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A Systematic Literature Review of Research and Implication Blended Learning in Building Modern Education

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Abstract. This study attempts to present a thorough picture of how blended and mixed learning are used to promote meaningful learning at the secondary and higher education levels. To synthesize academic research pertaining to the use of blended learning in education, a systematic review of the literature was conducted. 50 articles out of a total of 1409 that were screened met the requirements for inclusion. The findings point to a number of beneficial roles in constructing modern education at the secondary and postsecondary levels. The effects of blended learning have a significant impact on improving how students engage with low-tech infrastructure while studying. In the new norm, teachers must be at the center of more efficient decision-making on blended learning. This paper's content can be used to describe the mixed-methods trend in education and how it helps to provide engaging learning opportunities.

Key words: Blended Learning; Modern Education; Systematic Literature Review

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INTRODUCTION

The decision to use digital education during the past 15 years has significantly advanced the learning and teaching process (Buran &Evseeva, 2015). Internet-based information technology advancements are feeling the expansion of online education programs, which are converting the traditional educational system into a modern one (Previtali & Scarozza, 2019). Schools were the most widely used teaching method in education for centuries. But because it can prevent students from critically evaluating the material they are given, traditional teaching is now referred to as a passive approach to instruction. A completely face-to-face approach does not allow for collaborative learning or the use of sophisticated thinking abilities by teachers. Many teachers in higher education believe such a paradigm change from traditional teaching to an online environment to be difficult (Okaz, 2015).

Web-based learning initiatives concentrate on delivering offline instructional materials online. Additionally, e-learning courses (learning that is given digitally) frequently consist of repetitions of online classes. Since e-learning experiences frequently involve lengthy content sets, it becomes clear that one method of instruction delivery might not provide all the choice, engagement, social contact, relevance, and context required to promote successful learning and performance. In the past two decades, an increasing number of learning designers have been experimenting with blended learning models that include several delivery methods. In addition to providing additional possibilities, blended learning is also more efficient.

As distance work and distance learning spread over the world during the COVID-19 epidemic, the word "distance learning" became quite popular. Self-contained e-Learning and virtual classrooms are now commonplace in education and training programs. Even after COVID-19, mixed learning patterns will persist even as instruction moves back into traditional classrooms. The environment for learning, broad goals and instructional customs all influence the adoption of a blended learning paradigm (Prohorets & Plekhanova, 2015). Due to the way that blended learning combines in-person instruction with online learning, it is a common learning strategy in educational institutions. Additionally, the usage of blended learning is growing, therefore there is a push to evaluate its effectiveness through student learning (Rahman et al., 2015). In blended learning environments, online and in-person instruction are combined (Goidsenhoven et al., 2020). Blended learning is one of the modern educational trends that is expanding quickly in the academic world (Hubackova & Semradova, 2016). Depending on how it is defined, mixed learning can take on several forms. It is also known as hybrid learning or mixed learning. There is no universal

definition of blended learning in the literature (Abusalim et al., 2020).

There are three goals for this article: The purpose of this article is twofold: 1) to describe the function of blended learning at the level of secondary and college educators, and 2) to discuss the implications of blended learning in contemporary education in order to achieve the ideal balance both individually and collectively and to add meaningful learning experiences. To facilitate achieving that goal, the following research question will direct reviews during this review's systematic analysis:

RQ1: How does the development of blended learning based on the type of research published in the journal vary from 2015 to 2021?

RQ2: How is the topic/theme of research blended learning in 2015 to 2021?

RQ3: Which level of education applies a lot of blended learning from 2015 to 2021?

RQ4: What are the implications of blended learning at the secondary and college levels in 2015 to 2021?

RQ5: What are the implications of blended learning in the modern era?

METHODS

Systematic Literature Review

This study is an explicit, predetermined scientific literature review that aims to identify, select, evaluate, and summarize findings from related studies. It also conforms to predetermined eligibility criteria for answering specific research questions. To reduce biases in the identification, selection, and summary of studies, this methodology is explicitly reproducible. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) refer to the systematic approach to review. This strategy aims to systematically direct the documentation of library reviews in order to enhance the completeness, accuracy, and transparency of publications.

Search Terms

Online databases with significant academic study archives are used for literature searches, including MEDLINE, ACM Digital Library, Elsevier (SCOPUS), Emerald, IEEE Xplore, and ScienceDirect. Software called Publish or Perish (PoP), which "retrieves and analyzes scholarly citations," aids in the search for this database. To see if additional related research were in contact with this study, a search of the list of references in articles that met the inclusion criteria was also carried out. PICO determination (Population/Problem, Intervention, Comparison, and Outcome) keywords are used in the first search. The terms blended learning and modern education were found through these searches. To control the flow of searches in the abstract, title, or keyword of the article, these keywords must match the title. Exploration and selection of article titles, abstracts, and keywords based on pre-established eligibility criteria from search results Using the phases of the online covalence program https://app.covidence.org/reviews/, articles are selected: 1) Import references, which are citations taken from imported databases in RIS format; 2) Screening of titles and abstracts: the procedure of screening titles and abstracts; 3) Full-text review: selecting items to include or remove based on predetermined standards; 4) Extraction: Examining and evaluating publications in light of the research questions (RQ).

Selection Criteria

The Inclusion Criteria (IC), where a number of criteria are established to choose the pertinent article, defines the eligibility criteria for literature. The search is improved by choosing one of the five criteria listed below:

1) It is original research that has been studied and written in English.
2) It aims to investigate or analyze blended learning in learning as well as its implications for modern education.
3) It contains 21st-century skills (communication, collaboration, creativity, critical thinking, and problem-solving) as well as technical skills, information management, as variable dependencies because the focus is on the factors that influence an individual's skill level.
4) Engage participants from high school to college-age to represent preparation for modern life to come.
5) Published in peer-reviewed journals, which are thought to be the most trustworthy sources of scientific data.

Study Selection

Three steps were taken in the study's execution. First, the eligibility of each article's title is determined using the aforementioned inclusion criteria. Second, all originally pertinent abstracts are screened using five standard criteria. Third, each publication is examined for inclusion

in its entirety. Information has been taken from the entire text of each article thought to be pertinent. The name of the author, publication date, journal, objective, technique, bound variable and operationalization, free variables, findings, and conclusions are all encoded for each possible article. To make sure that only the most pertinent articles are chosen, article coding is used.

PRISMA Flowchart

4,316 articles were found through publishing or perish searches despite the limitations on document type and language. 2,907 unique articles were eliminated out of 4,316 total articles after 1,409 of them were found to be duplicated. 118 articles were examined in full text as part of the eligibility procedure after screening the title (1291) and abstract (21) and selecting 98 articles that qualified for inclusion based on the title and abstract. 50 out of the 98 articles passed all five inclusion criteria after being read in full again. A selection flowchart can be seen in Figure 1. Because the included article's references do not add to the knowledge already known, an additional note cannot be found through other sources. Full-text filtering should not be used for the following seven reasons: (a) it is not original English-language research; (b) the full text is not available; (c) there are no independent variables; (d) there are no directional effects, and (e) there are no participants in the age range of middle school to college. Using the Revman 5.4.1 program, the PRISMA flowchart model is represented as follows.

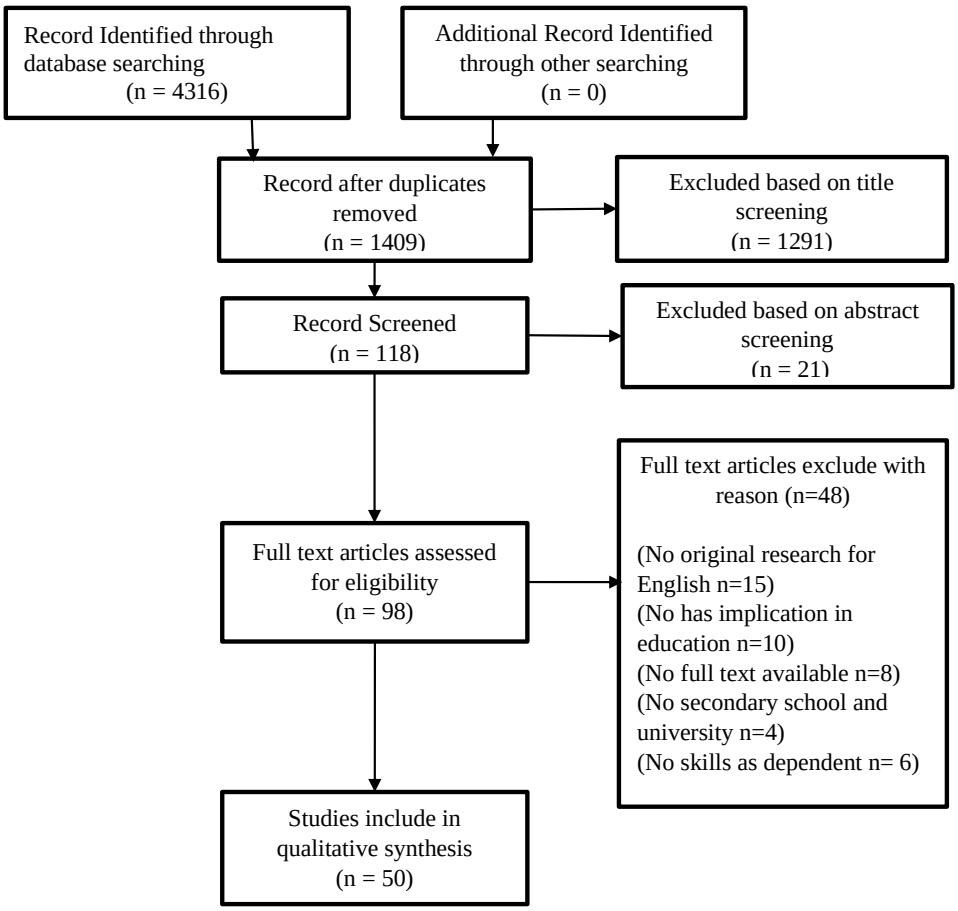

Figure 1. PRISMA Flowchart

RESULTS AND DISCUSSION

Categorization of Selected Studies

Studies that identify factors affecting blended learning are categorized by year, subject, method, intervention, and learning outcome. In order to determine if the articles matched the author's inclusion requirements for use as literature in the literature review, which was acquired from 50 journals evaluated, the articles were chosen based on the title and abstract information. The Table 1. provides the summary or resumes gleaned from the research.

Table 1. Study characteristics included articles

No	Type of Study	Year of research							N
		2015	2016	2017	2018	2019	2020	2021	
1	Experiment	2	1	1	2	2	1	2	11
2	Case-study	1			1	1	2	2	7
3	R&D research	1	1				1		3
4	Content analysis			2	1	1	1		5
5	survey		1	1	2	2	1	2	9
6	Theoretical		1	1		1			3
7	Mixed method						1	2	3
8	Literature review			1	1	1	2	2	7
9	Comparative-analysis					1	1		2
10	Total	4	4	6	7	9	10	10	50

A summary of the various study kinds and research years is given in Table 1. To be clear, a theoretical analysis only provides references to the works required for analysis, whereas a review should include all scientific literature in the author's chosen topic. According to the findings, experiments (N=11) were the most frequently employed type of study, followed by survey studies (N=9), literature reviews and case studies (N=7), and survey studies (N=9). A small number of studies made use of extensive performance tests where participants had to finish a job. The majority of studies relied on participants' self-assessments rather than determining the precise skill levels of the participants.

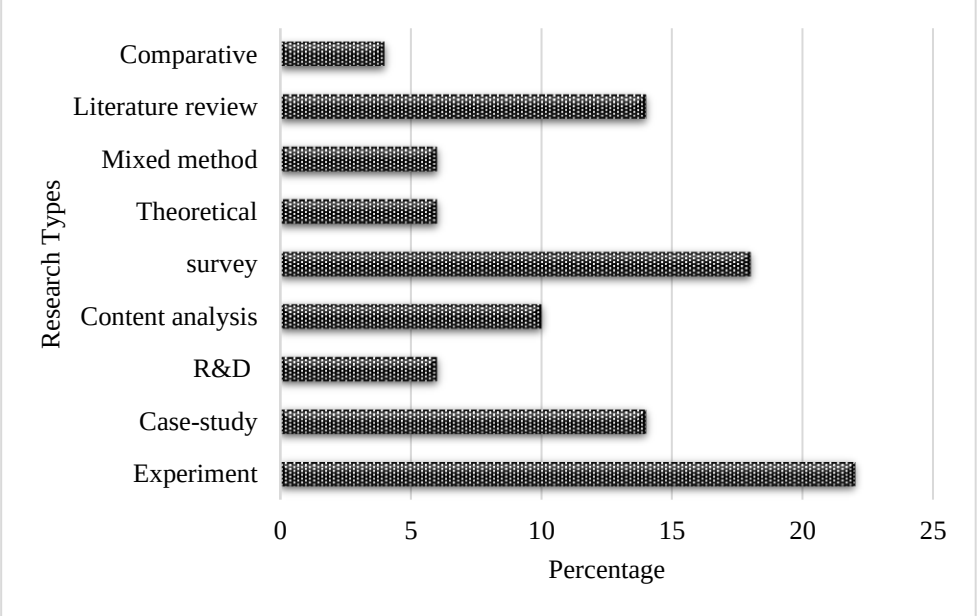

Figure 1. Percentage of blended learning research types

Furthermore, categorization of blended learning research at the level of secondary to a college education. From the results of the analysis obtained that the application and survey of the implementation of blended learning from 2015-2021 were highest at the college level with the highest percentage in 2021. 2015 and 2016 were 75%, followed in 2017 to 2021 at 50%; 57.14%; 55.5%; 60% and 70% in 2014, 70% and 70% in a row. Then at the high school level, the largest percentage occurred in 2017 at 33.3%, and followed by junior high school the largest percentage occurred in 2019, namely 22.2%. It is presented in Figure 2.

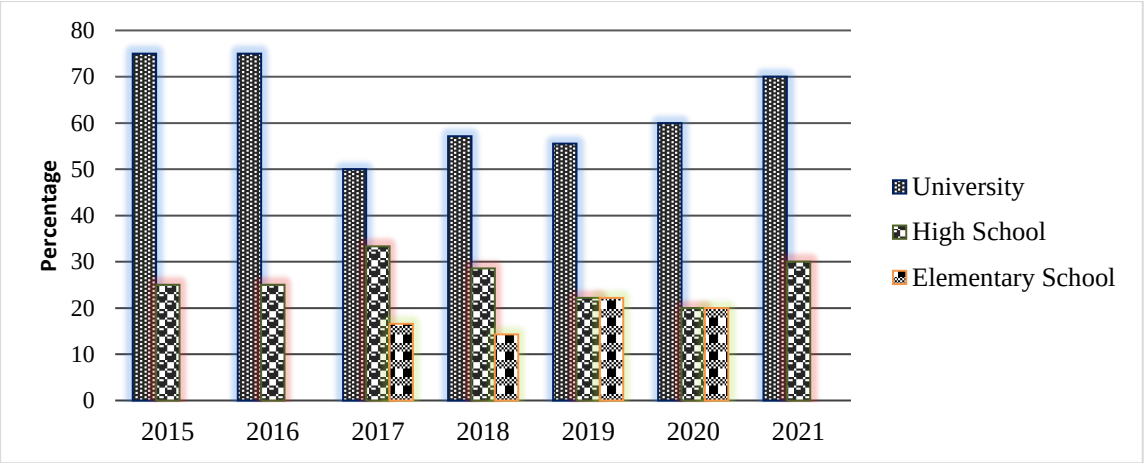

Figure 2. Categorization of research at the education level

An overview of the ideas and concepts utilized in the article is shown in Figures 3 and 4. The majority of papers discuss educational research, particularly on blended learning. The papers emphasize teaching and learning techniques to make sure that students are proficient in blended learning concepts, implications, design, roles, and classroom impacts in order to be prepared for their future.

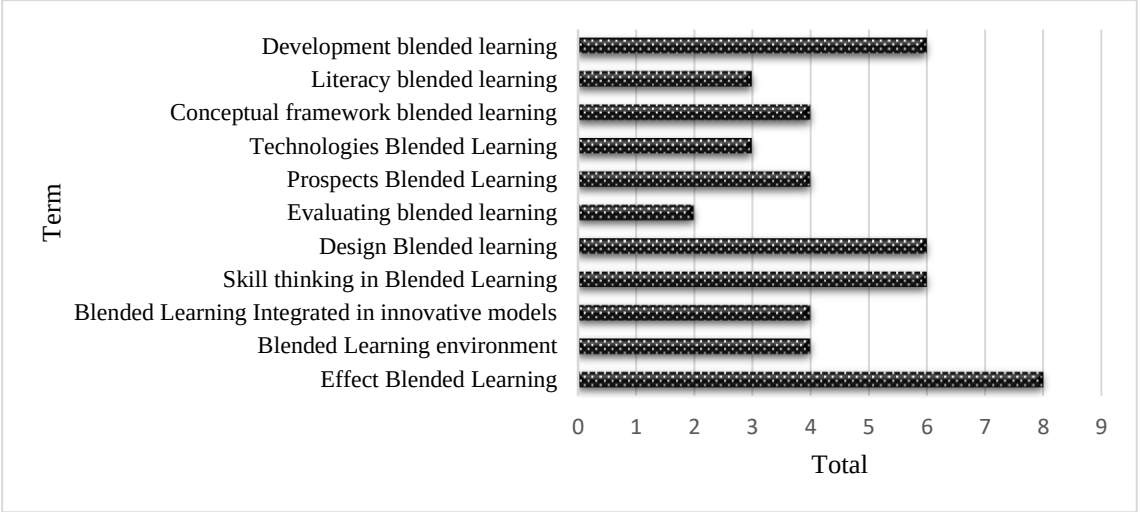

Figure 3. Terms used included articles (N=50)

The classification of a minimum indexed journal Scopus or a reputable journal is chosen for study field categorization. The field of further education engineering education is the most pertinent when a number of categories are chosen. It is evident from this categorization that education is the most popular area of study (N=26). A lot of studies also touch on the subject of education. Engineering, technology, management, and social and behavioral science, for instance (N=24).

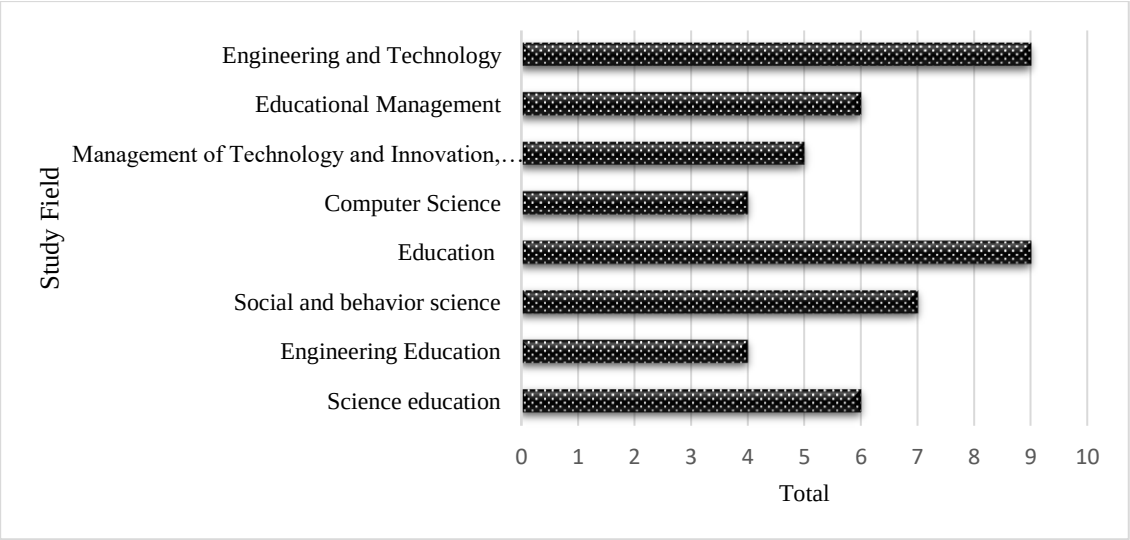

Figure 4. Concepts used included articles (N=50)

Implications of blended learning

The following Table.2 provides an overview of the roles mentioned in the included article and the main concepts being used. Overall, the article has a diverse scope, discusses the different dimensions of blended learning, utilizes a variety of theoretical models, and adopts a variety of methodological approaches.

Table 2. Resume literature review

Subject	Article	Outcome
Secondary School	(Stockwell et al., 2015) ; (Basogain et al., 2018); (Fitri et al., 2019) ; (Hubackova & Semradova, 2016); (Hubackova & Semradova, 2016); (Margolis et al., 2017); (Hess et al., 2016); (Purnomo et al., 2019); (Zhang, 2018); (Kundu, 2018); (Kunndu et al., 2021); (Asarta & Schmidt, 2020); (Suprabhan, K; Subramonian, 2015), (Yeen-Ju et al., 2015); (Halverson & Graham, 2019); (Rasheed et al., 2020); (Van Laer & Elen, 2020)	• improved communication and mathematic cognitive science, • Creating real social communication • increase the mastery and readiness of the use of alms, • influence attitudes and behaviors, in student performance, communication skills, • improve retention, graduation rate, learning motivation, sustainability of curriculum innovation, • arouse interest in learning, practicing the ability to manage students and the ability to evaluate themselves, • improve learning experiences, achievement, problem-solving skills, collaborative learning, cognitive abilities, bring positive changes in student learning engagement, improve reading and literacy activities.
College	(Pavla et al., 2015) ; (Okaz, 2015); (Khlaisang & Likhitdamrongkiat, 2015); (Nazarenko, 2015); (Buran & Evseeva, 2015); (Rahman et al., 2015); (Martín-García et al., 2019); (Previtali & Scarozza, 2019); (Previtali & Scarozza, 2019); (Abusalim et al., 2020); (Nguyen, 2017); (Chowdhury, 2020); (Garner & Rouse, 2016); (Burhendi et al., 2019); (Ravenscroft & Luhanga, 2018); (Galustyan et al., 2020); (Van Goidsenhoven et al., 2020); (Clement et al., 2016); (Asarta & Schmidt, 2020); (Smith & Hill,	• Blended learning can improve the quality of education above ICT, cognitive skills, create real social communication, professional competence, ICT skills, critical thinking, and information processing skills, • develop information ecology and use of online resources, • make the quality of learning better and interesting, • provides a marginal effect in all cases, being the most important factor affecting faculty satisfaction, • Blended learning does not affect student GPA, • Formative assessment evaluation forms are more efficient when supported by technologies such as LMS, radical improvements in the quality of education as well as in the accessibility and cost-effectiveness of learning programs, • influence social communication, develop discovery models, increase activities and motivation,

Subject	Article	Outcome
	2019); (Bahri et al., 2020); (Hilliard, 2015); (Han & Ellis, 2019); (Surjono et al., 2017); (Basogain et al., 2018) (Van Laer & Elen, 2020); (Jani et al., 2018a); (Lorenzo, 2017); (Yeigh et al., 2020); (Dziuban et al., 2018);	• Improve cognitive, communicative, operational, and reflective abilities, and can bring together students' knowledge and skills, • Blended learning is practical, individual, and results-oriented, • Develop self-regulated learning, • Enhance the student experience and provide professional teaching staff, • Develop learning materials, understanding, creative skills as well as student performance.

The use of structured active learning, using teacher feedback on student preparation, incorporating student feedback into learning, using classroom settings in an LMS, consistency of the teaching team, timely material posting, time to complete tasks, accountability of online activities, and making sure user-friendly technology is managed for are some of the best practices in the application of blended learning in the classroom (Margolis et al., 2017). The purpose of blended learning in this case is to enable the flipped classroom strategy in addition to summarizing the course. The learning content that is focused on the student's environment is moved outside of the classroom in flipped classrooms, thus the student is then responsible for covering that portion of the learning content as homework. Additionally, face-to-face sessions changed from being a teacher-centered classical performance to a lively learning space (Bernard et al., 2017). The conclusions are highly strong and valid, which can greatly depend on theory, policy, and practice, according to the un-dimensionality of significant relationships, which is the last point. Colleague relationships have an impact on how learning management systems perform in terms of providing fresh guidance about how anxiety levels can be decreased through understanding the importance of predicting characteristics and how they affect the use of blended learning in practice.

The soul and economic well-being of a country depend heavily on the quality of education of its citizens. Implementing innovative teaching programs in the education system will improve the quality of education, creating a more efficient workforce to benefit society as a whole. In recent years the concept of blended learning has been actively discussed in modern pedagogical literature. Three types of environments that provide education are described: online/distance learning, face-to-face in the The level of education that its population receives has a significant impact on both a nation's soul and economic health. Innovative teaching initiatives will raise educational standards and result in a more productive workforce that will benefit society as a whole. Modern pedagogical literature has recently aggressively debated the idea of blended learning. There are three different environments that offer education: face-to-face in the classroom, online/distance learning, and campaign learning between two (Prohorets & Plekhanova, 2015).

Today's education industry is increasingly receptive to the idea of e-learning, and one of the finest methods to do so is through blended learning (Chowdhury, 2020). For blended learning to ultimately succeed, instructor motivation and active involvement are both crucial criteria. A uniform approach to the infrastructure for virtual learning should be developed without exposing teachers to any of the technological parts that must be handled by experts. Appropriate constructive dialogues, tight collaboration, and sharing of experiences should also be encouraged. The quality of instruction is enhanced via virtual learning, which also reduces the instructor’s workload (Pavla et al., 2015).

Many colleges have used blended learning over the past ten years to explore how people learn and accommodate various learning styles (Garner &Rouse, 2016). The excellent research focused on society, knowledge, and the environment (Nguyen, 2017). Researchers are still figuring out how to utilize mixed learning. Blended learning can take place at various levels, including the activity level, course level, program level, and institutional level. However, it is still difficult to determine how to persuade administrators, teachers, and even students to adopt blended learning. As this will provide strong evidence to justify the expansion of the approach to the program or institutional level, we must utilize blended learning at the course/training level in order to do so effectively

at the institutional level.

The use of blended learning in classrooms all across the world is growing quickly. The concept of preserving conventional learning methods influenced by millennia of pedagogical experience while turning over many educational tasks to modern technologies seems intriguing. This enables a compromise to accommodate the usage of technology in the teaching and learning process to keep up with the 21st-century trend (Nazarenko, 2015). Teachers and students can benefit from blended learning in a number of significant ways, making them active participants in the learning process who are accountable for the outcomes of their work. The creation of electronic courses takes time at first, but once they are in place, teachers may make the most of their time and keep the standard of their instruction. The usage of internet resources and information technology is crucial for maintaining effective learning (Buran &Evseeva, 2015). Our living environment and way of life are changing as a result of information technology, which focuses on network connectivity and multimedia technologies. And students are society's future, bearing the enormous burden of creating the nation's future (Zhang, 2018).

Some promise prospects for proper conformance between stakeholder challenges in the learning industry and the demands of learners' knowledge and abilities through techniques of blended learning delivery systems. Through the use of technology, a variety of learning options have the ability to lower teaching expenses while fostering student engagement and offering numerous opportunities for face-to-face encounters. This offers a variety of fun creative activities for public institutions, colleges, and schools (Boone, 2015). The level of user happiness is one indicator of how effective blended learning is. Both synchronous and asynchronous learning can be built upon an integrated learning environment. Websites, web-based courses, polls, online study groups, and discussion boards can all be categorized as commonly utilized asynchronous learning media. Synchronous learning activities give students the same hands-on process instruction they would receive in a classroom setting. In other words, the fundamental element of synchronous learning necessitates that everyone logs in at the same time (Purnomo et al., 2019). While evaluation is a crucial step in the educational process. Students can demonstrate their skill and aptitude to use information in solving real-world situations by participating in learning activities that include an evaluation.

Online and in-person activities are combined in blended learning, which frequently requires more preparatory time from the students outside of the classroom than traditional face-to-face instruction. According to Margolis et al. (2017), blended learning is successful and has many advantages for students. However, combining the two modes of learning can make the amount of preparatory time required outside of the classroom too much for pupils to handle. According to studies, student engagement is crucial to learning and that it correlates with greater learning outcomes and superior knowledge retention (Ravenscroft & Luhanga, 2018).

The terms "blended learning" and "using technology in addition to teaching challenging subjects or offering additional information" are not synonymous (Burhendi et al., 2019). Blended learning should be viewed as a chance to reform how courses are created, organized, and completed in higher education using a combination of in-person and online learning. When compared to traditional education, blended learning also crosses boundaries of time and location and can directly improve students' learning outcomes. The efficient use of time, however, hinges on finishing online tasks. Thus, the success of blended learning depends on the student's ability to develop a resilient learning strategy and their own drive to finish the course of study. The research demonstrates that blended learning can be a useful tool for empowering students to work independently and advance their learning abilities, yet it is inevitable that every person would react differently to these difficulties. According to the study's findings (Bowyer & Chambers, 2017), self-motivation, independence, and the capacity for autonomous work are essential for students to succeed in blended learning.

The novel concept of blended learning has enormous potential to give kids a high-quality education. Unfortunately, the majority of research on mixed learning has concentrated on educational settings, and more attention is required for its implementation to be successful in developing countries where primary education faces numerous challenges despite government efforts at all levels (Kundu, 2018); (Kundu et al., 2021); (Kundu et al., 2021). The moment has come for nations to employ technology in education and allow students and instructors to

learn in their own ways. Keeping students' attention and imparting knowledge in a way that it sticks with them long after the class is the primary difficulty that all teachers in schools face. In order for this to occur, learning environments in the classroom must be reimagined, and new approaches to teaching must be used. If the learning process is carefully thought out, blended learning may show to be an effective technique.

Comparing blended learning tactics to face-to-face strategies, they both offer advantages and disadvantages. The capacity to personalize training and better meet each student's unique needs is the blended learning approach's strongest point. Online teachers run interactive sessions and promote class participation and discussion using a curriculum created expressly for online instruction (rich content, interactive media, and cutting-edge instructional tools) (Lorenzo, 2017). The study's findings (Jani et al., 2018a); (Chang et al., 2018); demonstrate how employing a blended learning strategy can enhance students' skill understanding and knowledge. It was discovered that students have improved in their ability to apply strategy and tactical understanding to challenges and decision-making. Overall, compared to the types of courses/lessons employed in the study, the blended learning experience offers students additional benefits of outcomes to a bigger and wider degree (Asarta &Schmidt, 2020).

CONCLUSION

Since students are the nation's future leaders, the study gives a wealth of educated information to higher education institutions, secondary and elementary schools, academia, society, and the country at large. They should therefore be aware of the significance of blended learning as one of the new approaches to education. Academics and institutions that use blended learning offer an alternative to traditional classroom instruction. By drawing in more students and offering a better environment, blended learning can raise the standard of instruction. The findings of this study point to an additional area of inquiry. Because students from different institutions or programs could have different opinions about how satisfying blended learning is, the results of this study won't be generalized to other demographics. As a result, for upcoming research, scientists can conduct analytical studies to enhance robust statistics for data taken from different probability distributions, particularly for abnormal distributions. In order to make this research more relevant for the field of education, particularly in Indonesia, it is also advised that researchers use a bigger sample size and carry out comparative studies. This is because blended learning requires contemporary engineering education.

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