010), for example, added an online activity to the Imaging Our World course to encourage students to communicate more with their classmates.

In addition to standard teaching methods such as lectures and tutorials, McCarthy encouraged his students to submit work to Facebook and provide feedback on their peers' entries. The resulting discussions were then taken into the real classroom to help students form meaningful relationships based on their embryonic online connections. McCarthy's goal in including the online activity was to strengthen the face-to-face interactions between students. He evaluated his work based on weekly student comments, pre- and post-semester questionnaires, and project-specific reflections at the end of the semester. He noticed that the additional activity supplied by Facebook provided a platform for students to develop preliminary intellectual and social contacts with their classmates while satisfying a variety of learning objectives.

In considering the low-impact approach, we identified four benefits and five challenges.

Benefits of Low-impact blend:

- (1) An easy approach for designing blended learning courses, potentially encouraging hesitant teachers to try blended learning. According to Silverwood (2006), teachers who could benefit from blended learning may be reluctant to try it because they think that blended learning is very complex and highly technical.

(2) A quick approach to producing a blended learning course. Driven by a specific pedagogical need, teachers can directly add a new activity that appropriately meets that need without consuming extra time and effort in rethinking and replanning the whole course or investigating the many possible blended learning components and delivery methods. An example is McCarthy's (2010) Facebook activity.

(3) A low risk of failure when applied carefully. According to Vaughan (2007), the three major risk factors identified by teachers who have taught blended courses are: fear of receiving lower student evaluations, fear of losing control over the course, and uncertainty about the impact of online learning on classroom relationships. Adding an activity while keeping the traditional course almost the same can minimize these risks.

(4) Minimal experience in teaching the traditional course is enough to design the blended course. With limited experience, the instructor can spot the part of the course that could be enhanced by an extra online activity.

Challenges of Low-impact blend:

(1) Teachers need to have some technological knowledge to successfully apply this approach. According to Cennamo, Ross, and Ertmer (2009), to successfully integrate technology into the teaching experience, teachers need knowledge that can allow them to:

- identify which technological tool is needed to meet a specific pedagogical goal;
- specify how the tool will be used to help students achieve that goal;
- enhance students' ability to use appropriate technological tools in the different phases of the learning process: exploration, analysis, and production;
- select and adopt technological tools that can allow them to identify needs and resolve issues related to their own professional development.

(2) A low-impact blend has a high risk of producing two separate courses. According to Newcombe (2011), adding online work to a traditional course without reducing in-class time often leads to two separate courses, one online and one face-to-face.

(3) Adding an extra activity can be seen by students as a burden rather than a bonus. The added activity can be regarded by many students as just another task on top of an already content-heavy course (Garrison & Vaughan, 2011).

(4) Adding a new activity without eliminating an existing

one can excessively increase the instructor's workload. Teachers can face time constraints and overwhelming workloads as a result of adding additional online teaching resources (Reeves, 2003).

(5) Extra activity in an existing course is often not recognized by administrators, and teachers are therefore not compensated for their efforts (Amiel & Orey, 2007). According to Lee and Lee (2008), inadequate compensation and incentives are one of the main factors negatively affecting teachers' e-learning use.

Recommendations of Low-impact blend:

(1) An instructor should start by adding a simple online activity that they and their students can easily manage, for example, an online discussion board (Hofmann, 2006) or the Facebook activity that McCarthy (2010) added to his course. Later, if more online activities are needed, a medium-impact approach involving replacement could be considered.

(2) The addition of an activity must be driven by a specific pedagogical need, rather than, say, technology for technology's sake. Teachers therefore need to find out what is problematic or lacking in their courses and understand how to apply the technologies and teaching approaches to address these issues (Picciano, 2009).

(3) The added activity should be well integrated into the course. It is essential to consider the connection between what occurs in class and what happens online (Chen & Looi, 2007; Kaleta et al., 2007).

(4) The course should not be overloaded with tasks and activities. It is worthwhile investigating students' opinions about the course components. Sharpe et al. (2006) reported that consistent and transparent communication with students about their opinions and expectations is essential for the success of the blended learning experience.

(5) A low-impact blend is recommended for teachers with no experience in designing for blended learning. It is easy to implement and has a low risk of failure.

Medium-impact blend: replacing activities

In the medium-impact method, an existing course is updated by replacing some of the face-to-face activities with online ones. This strategy is based on the premise that some course components would be more effective as online activities. In some circumstances, the remaining face-to-face sessions are left unchanged, whilst in others, the in-class activities are modified. A second-year political science course overhaul is one example of this technique (Garrison & Vaughan, 2011). Originally, the course consisted of three one-hour lectures per week. The instructor noted that four or five students domin-

ated the case studies covered in class. The replacement strategy was used, reducing the three lectures to two and introducing an online discussion.

Benefits of Medium-impact blend:

(1) This approach allows teachers to start simply and implement incrementally, replacing course components as required (Duhaney, 2004).

(2) The experience gained in using this approach can help build teachers' confidence in running a blended learning course.

(3) A useful approach for teachers with some experience in designing for blended learning who do not want to risk making significant change to their courses. Kaleta, Garnham, and Aycock (2005) noted that teachers normally prefer to teach in the same traditional way that they are familiar and comfortable with and find it hard and challenging to commit a significant amount of time and effort to develop a new course.

(4) Allows teachers ongoing opportunities to experiment with different approaches to learning and more types of educational technologies without losing the whole benefits of the traditional course. According to Aycock, Garnham, and Kaleta (2002), learning to employ technology in an appropriate and effective way is challenging and can improve with experience.

Challenges of Medium-impact blend:

(1) Teachers need to have good technological knowledge and some confidence to apply this approach, as there is no going back to the previous method of teaching. Ertmer and Ottenbreit-Leftwich (2010) pointed out that knowledge of technology is essential to facilitate students' learning, although it is not sufficient if the teacher does not feel confident using that knowledge.

(2) The replacement and integration of new course components require dedicated time and effort to produce the blended course.

(3) There are no defined standards to guide decisions as to how much or what part of courses can be replaced. Such decisions are influenced by many factors, mainly the nature of the course content and the intentions of the instructor (Vaughan, 2007).

(4) Prior experience in teaching the traditional course is useful. A key challenge when designing a blended learning course using this approach is to identify the parts of the course that do not work properly in the traditional format and then decide if they can work better online. Having little or no prior experience in teaching the course makes this process difficult.

(5) Intensive long-term planning, observation, and evaluation of the course are necessary for a successful implementation. Arriving at a good balance between online and face-to-face components is a result of a gradual process of introducing new resources or techniques to replace the existing components and then evaluating whether the use of these new resources or techniques is helping students in achieving the learning targets (Duhaney, 2004).

Recommendations of Medium-impact blend:

(1) Teachers should apply the replacement approach incrementally. They should start by moving a small chunk of their syllabus to online, reducing face-to-face class time accordingly, and then scale as necessary until they arrive at a harmonious balance between face-to-face and online (Brunner, 2006; Duhaney, 2004).

(2) The harmonious balance will vary from course to course. Variations exist due to some factors, including student characteristics, instructor experience, teaching style, course instructional goals, and available online resources. In some courses, more face-to-face than online will be appropriate, whilst others will tip the balance in favor of online components. Still other courses will mix the two models of instruction somewhat equally (Dönmez & Aşkar, 2005; Dziuban, Moskal, & Hartman, 2005).

(3) Reaching a harmonious balance will require continuous review and regular course evaluation. According to Sharpe et al. (2006), iterative course redesign should consider evaluative feedback as a critical success factor for course improvement. Teachers' accumulated experience in designing for blended learning can play a vital role in reaching this balance. According to Ocak (2011), striking a good balance between face-to-face and online components is complicated and requires expertise.

(4) This approach is achievable by teachers with medium- to long-term prior experience in teaching the traditional course. Many critical decisions are going to be made throughout the replacement process, such as how much or what part of courses can be replaced (Vaughan, 2007). The teacher's experience is essential in making the right decisions.

(5) Institutional support is important for the success of this approach. Vaughan (2007), when discussing this approach, pointed out that providing technical support, considering teachers' workload, and dealing with their fears and resistance to blended learning are important for the success of the blended learning experience. He also emphasized the need for professional development to help teachers learn new teaching and technology skills and to assist them in deciding the most appropriate delivery methods to achieve their course objectives.

High-impact blend: building from scratch

The blended learning course is created from the ground up using the high-impact strategy. This strategy has been defined in the literature in a variety of ways, including complete redesign, entire redesign, and radical transformation. Harriman (2004) and Hofmann (2006) outlined a popular way to utilize this approach. They suggested that instead of looking at the complete course, the instructor examine each course learning outcome. For each outcome, the instructor must choose the optimum delivery method. They claimed that by adopting this strategy at the learning outcomes level, teachers can obtain the most effective technology blend and create a better curriculum. This technique is congruent with the constructive alignment model of curriculum creation, in which assessment tasks are linked to learning outcomes (Biggs, 1996). Hofmann also stated that it is incorrect to believe that redesigning an existing course will take less time than creating a new course, and that designers should create the entire course from scratch without fear of “slaying the sacred cows of successful traditional programs” (Hofmann, 2006, p. 33).

In considering the high-impact approach, we identified three benefits and five challenges.

Benefits of High-impact blend:

(1) Provides an opportunity to make enhancements and to reduce or eliminate problems that the current course might have. Teachers start from a fresh perspective with a better chance to come up with a more successful course, especially when the traditional one has some problems (Graham, 2012a).

(2) Allows better integration of online and face-to-face components. According to Littlejohn and Pegler (2007), it is essential to build the course from scratch to create effective integration of face-to-face and online components.

(3) Allows teachers the opportunity to get the maximum benefits of blended learning and to better meet their students' needs. Building the course from scratch provides a better chance to rethink and redesign the whole course with learners' needs in mind. Teachers are able to consider a wider choice of delivery media to integrate into their courses, and that will increase the effectiveness of the courses (Carman, 2002).

Challenges of High-impact blend:

(1) A high level of technological knowledge and confidence is necessary to successfully apply this approach. With a high level of technological competency, teachers can readily learn new technology tools and use them in their courses (Cook, Owston, & Garrison, 2004). Wozney, Venkatesh, and Abrami (2006) found that one

of the greatest factors that influence teachers' technology integration was their confidence that this technology could help them to better achieve instructional goals.

(2) The approach has a higher risk of failure than the other approaches because it may result in a totally new and untried course being introduced to students.

(3) Teachers must consider a large number of possible blended learning components and fully understand the implications of these. According to Walters (2008), the wide choice of delivery media, wide variety of technology combinations, and the lack of exemplars to follow for particular mixes means that teachers face complex situations and therefore pressure when redesigning their courses.

(4) Requires experience in designing for blended learning. According to Huang and Zhou (2005), teachers who lack the necessary theoretical knowledge and experiential experience will find it hard to take full advantage of blended learning. Ellis, Steed, and Applebee (2006) also stated that familiarity with technology and incremental experimentation with blended learning can help teachers to understand how technological media are related to teaching.

(5) Planning and developing a new blended learning course takes a long time to apply. Vaughan (2007) proposed that developing a blended course normally takes two to three times longer than developing a similar course in the traditional format.

Recommendations of High-impact blend:

(1) Teachers with no or limited experience in designing for blended learning should try one of the two other approaches first to gain some experience that can help them in applying this approach. Designing an effective blended learning course requires a great deal of knowledge and expertise to help select the learning activities that are better taught in the classroom and others that need to be created for online (Walters, 2008). Mortera-Gutiérrez (2006) reported that one of the worst practices when teaching a blended course is that teachers do not use the most appropriate media to deliver the instruction.

(2) Teachers should be prepared to invest considerable time in the design. According to Ragan (2007), full course design for blended learning courses is time-consuming, and teachers should allow at least six months' lead time for course development; however, one year is preferred. Partridge, Ponting, and McCay (2011) found that the greatest barrier to implementing a successful blended learning experience is a lack of time.

(3) Teachers should consider including a variety of delivery media in their blend. According to Carman (2002), e-learning is most effective when it uses a blend of different delivery options.

(4) Institutional support is a key factor for the success of this approach. According to Aycock et al. (2002), full course design is needed to obtain an effective blended learning experience, and, to ensure this, there must be a high-level of institutional support in the form of time release, professional development, funding, and technical support. Considering the large number of online components that need to be considered, teachers should undergo professional development that focuses on the proper use of new educational technologies that teachers have not experienced before. The role of educational designers is also very important, not only to provide advice during the development stage, but also to review the new course (Moskal, Dziuban, & Hartman, 2013).

It is important to create and support plans for institutions to start this new blended learning project after the blended learning vision has been determined and acknowledged. To oversee this effort and strategically handle any problems or difficulties that might arise during blended learning, an academic practice team was formed. A minimal level of Blackboard or Chalk-and-Talk usage is required to support blended learning. Effective content management is acknowledged to require the use of the LMS. The setting should be appealing and easy to use so that students may quickly access the necessary information. Additionally, the grading center should be used to give the class timely feedback, and information regarding examinations must be accessible. Blackboard's discussion board could potentially be utilized to facilitate communication between students and instructor-learners. Additionally, since it has been noted that e-learning frequently suffers from having a lot of material available for students to digest on their own, the activities developed should complement rather than overwhelm the students (Waddoups et al., 2002).

CONCLUSION AND RECOMMENDATIONS

Modern times study has numerous educational ramifications. First, it shows that blended learning can suit students' educational needs. According to the overall learner satisfaction survey, blended learning boosted student learning flexibility while preserving social links in the traditional classroom by allowing students to study using a choice of delivery methods that combined in-person and online components. Second, the survey found that scholars had difficulty meeting the growing expectations of blended learning. The development is consistent with the concept that a hybrid environment fosters students' motivation to persist and their involve-

ment to grow (Godfrey Perfectson et al., 2024).

There is no doubt that an educator plays an important part in determining how well blended learning is implemented. It takes time, effort, technological competence, and a defined pedagogical goal to create a mixed-delivery course that uses technology. As a result, a professional development program is required, as well as assistance for academics and students. The study advised that schools adopt more online learning in which students/learners spend the majority of their time together, resulting in a learner-centered learning environment.

DECLARATION

Source of funding

This research received no external funding.

Conflict of interest

The authors declare no competing interest.

Data availability statement

Not applicable

REFERENCES

- Abidin, Z. & Saputro, T.M.E. (2020). Google Classroom as a Mathematics Learning Space: Potentials and Challenges. *Journal of Physics. Conference Series*. 1567 022094.
- Chen, W., & Looi, C. (2007). Incorporating Online Discussion in Face-to-Face Classroom Learning: A New Blended Learning Approach. *Australasian Journal of Educational Technology*, 23, 307-326. <http://ascilite.org.au/ajet/submission/index.php/AJET/index>
- Chen, D., & Lu, D. (2019). Exploring Blended Learning Models Supported by Mobile Interactive Technologies in Higher Education: *International Journal of Interactive Mobile Technologies*, 2024, Vol 18, Issue 11, p27.
- Duhaney, D. C. (2004). Blended Learning in Education, Training, and Development. *Performance Improvement*, 43(8), 35-38. <https://doi.org/10.1002/pfi.4140430810>
- Garrison, G., & Kanuka, L. (2004). *Uncovering Its Transformative Potential in Higher Education: The Internet and Higher Education*.
- Garrison, D. R., & Vaughan, N. D. (2011). *Blended Learning in Higher Education: Framework, Principles, and Guidelines*. San Francisco: John Wiley & Sons.
- Godfrey Perfectson, O., Otega Prosper, E., & Onwuzo, C. J. (2024). Evaluating the Impact of Blended Learning Models on Higher Education Outcomes: A Multidimensional Analysis. *Journal of Digital Learning and Distance Education*, <https://doi.org/10.56778/jdlde.v4i2.535>
- Hofmann, J. (2006). Why Blended Learning Hasn't (Yet) Fulfilled Its Promises. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of Blended Learning: Global Perspectives, Local Designs* (pp. 27-40). San Francisco, CA: Pfeiffer Publishing.
- Newcombe, E. (2011, June). A Work in Progress: Refining the "Blend" of Face-to-Face and Online Instruction. Paper Presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2011, Lisbon, Portugal. Retrieved from <http://www.editlib.org/p/38304>
- Norberg, A, Dziuban, C., Moskal P. (2011). A Time-Based Blended Learning

- Model. *On the Horizon*, 207-216.
- Oyarinde, O.N. & Komolafe, O.G. (2020). Impact of Google Classroom as an Online Learning Delivery During the COVID-19 Pandemic: The Case of a Secondary School in Nigeria. *Journal of Education, Society and Behavioural Science*, 33(9), 53-61.
- Oyegbami, G. A., Oni, S.O., & Olujide, M.K. (2022). Information Dynamics for Effective Academic Performance Among University Students. A Case Study of Agricultural Science Education Students, Federal University Oye-Ekiti. *Fuoye Journal of Education FIJED*. Vol. 5, No. 1 .
- Picciano, A. G. (2009). Blending With Purpose: The Multimodal Model. *Journal of the Research Center for Educational Technology (RCET)*, 5(1), 4-14.
- Reeves, T. C. (2003). Storm Clouds on the Digital Education Horizon. *Journal of Computing*, 15(1), 3-26. <http://www.editlib.org/j/ISSN-1042-1726/>
- Regha, I. O. (2015). Adoption of Blended Learning into the Nigerian Education System: Prospects and Challenges. *International Journal of Social Sciences* ISSN 2454-5899.
- Twigg, C. A. (2003). Improving Learning and Reducing Costs: New Models for Online Learning. *EDUCAUSE Review* 38(5), 28-38. <http://www.educause.edu/ero>
- Vaughan, N. (2007). Perspectives on Blended Learning in Higher Education. *International Journal on E-Learning (IJEL)*, 6, 81. <http://www.editlib.org/j/IJEL/>
- Waddoups, G. L & Howell, S.L. (2002). Bringing Online Learning to Campus: The Hybridization of Teaching and Learning at Brigham Young University.