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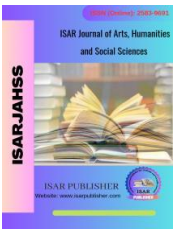

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Original Research Article

EMERGING TRENDS OF BLENDED LEARNING INSTRUCTIONAL APPROACHES ON BASIC EDUCATION STUDENTS' ACADEMIC ACHIEVEMENT: META-ANALYTIC ASSESSMENT AND THEORY GENERATION

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Abstract: It has been observed that Blended Learning (BL) allows teachers to integrate elements of traditional face-to-face instruction with tailored online learning modalities since the outbreak of the COVID-19 pandemic. This prompted the authorities to suggest adopting alternatives to ensure that students are not left behind without studying and to prevent the disease from spreading. This study aims to produce a statistical synthesis of contrasting learning outcomes for either fully online or blended learning conditions with those of face-to-face classroom instruction. Furthermore, the inductive approach to theory development was used to determine the significance of BL. The researchers worked on the impact of BL on basic education by studying 31 articles that were relevant in title and abstract. All articles were included from 2012 to 2022. Semantic Scholar, ERIC, Open Access, Elsevier, etc. were searched to identify published literature using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Results revealed that most Asian countries have published studies with more than one-month duration in BL, and high school students were more engaged in hard sciences which shows the practical significance of their study. Superior enlightenment results in students' achievement when they are given opportunities to study and engage through BL. Considering these factors, it can be concluded that BL is associated with better academic achievement than conventional teaching in basic education.

Keywords: achievement, basic education, Blended Learning, conventional teaching, meta-analysis.

INTRODUCTION

It has been observed that blended learning permits teachers to combine elements of traditional face-to-face instruction with adapted online learning modalities since the outbreak of the COVID-19 pandemic. This persuaded the authorities to propose adopting alternatives to ensure that students are not left behind without learning and to prevent the disease from spreading. It is instilled in the hearts of the consumers of knowledge that learning new skills throughout their lives is a lifelong process. Moreover, it is believed that continuing education for personal development and fulfillment shows significance toward career development. The investigation of Rodriguez and Cobo (2022) underscored that no single country across the world finds it hard to set action on transforming the security of learning during the COVID-19 pandemic. It can be said that more differences in magnitude have happened during the last 12 months, from the remote learning perspective, than in the last 12 years.

The combination of traditional face-to-face learning with technology and distance learning led to the pervasive utilization of blended learning. According to the study by Muxtorjonovna (2020), blended learning is an valuable way of teaching that is flexible and easy to approach. Besides, it can increase students' motivation and their achievement in the course. However, the psychological effects of blended learning in terms of teachers' anxiety are moderate and they seldom experience boredom and distress in these terms (Manghano et al., 2021).

Research has found that knowing when to trust the professionals is one of the many challenges facing the evidence-informed teacher or school leader. Great importance is often ascribed to meta-analysis (Jones, 2018). Moreover, the article by Shorten and Shorten (2012), describes it as a research procedure used to methodically combine the results of distinct, independent investigations to determine an overall or 'absolute' effect. Analysts test how sensitive their findings are to their own systematic review protocol (study selection and statistical analysis) by considering differences in sample size, heterogeneity (variety) in the study approach, and findings (treatment effects). Similarly, research on learning strategies and activities that students can use to improve their learning has increased recently. This is not surprising given the direct, practical applications of such research and its importance to students, teachers, and school administrators alike (Donoghue & Hattie, 2021).

Vallee et al., (2020) independently chosen studies were used to compare blended learning to traditional learning overall, offline blended learning to traditional learning online blended learning to traditional learning, digital blended learning to traditional learning, computer-aided instruction blended learning to traditional learning, and blended learning with virtual patients. Data were extracted, bias risk was assessed, and the studies were independently chosen. According to the research, blended learning

in health education regularly outperformed traditional learning in terms of knowledge attainment.

Findings from prior studies by Anthony et al., (2020a) showed that a blended learning method improves students' knowledge and learning engagement since it has a big impact on their awareness of the teaching style and their learning background. The results also recommend that lecturers should use technology, pedagogy, material, and knowledge, as well as face-to-face interactions, activities, information, resources, evaluation, and feedback for students. In addition, the study shows that the most common theories used by earlier studies to investigate BL adoption were ad hoc, technology acceptance model, information system success model, unified theory of acceptance and usage of technology, and finally diffusion of innovations theories.

In terms of instructional features, the meta-analysis found that students who received online education did marginally better than those who received face-to-face instruction, indicating an average level of learning circumstances. research comparing blended learning with conventional education found a considerable benefit over in-person training, whereas research comparing purely online with in-person instruction did not find such an advantage (Means et al., 2013). More specifically, meta-research supports both the advancement of research and the training of the researcher by advancing awareness of the state of the field study today (Mainardes, 2018).

Mahmud et al., (2020) conducted a quantitative meta-analysis to assess the overall efficacy of treatments for blended learning. To assess the effectiveness of the blended learning interventions on learning effects, Cohen's d was used, producing effect sizes (ES). The overall conclusions provide a thorough body of high-quality data showing that blended learning has a great deal of promise for achieving learning objectives while being supported by technology.

Additionally, it is stated that blended learning might enhance performance, attitude, and success in most nations in the meta-analysis of Yu (2021) using Stata/MP 14.0. However, blended learning was unable to significantly raise student participation in academic tasks in either China or the USA. In the USA, there were no discernible differences between blended and non-blended learning in terms of student achievement. Like this, Muller & Mildenberger (2021) look at the effects of substituting an online learning environment for traditional classroom instruction. Strict inclusion criteria for the research design, assessment of learning outcomes, and use of blended learning were used in the meta-analysis (k = 21 effect sizes). Although not substantially different from zero, the estimated effect size (Hedge's g) was positive, and the confidence range [-0.13, 0.25], suggesting that overall differences between blended and traditional.

In response to the COVID-19 Public Health Emergency, the Department of Education adopted the Basic Education Learning Continuity Plan (BE-LCP) and used a variety of learning delivery modalities (LDMs) to ensure that its students would continue to have access to learning opportunities through blended learning, distance learning, and homeschooling (DepEd, 2020). As stated by DepEd, blended learning involves "face-to-face with any or a mix of online distance learning, modular distance learning, and TV/Radio-based Instruction," according to Malipot (2021). It is intended to provide schools the ability to restrict face-to-face instruction, promote social segregation, and reduce the number of individuals outside the house at any given moment. The researchers will carefully examine several significant learning strategies, including learning conditions (such as studying alone or in groups), student characteristics (such as age and ability), materials (such as simple concepts or problem-based analyses), and criterion tasks (different outcome measures), before drawing conclusions about their efficacy. This review's qualifying article will serve as the foundation for a meta-analysis of the sources cited by these writers, which will provide more insight into the scope of the various learning strategies and how different moderators impact them.

The researchers from the DepEd Division of Cebu City comprised the Public School District Supervisor (PSDS)/District Research Chairman of South District IV, School Head/District Research Member of Don Sergio Osmeña Sr. Memorial National High School, and together with the District Research Coordinator has identified the following challenges during the initial survey of classroom teachers, monitoring of schools and through feedbacks using Gap Analysis wherein a thorough comparison of "What should be? From "What is Actual" and "What was done?" to be able to identify the gaps in the following problems.

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Finding out how the researchers did their gap analysis is presented in Table 1 below.

Table 1

Gap Analysis of the Current Study

WHAT SHOULD BE?	WHAT IS ACTUAL?	WHAT IS THE GAP?
All schools of the South District IV must have 100% proficiency in DistMEA	Only 1 school in South District IV has 75% proficiency in DistMEA	There are 2 schools in South District IV whose MPS in DistMEA is below 75% proficiency.
All Master Teachers (individual or group) of South District IV must conduct action research at least once a year on blended learning strategies for learners' academic performance.	None of 47 Master Teachers (individual or group) in the secondary level conducted action research (experimental design) for the current school year.	100% Master Teachers at the secondary level do not conduct action research at least once a year.

To systematize the procedure of this action research, the authors in their capacity had scheduled an initial survey/orientation on the making of classroom-based action research, especially on the teaching and learning dimension with an enhancement of experimental designs and the submission of the results to the Division Office of the PSDS per grade level and per school. Then the survey form was prepared and validated by experts and Senior High School Teachers and finalized. The accomplished form will provide the researchers to explore existing studies mainly considering Blended Learning (BL) in the context of students and teachers in improving teaching and learning. Now that digital learning has emerged as a major trend in both K to 12 and basic education, the relative efficacy of online and face-to-face instruction needs to be revisited since it has raised the models of blended learning. But only fewer studies explored the blended learning implementation process, and research coordinators as well as explored master teachers' who initiate instructions related to blended learning adoption in basic education. To fill this gap in knowledge, this current study aimed to systematically review and analyze prior studies that explored blended learning adoption and implementation related to students and teachers.

Basic Research Questions

This meta-analysis is designed to produce a statistical synthesis of contrasting learning outcomes for either fully online or blended learning conditions with those of face-to-face classroom instruction. Specifically, this would answer the following questions:

1. What are the attributes of the selected blended learning studies in terms of:

1.1 Interventions;

1.2 Country;

1.3 Year of Publication;

1.4 Intervention Duration;

1.5 Learning Stage;

1.6 Domain Subject; and

1.7 Effect Size?

2. What are the practices involved in blended learning implementation in basic education?

3. What implications can be deduced based on the result of this study on the utilization of blended learning and increasing students' academic achievement?

Innovation, Intervention, and Strategy

The use of blended learning as an innovative concept embraces the advantages of both traditional teachings in the classroom and ICT-supported learning including both offline learning and online learning. As an innovation, intervention, and strategy of this study, the researchers spearheaded the development and validation of qualified online journals through intermittent meetings and agreements. The level of academic performance of the students on the use of modular and blended learning delivery modalities at present time in the Division of Cebu City, South District IV comprises the following schools: Don Sergio Osmeña Sr. Memorial National High School, Labangon Bliss Elementary School, Labangon Elementary School, Sibugay Integrated School, Oprra National High School, Oprra Elementary School, and Kalunasan Elementary School will closely be approximating the level of mastery with very satisfactory performance in terms of their grades during the monitoring and evaluation phase vis-à-vis the reports coming from District Monitoring Evaluation and Adjustment (DistMEA) after thorough processing of meta-analysis.

As seen in Figure 1, Blended Learning implementation involves F2F and other corresponding online learning delivery methods. Normally, students attend traditional lecturer-directed F2F classes with computer-mediated tools to create a blended learning environment in gaining experiences and promoting learners' learning success and engagement. Blended learning provides motivating and meaningful learning through different asynchronous and synchronous teaching strategies such as forums, social networking, live chats, webinars, blog, etc. that provides more opportunities for reflection and feedback from students.

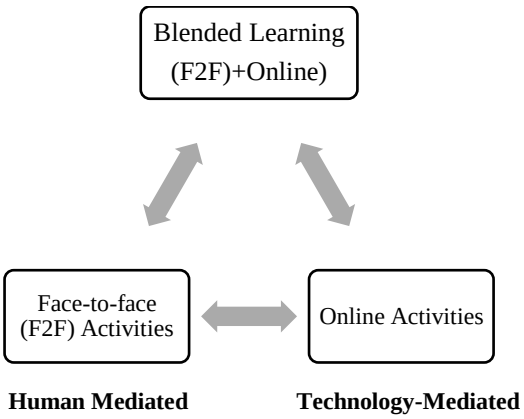


Figure 1: Key Aspects of Blended Learning

The strategic management to establish the content and practice of dynamic teaching courses and integrate production with teaching has practical significance in the future. Figure 2 shows the pillars of instructional innovation.

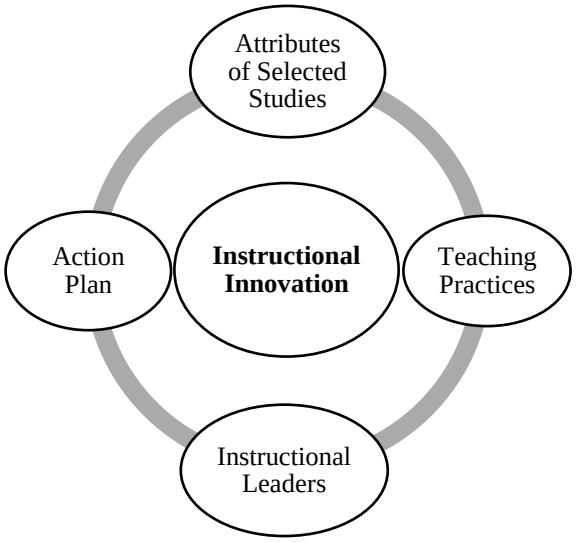


Figure 2: The Pillars of Instructional Innovation

First, the pillar shows the attributes of selected studies that will be sought comprising research methods, countries and publication year, research index, intervention duration, learning stage, and teaching method. The meta-analysis conducted must show its effect sizes by employing blended learning as well as its length of instruction varying across studies to establish the impact of human-mediated and technology-mediated instruction.

Second, the teaching practice exercise is the succeeding point where the relationship among the three major players: instructional leaders, master teachers, and aspiring teachers' interface to determine the quality of experience the aspiring teacher will take away. It becomes the foundation on which the aspiring teacher once certified and employed builds his/her professional identity. It is, therefore, necessary that aspiring teachers are paired with competent, knowledgeable, and concerned instructional leaders to help them assume the full range of duties of a teacher during this hands-on training or application of blended learning (Aglazor, 2017).

Third, leadership that fosters innovation requires leaders who have a clear vision of where they want to take their school, have a commitment and passion for change, support risk-taking, and lead by example. According to Meyer (2019), teacher leaders' step outside their classroom doors and accept the challenges to

improve their practice through working with colleagues, school administration, and professional staff as well as students and their families.

The last pillar in this study ends with an action plan which serves as the roadmap that ensures all students reach their full academic potential and are prepared to succeed and meet specific goals that are set in the plan. In other words, it is a systematic way of defining a goal, figuring out strategies for meeting the goal, and deciding how teachers will assess whether they have met the goal. Furthermore, they can use action plans in relation to their own professional goals, and they can also use them to work with students. The sharing of this action research can be done through the district-based Learning Action Cell (LAC), which primarily functions as a professional learning community for teachers that will help them improve practice and learner achievement (DepEd Order No. 35, s. 2016).

Finally, the inductive approach to theory development will be used to create a theory that would explain the occurrence of a phenomenon that will be observed. The attributes of the selected blended learning studies, and practices involved in blended learning implementation in basic education. According to the study of Gagani (2019) the credibility of quantitative research results through A Humean Approach: (1) The data must be based on a natural world setting or based on hard data previously proven. Like qualitative research, the type of data that will be gathered must be studied; (2) Codifying the data systematically. After the data gathering, the next step is to codify the data. Do the data need to be organized, needs to be put in order, the data suggest being categorized, or do the data present a pattern on the effect of the previous medicine; (3) Testing the hypothesis through experimentation. The experimentation in this stage is two folds. One is the testing of the hypothesis using actual cases and acting directly in the real-world setting, the second one is the investigation that happens in a confined laboratory, and (4) Accepting results/theories as a justified generalization. When the result is verified by quality evidence, then it is reasonable to accept it for the moment.

Methodology

An extensive literature review is important to carry out before starting any research investigation (Anthony et al., 2017b). Finding research gaps that exist and revealing areas that prior studies have not fully explored (Anthony et al., 2017c). Likewise, a systematic literature review (SLR) identifies, selects, and critically appraises research to answer a clearly formulated question (Dewey & Drahota, 2016). The systematic review should follow a clearly defined protocol or plan where the criteria are clearly stated before the review is conducted. It is a comprehensive, transparent search conducted over multiple databases and grey literature that can be replicated and reproduced by other researchers. It involves planning a well-thought-out search strategy that has a specific focus or answers a defined question. The review identifies the type of information searched, critiqued, and reported within known timeframes. The search terms, search strategies (including database names, platforms, and dates of search), and limits all need to be included in the review. In addition, the preceding research exposed a flaw in its layout, sampling, or interpretation as well as documenting an ongoing educational problem and advised reading the impact of an innovative intervention to try and enhance the studying modalities amidst the COVID-19 pandemic (Moral, 2021). The research design of this review study is shown in Figure 3.

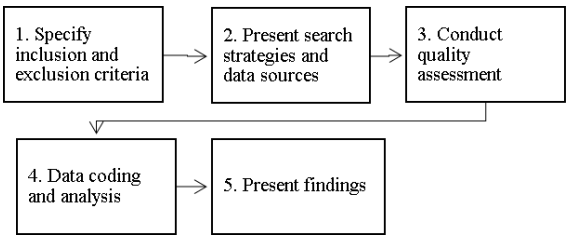


Figure 3: Research Design for Systematic Literature Review

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria (Table 2) and quality assessment criteria (see Table 3) were employed as the sampling/selection methods used to select the articles involved in this study. The inclusion and exclusion criteria are defined in Table 2.

Table 2

Inclusion and Exclusion Criteria

Inclusion	Exclusion
Should involve BL implementation practices or adoption constructs/variables and factors	Studies that do not present BL implementation practice or adoption constructs/variables and factors
Should employ a model, framework, or theory for an investigation related to BL.	Models, frameworks, or theories used in contexts other than BL
Should be written in English and published in 2012 and 2022	Studies that use languages other than English
Studies that involved BL teaching and learning in relation to basic education students, teachers, and administrators	BL studies that do not involve students, lecturers, and administrators

Quality Assessment

One of the vital determinants that are required to be checked along with the inclusion and exclusion criteria is the quality assessment. To this end, a quality assessment checklist that comprises "10" criteria was designed and employed as a means for evaluating the quality of studies selected. The quality assessment checklist is shown in Table 3. The checklist was adapted from recommendations from Kitchenham and Charters in Anthony (2021, d). Accordingly, the question will be measured based on a 3-point scale which ranges from, 1 point being assigned for "Yes", 0 points for "No", and 0.5 points for "Partially". Hence, each article's scores range from 0 to 10 where a study that attains a higher total score, possesses the capability to provide address the specified research questions. The assessment results of this study will be appended which show the quality of the selected articles. Correspondingly, it is evident that the selected studies have passed

the quality assessment, which implies that all the articles are eligible to be utilized for further meta-analysis.

Table 3

Quality Assessment Criteria

#	Questions
1	Are the research aims plainly stated?
2	Are any BL practices considered in the study?
3	Are the constructs and factors considered in the study? Is the study context visibly specified?
4	Does the article develop a model/framework or based on
5	existing theory?
6	Are the data collection methods sufficiently detailed?
7	Does the article explain the reliability and validity of the variables?
8	Are the statistical approaches employed to analyze the data?
9	Are the results clearly discussed?
10	Are the implications of the study clearly presented?

Search Strategies and Data Sources

The articles involved in this study were retrieved through a comprehensive search of prior studies via online databases which included Google Scholar, Elsevier Science Direct, Semantic Scholar, ResearchGate, ERIC, Open Access, Academia Edu, etc. The search will be undertaken in January 2012 and May 2022. The search terms comprise the keywords "blended learning practices" or "blended learning variables" or "blended learning factors" or "blended learning constructs" and ("effectiveness of blended learning" or "impact of blended learning" or influence of blended learning"). The mixture of the keywords is a crucial step in any systematic review as it defines articles that will be retrieved.

Ethical Considerations

The researchers will carefully examine a number of significant learning strategies, including learning conditions (such as studying alone or in groups), student characteristics (such as age and ability), materials (such as simple concepts or problem-based analyses), and criterion tasks (different outcome measures), before drawing conclusions about their efficacy. This review's qualifying article will serve as the foundation for a meta-analysis of the sources cited by these writers, which will provide more insight into the scope of the various learning strategies and how different moderators impact them.

DISCUSSION OF RESULTS

This chapter presents, analyzes, and interprets the results of the investigation conducted. The text is presented in the following order: search results using PRISMA or Preferred Reporting Items Systematic Reviews and Meta-Analysis, tabular and figure presentation for statistical synthesis. For theory generation, the writers formulated thematic analysis and propositions.

The obtained data were continually compared, and quantitative data were analyzed using thematic analysis to provide significant reoccurring motifs (Nicolas, 2021). The study was conducted using Braun and Clarke's six-phase framework, which involved familiarizing oneself with the data, creating initial codes, identifying themes, reviewing themes, describing themes, and finally writing a written report.

The flowchart for the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method, which was used to find and improve the publications, is shown in Figure 4. The PRISMA declaration was developed to assist writers in better reporting systematic reviews and meta-analyses. PRISMA may also be helpful for critical evaluation of published systematic reviews (Moher et al., 2009). It may also be used as a framework for reporting systematic reviews of other types of research, notably evaluations of treatments.

In order to help to the quality assurance of the revision process and to ensure that it can be replicated, it also offers a standard peer-accepted approach that makes use of a suggestion checklist. This methodology was strictly followed for this study. A review protocol was created, outlining the search strategy, article selection standards, method for evaluating the quality of the articles, and steps for data extraction and analysis (Ashraf et al., 2021).

Search Result

The figure displayed PRISMA involved three levels such as identification, screening, and included. Identification as the initial stage gave a total of one thousand five hundred fifty (1,550) came from Google Scholar, sixty-four thousand three hundred eleven (64,311) came from Taylor and Francis, seven thousand seven hundred forty-five (7,745) came from ERIC, and four thousand three hundred (4,300) came from Semantic Scholar. Two hundred thirteen have been removed due to non-basic education practical use of blended learning since they are applied in higher education context. Screening involved three hundred fifty-nine (359) but one hundred eighty-seven (187) of these have been unavailable for access; one hundred twelve (112) have been excluded because the studies did not use quantitative research methods. Sixty (60) have been assessed for eligibility where five have no fitting abstract and nine (9) did not pass the intensive screening. Using the CASP checklist, only thirty-one (31) are left for final qualification.

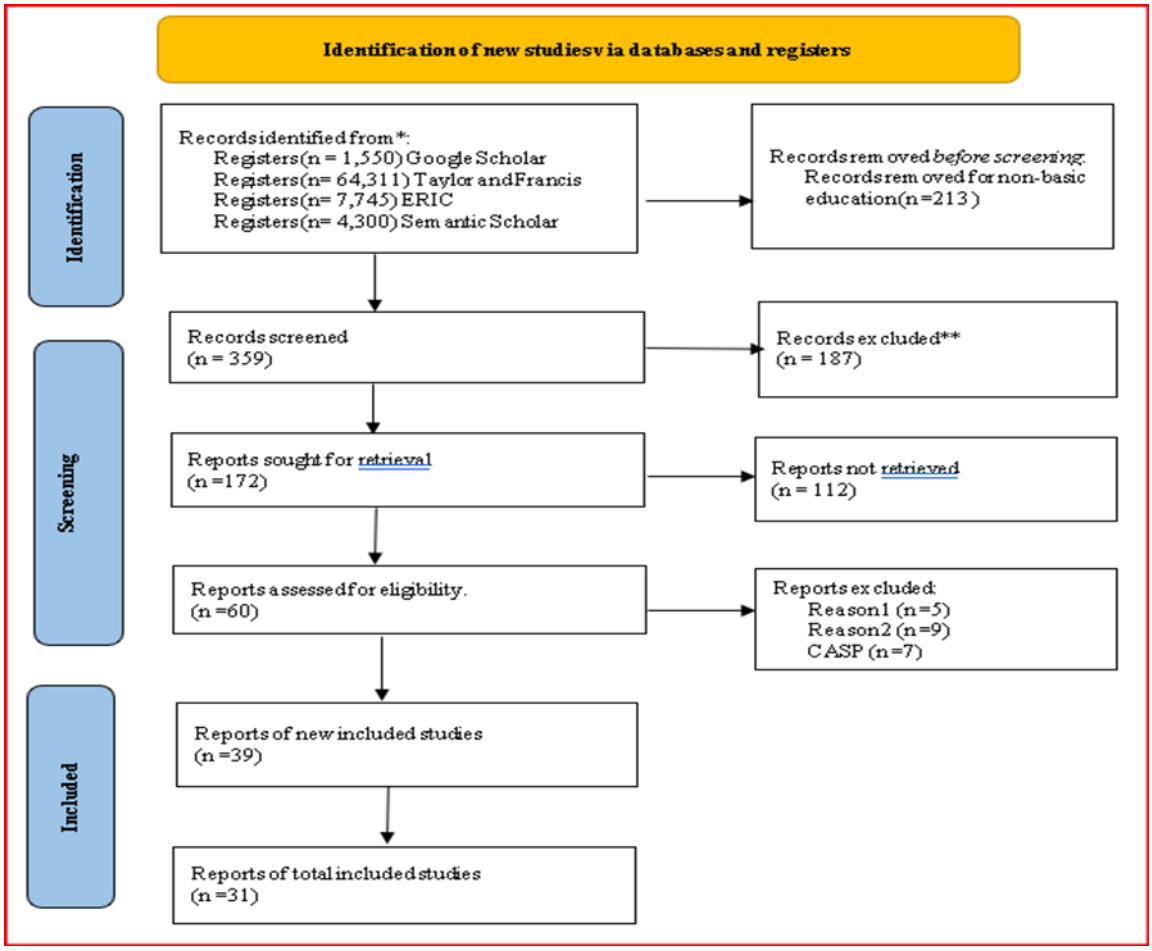


Figure 4: The Flow of Information Through the Different Phases of a Systematic Review

Figure 5 shows the country of publications of the selected studies using blended learning (BL). It was shown that most Asian countries have the same frequency of four (4) published papers and prolific writers are in Turkey, Indonesia, and India. Based on the Turkish applied intervention on blended learning, the Web-based App + F2F are most prevalent in their institutes. Also, the Indonesian teachers used BL Moodle with Scientific Learning + F2F while Indian basic education utilized BL + Traditional F2F learning. The investigation of Rodriguez and Cobo (2022) underscored that no single country across the world finds it hard to set action on transforming the security of learning during the COVID-19 pandemic.

In comparison, the least of the countries that have similar quantities of BL in basic education publications are the following: Greece, Taiwan, Palestine, Pakistan, Eswatini, Kuwait, USA, Malaysia, Kazakhstan, and Vietnam. The results indicate that out of thirty-one (31) selected studies through meta-synthesis, there is still an average development of students' engagement between BL and F2F learning approaches. The persistence of students' achievement when it comes to BL is more effective than F2F method.

Figure 5

Selected Study by Country of Publications

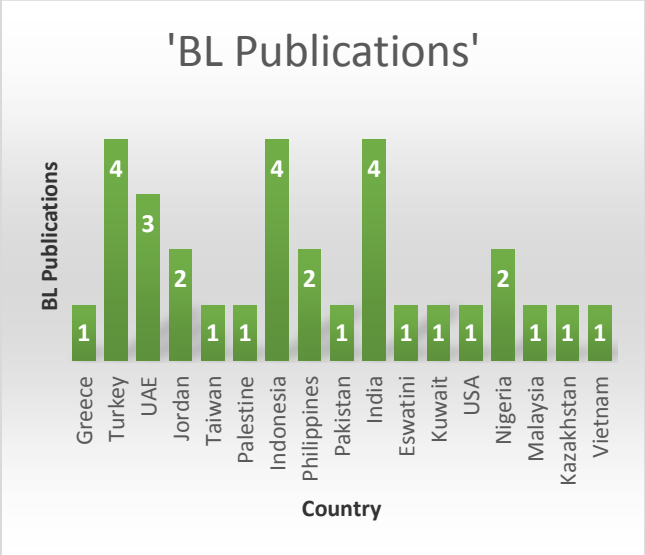


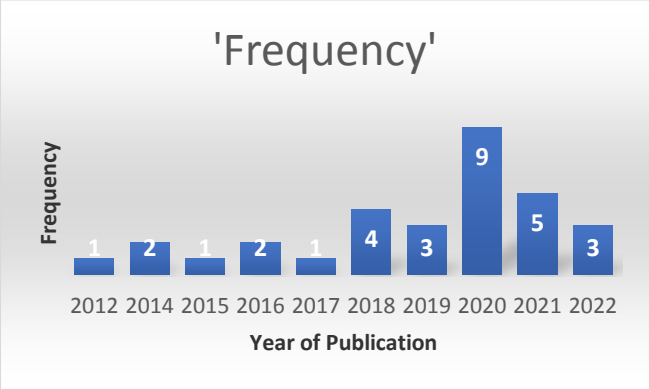
Figure 6 illustrates the year of publication on Blended Learning (BL). It was found that the year 2020 has the greatest number of published studies with a frequency of nine (9) out of thirty-one (31). This was due to the outbreak of the COVID-19 Pandemic which affects the different levels of education and prompted schools and universities to utilize an alternative delivery mode of

instruction. The setting forth flexible learning options which covers different forms of learning delivery and its accompanying learning materials that are sensitive to students' needs were also prioritized by the Department of Education. This is substantiated by the study of Malipot (2021), that BL or a mix of online distance learning, modular distance learning, and TV/Radio-based Instruction is designed to enable schools to limit face-to-face learning, ensure social distancing, and decrease the volume of people outside the home at any given time.

However, the previous years covering 2012 to 2019 show lesser to least publications on blended learning since the level of adjustments were not that too affected by the pandemic. The sessions of webinars were not that also intensive as those fed by the Department of Education to teachers just to ensure that education will continue despite the pandemic.

FIGURE 6

SELECTED STUDY ON YEAR OF PUBLICATIONS



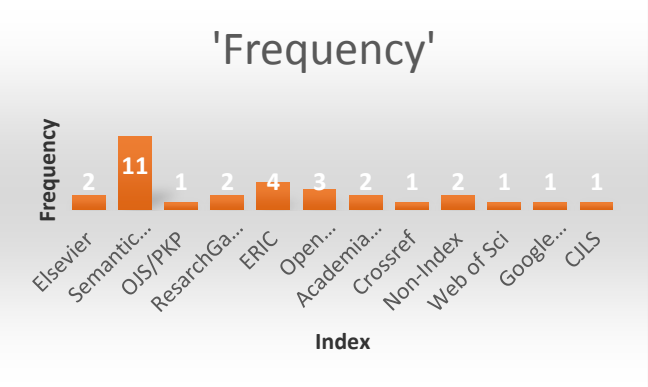
The chosen BL-qualified research from various indexes or databases are shown in Figure 7. With a total of eleven (11) published blended learning articles in basic education, Semantic Scholar has the most frequency. Developers may access this research publication's team's free, trustworthy source of academic data to create applications that hasten scientific advancement. The Allen Institute for AI, a non-profit research organization established in 2014 with the goal of undertaking high-impact AI research and engineering in service of the common good, therefore launched Semantic Scholar in 2015 as a ground-breaking initiative (Semantic Scholar, n.d.).

In general, the rest of the BL studies are from various data sources and whose quantities are almost closer to each other, such as Elsevier, OJS/PKP platform, ResearchGate, Open Access, Academia Edu, Crossref, Web of Science, Google Scholar, etc. These studies are very helpful in quantitative social science research because they give a researcher a way to create a composite measure that summarizes responses for multiple rank-ordered related questions or statements. Web of Science is an interdisciplinary service that covers all scientific fields, but it only includes what it considers to be "best" journals and focuses on those published in English. Scopus is the largest abstract and citation database of peer-reviewed literature and is owned by Elsevier.

In this situation, the method of meta-synthesizing the contents of every quantitative study helped the researchers to specify the structures that organize the collected data and easier to look up. In other words, a systematic literature review (SLR) identifies, selects, and critically appraises research to answer a clearly formulated question in relation to students' academic achievement with the use of blended learning (Dewey & Drahota, 2016).

Figure 7

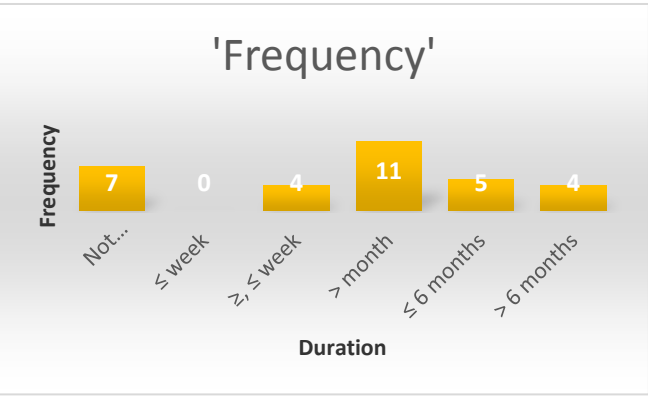
Selected BL Studies from Index/Database



It can be gleaned from Figure 8 on selected BL studies and their duration. The results reveal that all types of experimental studies under blended learning were administered within a duration of more than 6 months (> month) or a quantity of eleven (11) compared to more/less than 6 months with a frequency of four (4). This tie of frequency indicates that the magnitude of BL was controlled by the researchers from the qualified experimental studies as part of the intervening variable.

Figure 8

Selected BL Studies and their Duration

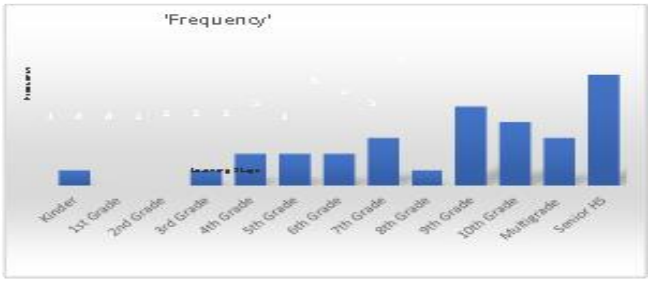


On the other hand, an experimental design with less than a week shows nothing or zero (0) frequency during the meta-analysis procedure. It is also worth mentioning that there were seven (7) studies on time allocation that were not mentioned. The data signifies that the duration of an experiment is inherently associated with the set of subproblems from the searchers' points of view and mostly with the type of competencies taken from the curriculum adopted by the authors of the published studies. As a rule, time is very important in any research design.

The learning phase of blended learning research in elementary school is shown in Figure 9. The senior high school students were mostly exposed to experimental investigations employing BL and F2F techniques, according to the findings. Most Asian nations attempted to assess the usefulness of BL along core, specialized, and applied topics with a frequency of seven (7) out of thirty-one (31) research. For instance, Kazu and Demirkol's (2014) study found a substantial difference between the grade distributions for academic achievement and the grades of students according to gender. Female high school students have proven to be more effective than male high school students in both learning contexts.

Figure 9

SELECTED BL STUDIES AND LEARNING STAGE

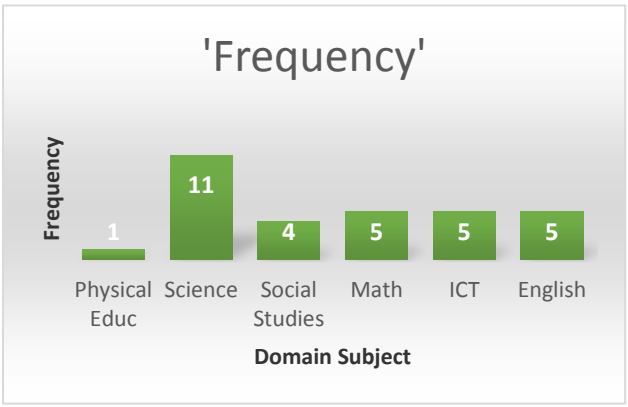


On the contrary, the 1st and 2nd Graders show zero (0) intervention on BL with common frequencies of one to three (1-3) in Kindergarten and Elementary levels. But in the first instance of its results regardless of grade level in elementary education, most of the authors in the qualified studies concluded that BL is effective in the new normal system in improving the creativity and activeness of students (Miskiah & Sudjarat, 2020); the computer-aided BL enabled the Grade 4 students to achieve higher English achievement positive attitude and learning permanence compared to the traditional way of teaching (Assylzhanova et al; 2022). Even more prior to the pandemic the report of Lin et al; (2017) the 3rd Grade male students show positive attitudes toward studying mathematics in BL environment. Lastly, the first qualified study by Vernadakis et al; (2012) appears that blended instruction should be embraced by teachers to assist students to improve their performance because the t-test analysis on independent samples revealed statistically significant.

To find out the domain subject applied using blended learning, Figure 10 exposes that majority of the teacher-researchers were hooked to science education with a frequency of eleven (11). Most of the included topics in this area were genetics, functions of plants, chemical reactions and biomolecules, motion, etc.

Figure 10

Selected BL Studies and their Domain Subject

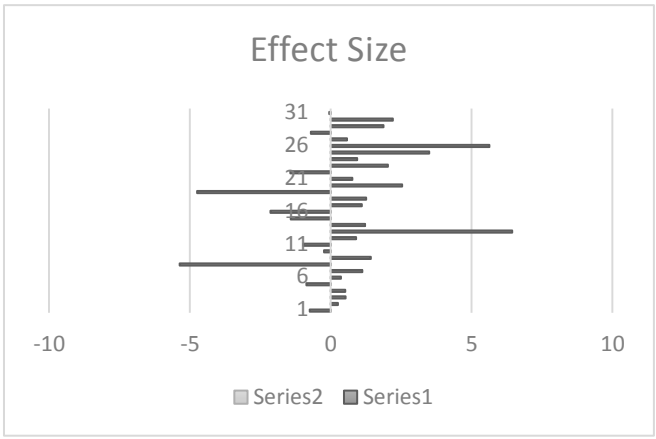


Since most of the qualified studies revealed statistically significant of BL versus the traditional approach, science teachers recommended that BL must be used effectively while curriculum planners should ensure the incorporation of this strategy in the teaching and learning of chemistry concepts (Udoh & Udo, 2020; Aziz et al; 2021). Studying the effect of using BL in teaching with other teaching results and variables (Kahder, 2016). Afterward, the rest of the domain subjects having the same quantities (i.e., Math, ICT, and English) may require more researchers' attention to the light of the findings can provide recommendations in various areas. Yet the least of the subject domain, Physical Education shows only one (1) due to its natural inclination of the students' performance with an integration of ICT in a 3C-model of didactical components. Its findings can provide great management insights into developing effective strategies for creating new opportunities for students and teachers.

The last characteristic of the chosen research displays its effect magnitude. Effect size, according to Bhandari (2022), informs the researcher of the significance of the association between variables or the distinction between groups. It demonstrates the relevance of a study finding in the real world. A big effect size denotes the practical relevance of a study conclusion, whereas a small impact size suggests limited practical implications. The 13th research by Siddiqui et al. (2019) shows 6.442 in Figure 11, which corresponds to an incredibly huge impact size. In Grade IX Chemistry lessons in Pakistan, the BL Program + Traditional Method was applied for ten (10) weeks to a sample size of fifty-three (53) students in the experimental and control groups.

Figure 11

Selected BL Studies and Their Effect Size



Based on the findings after comparing the two groups, BL program have significant and positive impact on academic achievements through the mediation of autonomy. Likewise, the 26th study conducted by Ezeanyika et al; (2021) shows an extremely large effect size of 5.632 with a sample size of 59 and 53 for the experimental and control group conducted in Nigeria for 6 weeks among senior high school. The findings of the study revealed among others that there was a significant difference between the mean academic scores of the students taught in computer studies using blended learning instructional approach versus the conventional method. It is then recommended by state ministry of education on how to use BL in teaching.

On the other hand, there are two studies showing very small on its effect sizes. The study of Qindah (2018) in Palestine revealed -5.366 when administered to 10th Grade with a sample size of 22 and 23 in experimental and control group. However, BL has positive effect on students' achievement in grammar instruction as well as the blended material used which improves their pronunciation. Consequently, the 19th study by Alajmi (2020) shows a very small effect size of -4.747 that was administered among Grade 11 students in geography subject. Despite the effect size, the superiority of BL in terms of the high degree of learners' acquisition of geography skills in favor of the experimental group with a sample size of 33 over the control group having 32 sample size. Employing blended learning in geography is one of the recommendations to increase student achievement.

In a blended learning environment, the study by Vernadakis et al. (2012) demonstrates substantial variations in student performance when the 3C-model of didactical components is used. As some e-learning aficionados have argued, digital media will not replace conventional methods of teaching and learning.

Furthermore, technology may enhance conventional education, and FTF meetings can benefit technology-assisted learning. Although when Kazu and Demirkol (2014) used brainstorming and cluster analysis in a web-based learning environment, they found no discernible change. The results could imply that brainstorming might only produce a finite number of ideas and that it is impossible to account for all the risks and repercussions with so small a pool of concepts. The use of many responses and the same concept in

Almasaeid (2014) saw an improvement in pupils' academic performance. The student who needs academic support or an additional challenge in the form of advanced lectures benefited from tutorials as independent factors. This may increase your willingness to take on more difficult jobs and acquire new information. In contrast to Saritepeci and Cakir's research, H. The results indicate that the students' level of proficiency is not that high, especially if it is not constantly practiced as the usual instruction considering the type of learning environment for an object-orientated dynamic learning environment, according to Information Technology Proficiency Survey and Engagement Survey versus Moodle (Modular Object-Oriented Dynamic Learning Environment) (2015).

According to Khader's (2016) research, the experimental group benefited from variations in post-achievement related to the teaching strategy. Since both the respondents and the teachers are involved in the learning process, regardless of the teacher's gender demographic profile, reviewing the prior knowledge with Intel and ICT integration facilitated the students' comprehension, allowing an integrative skill to be thoroughly mastered. Similar to this, Lin et al. (2017) revealed that the experimental group's students benefited from the blended learning experience by improving both their attitudes about studying mathematics as well as their learning results. The results show that teachers value students' numeracy abilities since it affects how they feel about the topic.

The experimental group's academic performance significantly differed from the control group's due to the blended learning environment (Ceylan & Kesici, 2017, Quindah, 2018, & Utami, 2018). The responders were proficient in all of the included areas, including problem solving, computer programming, and the creation of software products. Online tests given to students in pairs or small groups on a particular grammatical issue were also important for their knowledge, and Moodle's role as a learning management system helped to further this goal because it covered the material from the courses utilizing BL. The research indicates that this age group of student responses can benefit from both cooperative learning and ICT integration.

In contrast, Hinampas et al. (2018) demonstrate that there was no appreciable change in the academic performance of students exposed to blended learning through hands-on experiences in scientific labs. This shows that the respondents do not completely understand practical skills since they are still using a non-blended learning strategy.

Derived Hypotheses

Hypothesis 1: Most Asian countries have published studies on blended learning since the onset of COVID-19 up to 2021 through reputable research indices.

The literature review shows that since 2019 majority of the published studies on blended learning in basic education are Asians taken from different websites and indexing companies. Compared to many developed countries, BL has become the most favored model of learning due to a natural consequence of all over the internet and the World Wide Web. However, the developing countries in Asia experienced the lack of facilities like gadgets or computer sets, and connectivity. This does not prevent them to switch on mixed methods or hybrid learning. In addition, the publication practices of the selected journals produced pedagogical features which show the significance of blended learning up to the post COVID-19 season.

Hypothesis 2: A duration of more than one month is an effective range in conducting blended learning approaches.

The use of time is one of the most crucial components of any study design. For those who are performing fundamental experimental design, it is a priceless resource. The planning of advanced experiments for the day, week, month, and beyond includes specific information on the effectiveness of data collecting. Based on the unsuccessful studies on BL, the researchers believed it to be convenient and practical for a large sample size, appropriate for real-world natural settings rather than true experimental research design, and an analysis on the impact of independent factors happening in natural situations.

Hypothesis 3: High school students are more engaged in blended learning.

The BL used from the chosen studies demonstrates several techniques and certain strategies to assist secondary pupils in becoming engaged and then maintaining that engagement. Additionally, it should be mentioned that if no one is learning, teaching is useless. The best way to make sure learning is occurring is to monitor it at various levels, but devising teaching strategies that emphasize active involvement is even more beneficial. All in all, the used BL provides a starting point for lecturers and teachers that seek to improve learning and raise success rates by promoting student participation in online and mixed modalities.

Hypothesis 4: Hard sciences are more dominating disciplines to blended learning.

One can observe that there is a strong tendency toward blended learning as a method of creating a pleasant informative educational environment, particularly in the natural sciences, from experience and several reputable research. The stages of pedagogical design are defined in the context of blended learning and lessons that make use of a variety of teaching strategies, involve experiments that are relatively simple to set up with controlled variables and in which it is simpler to make objective measurements.

Hypothesis 5: Blended learning studies show more practical significance of the findings.

According to the certified research that passed the screening process, BL encourages children to go from passive learning to active learning, which enables them to read, talk, and think. Additionally, students have a choice between conducting online and face-to-face work independently or in groups. Teachers can also evaluate students' attention, responsibility, and genuine evaluation by considering their personalities. Finally, BL can provide the best of both worlds, giving instructors and students greater flexibility and accessibility without sacrificing face-to-face interaction.

From the hypotheses, the following propositions were derived.

Derived Propositions

Proposition 1: The blended learning approach serves as a scientific research response alternative during the new normal.

The new alternative suggests that blended learning would be crucial post-pandemic with the opening of educational institutions, notably schools, to prioritize the health and well-being of both students and instructors (Saboowala & Mishra, 2021). However, not only in higher education but also at the primary school level, the post-pandemic approach to teaching the new has brought about significant change. Megahed (2022) concluded that.

"BL offers myriad opportunities for synchronous classroom activities, it shares common ground with a purely online format, in that, both rely on online delivery. But the nature of students' interactions with online materials are challenging."

Proposition 2: The assigned subjects and underlying variables in blended learning will influence its causal relationships.

To encourage self-regulated and deeper learning, blended learning is frequently associated with student-oriented learning, in which students have more influence over the learning route (Bos et al., 2016). According to the independent variables that the researchers have adjusted, students' cognitive abilities are thoroughly examined. From this point forward, it depicts a link between the utilization of online learning tools and academic success. Based on the findings of the study conducted by Habib (2018), it can be said that:

"The students elaborated that having traditional and online learning together helped them to understand the contents more thoroughly… Blended Learning was found to have positive effect on learner's study achievement than the face-to-face learning environments. In blended learning environment, learners cooperate effectively."

Proposition 3: An integration of different disciplines will assist the students' performance through blended learning.

As a result of the application of BL to the chosen subjects, cross-disciplinary learning is produced, which can direct instruction and evaluation in courses that contain sequential learning across many disciplines. To support sensemaking in a novel disciplinary context by drawing on knowledge from other, prerequisite disciplines, Borda et al. (2020) claim that cross-disciplinary learning combines insights from interdisciplinary learning, transfer, and resource frameworks and highlights the processes of resource activation, transformation, and integration. Weller (2021) then emphasizes the advantages of disciplinary study by stating:

"It is worth remembering that many academic disciplines are 'constructions' themselves, that they have been developed by people working in a particular field and that they offer a particular focus on knowledge. When we consider interdisciplinary learning (and teaching), we are working across boundaries of knowledge and creating new knowledge from various sources."

Generated Theory: Superior enlightenment results in students' achievement when they are given opportunities to learn and engage through blended learning.

The generated theory empowers the students on grasping the competencies which are under the guidance and facilitating skills of well-effective teachers during the new normal season of pedagogy. Even though the student's level of understanding varies, the meaningful opportunities within the series of activities from the classroom across other disciplines are purposively participated by the students in order to achieve higher remarks on their performances. Continuous development of innovative and useful ways for students to access opportunities using computer devices can be declared and educational practices designed with blended learning environments are significantly desirable to the students in terms of satisfaction, comprehension, and purpose.

Conclusion and Recommendations

The new trends in education since the onset of the COVID-19 pandemic led the researchers to ponder how it did really influence the program of any educational institution around the world, particularly in the delivery of quality instructions in basic education. It created and envisioned the writers of this basic research knowing that the diversion really started in the global arena. To think critically, the scouted literature from different indices and databases empowered the teaching force of the organizers in this creative investigation. Notwithstanding, the hesitant of the next consumers of knowledge to try and test the hunches or some constructs that have bearings to various frameworks in education which change over time at the national and international level.

Indeed, the combined mental resources of the writers capsulized and derived some hypotheses from the systematic review using meta-analytic approach. Considering some characteristics of the students' capacity on aligning their propensity which necessitates a call for the rethinking of the teacher's professional standards with the guidance of instructional leaders. Thus, it can be gleaned from the first hypothesis that the blended learning approach was well practiced in most Asian countries through reputable data indices. As authors of this paper, the credibility and visibility of one's work helped us understand journal indexing compared to unpublished academic papers and of because they are often considered to be of higher scientific quality.

The time frame in conducting an experimental research design challenges us since there are various designs and since it helped us refresh our stock knowledge as to how the authors of our selected studies ensure that their chosen methods match their aims and that the data are high-quality. It tends us also to learn the right kind of analysis to answer the questions utilizing credible sources thereby drawing us to search for a valid and trustworthy conclusion. Students and teachers were also forced to apply blended learning even though they may not be ready to teach and learn in fully online contexts during the height of the pandemic by the year 2020 compared to the previous and after COVID-19. But still, there are benefits on the delivery of blended learning like flexible learning, motivation, interaction, and improving their ICT skills. In addition, poor internet connection and incomprehensible materials were considered as the problem that hampers their learning.

The results of the study tend also to researchers to migrate to flexible teaching and learning modalities to recalibrate the curriculum, capacitate the faculty, upgrade the infrastructure, implement a strategic plan and assess all aspects of the plan. The data suggest that most of the primary teachers are encouraged to craft and start planning a creative investigation through action research proposal at the classroom level since the secondary level had their published studies on blended learning based on the systematic review.

With some variable medium and small sizes, the effects as evaluated by Cohen's criteria are significant in comparison to the effects of most field-based treatments. The researchers were encouraged by these to compare and consider significant variances in study characteristics, program expenses, and scalability throughout South District 4 in the Division of Cebu City. As a result, the researchers suggest a more organized framework with new empirical criteria for interpreting a particular class of studies: causal research on education interventions with standardized achievement results as an output of the study in accordance with the planned sustainability plan.

The use of technology and its assumed rapid growth, which provides several benefits to the process of learning in the classroom, were also examined in this basic research. According to evidence from compiled experimental designs, pupils who use a mixed learning strategy have a stronger conceptual grasp than their

counterparts. The pupils assert that they can access learning materials at any moment and go over some challenging subject again. However, there are several challenges that students experience while trying to stay motivated to learn on their own and avoid becoming sidetracked by visiting other websites when they are learning online. However, before using this teaching strategy, it should be considered if students have access to the internet.

There is no denying that the face-to-face component benefits students by giving them opportunity to develop peer relationships and a sense of community as well as by giving the instructor time to provide clear communication and feedback. Numerous people undoubtedly benefited from the subject's online component's flexibility and control over job speed. The flexibility of working through the online modules at their own speed and for their own goals was appreciated by the students.

The In-Service Training (INSET) and Learning Action Cells (LAC) sessions will need to be tailored for these environments if teachers in the Department of Education are to address the new mantra, MATATAG, and give teachers the recommended skills, knowledge, and experience in blended and online instruction. This groundbreaking fundamental study in SD4 reveals characteristics of blended learning course design that support developing lessons that are tailored to the requirements of students. If most instructors use the idea developed in this imaginative inquiry to plan their lessons, their students may get the skills, knowledge, and experience they need to successfully utilize mixed environments in their work. This is how the planned theory aids pupils much during this pandemic season.

As a result, the findings of this fundamental research demonstrated that implementing blended learning had an impact on teaching and learning across all subject areas. Furthermore, it was proposed that teaching and learning at the elementary school level should consider the use of blended learning as one of the 21st-century competencies.

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