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Mathematics Learning Gaps and Equity in Blended Learning

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A B S T R A C T

This study focused on Mathematics learning gaps and equity in blended learning. This was conducted at Nueva Ecija University of Science and Technology – Gabaldon Campus during the school year 2022-2023. The descriptive-correlation method was used to determine the mathematics learning gaps during blended learning. The regression analysis was utilized in the study. One hundred eighty-five students from the Laboratory High School were the respondents to the study. The respondents were selected using stratified random sampling. Questionnaires were used as the main instrument of the data collection. The findings revealed that most of the respondents are female within the age range of 15-17 years old and most of them are Grade 10 students. Most of the respondents are having difficulty remembering mathematical concepts, worry about failing Mathematics tests, and tend to easily lose focus reading modules using mobile phones. The respondents agreed that teachers ask the class if they understand the mathematics lessons and mastering mathematical skills during a blended learning setup is not difficult. The data revealed that most of the respondents have access to mobile gadgets to support their learning needs. The most encountered learning gap by the respondents during blended learning was the communication gap. Motivation and communication were identified as learning gaps that contributed to equity in blended learning. Learning disparities in motivation and communication have a substantial impact on equity in blended learning. Students may be aware of the mathematics learning gaps that they have encountered and may employ learning techniques to bridge those gaps. Teachers may address math learning gaps that are affecting students' learning. Furthermore, during blended learning, teachers may employ a range of tactics. Teachers may receive professional learning development from school administrators in various educational strategies and trends in blended learning. Researchers in the future may perform similar studies to investigate the effects of mathematics learning gaps and equity in blended learning.

Keywords: blended learning, mathematics, learning gaps, equity,

1. Introduction

Mathematical learning and instruction on digital platforms expand the educational field and increase the number of answers to various mathematical problems. A blended learning approach to teaching mathematics was developed as a result of the widespread use of technology in mathematics classes in the 21st century and the strong encouragement given to it by many educational institutions.

The COVID-19 (previously known as the “2019 novel coronavirus”) global pandemic has compelled the government in all aspects of society to change how they connect and take part in the socioeconomic process. (Alhammadi 2021) The education sector is among those that are most severely afflicted by this pandemic. To prevent social incarceration, education providers in the Philippines must convert from face-to-face instruction to distance learning, blended learning, and modular instruction (Department of Education, 2020).

Blended learning is defined by the Department of Education as "face-to-face with any or a mix of online distance learning, modular distance learning, and Television/Radio-based Instruction." It is intended to help schools "limit face-to-face learning, ensure social distancing, and decrease the volume of people outside the home at any given time." There are numerous gaps in education, and the majority of them are related to the attainment gap. The "teaching-learning gap" is, however, the most important gap for education stakeholders, including teachers, school administrators, and the Department of Education and Commission on Higher Education. The learning gap refers to the gap between what learners gained and what was anticipated of them.

Motivational, skill, content, communication, and environmental gaps are a few methods to recognize learning gaps. To achieve equity in education, systems must be created which ensure each child has an equal chance of success. It is necessary to comprehend the particular challenges and barriers that specific groups or classes of students face and to provide them with extra resources to help them get over those obstacles. Although this might not ensure equal results, policymakers, stakeholders, and teachers should all work to give every child the same chance at success. The selection of tools and applications is influenced by the equitable and accessible usage of technology. For learners to actively participate in and profit from education, the selection process should prioritize satisfying their distinct requirements. Although having access to technology is crucial, structural disadvantages brought on by elements like economic inequality, distance from other areas, or discrimination cannot entirely be eliminated by it. Allowing students the chance to use the appropriate technology will additionally contribute to the development of more equitable learning environments (OECD, 2012).

The Philippines obtained an average of 353 out of a possible 500 points in the Programme for International Student Assessment (PISA) study, which had been released on December 3, 2018. This was much lower than the OECD average of 489 points. (OECD 2019). To address these pressing challenges in education, DepEd Order No. 034 was issued on July 11, 2022, to ensure high standards of learning amid the COVID-19 pandemic. The target year is 2022, giving schools enough time to gradually move to face-to-face instruction. Three days of in-person instruction and two days of online learning serve as this transition (Department of Education, 2022). In the wake of the pandemic, Nueva Ecija University of Science and Technology – Gabaldon Campus chose the blended learning modality wherein the combination of face-to-face classes and modular are used during the transition period.

The researchers believe that there are mathematics learning gaps encountered by the students, especially during the slow transition to face-to-face classes. This study aimed to find out if the socio-demographic profile of the students and the learning gaps influence equity in blended learning.

Generally, this study aimed to determine the equity in blended learning and mathematics learning gaps of all Laboratory High School students in Nueva Ecija University of Science and Technology – Gabaldon Campus. Specifically, it sought answers to the following: how may the socio-demographic profile of the students be described in terms of age, sex, grade level, parent's educational attainment, parents' occupation, family's estimated monthly income, and number of children in the family? What mathematics learning gaps are mostly encountered by the students during blended learning? How do the students describe equity in blended learning? and Do mathematics learning gaps impact equity in blended learning?

The mathematics learning gaps in this study were limited to the students' mathematical basic content knowledge, skills, motivation, environment, and communication. Equity in blended learning in mathematics was limited to technology skills and accessibility.

1.1 Mathematics Learning Gaps.

There are two possible ways that educational gaps can develop. Some children perform below grade-level expectations, which indicates that they have gaps in their knowledge and are unable to meet norms. A lack of education is another issue. (Garcia et al, 2017) Teachers base their lesson plans, pacing directives, and curriculum maps on this information since, under Republic Act No. 10533 all children will receive education based on the standards that have been established by the state.

As students move from one grade level to the next, there is a process that teachers can use to identify the knowledge gaps that students have learned. If policymakers, stakeholders, and teachers do not fill these gaps, students may have foundational defects, creating an unstable framework for developing their knowledge and skills. Conducting an educational gap analysis becomes crucial for a school to understand what students have learned and to be able to close any learning gaps. (OECD, 2020)

Dorn et al. (2020), revealed that the pandemic has disrupted conventional educational systems and fundamentally altered how students learn. The transition to remote learning has expanded the achievement gap between students from various socioeconomic origins in terms of schooling. The authors contend that if ignored, these learning gaps could have a long-term effect on the lives of the students who are impacted.

Furthermore, Dorn et al. (2020) cited that students from underprivileged backgrounds, those of color, and those with impairments have been disproportionately affected by the pandemic. It was more challenging for these students to take part in distance learning because they were more likely to lack access to technology and internet connectivity. As a result of the absence of stable internet access, students in rural areas were affected disproportionately.

The different elements that affect students' learning gaps in mathematics were examined by researchers in their article "Analysis of Factors Affecting Students' Learning Gaps in Mathematics" published (Inot & Eres, 2017). The study discovered that the learning disparities in mathematics among pupils were significantly influenced by variables such as gender, age, socioeconomic level, and parental engagement. The effectiveness of teaching and the curriculum, according to the authors, had a big influence on how well students performed in mathematics. Students who had access to a challenging curriculum and received high-quality instruction outperformed students who did not.

Further, Pulido and Bulosan (2018) sought to pinpoint the mathematics learning gaps among incoming Grade 7 students at Santa Rosa Science and Technology High School in the Philippines. According to the study, students' mathematical knowledge and abilities were seriously lacking, especially when it came to fundamental arithmetic operations, fractions, and decimal operations. The study also showed that these learning gaps were caused by things like poor preparation in primary school, inappropriate teaching techniques, and a lack of enthusiasm and interest in the subject.

1.2 Mathematics Content Gaps

According to one study by McMillan et al. (2018), students who failed in arithmetic exhibited misconceptions about basic ideas like fractions, decimals, and basic algebra. Instead of being caused by a lack of experience, these gaps frequently came from a failure to comprehend the fundamental ideas.

The previous claim is supported by Raschig and Leggett (2016) who conducted a second study to examine the effect of knowledge gaps on students' mathematical performance. Students with major mathematical knowledge gaps performed noticeably worse on examinations than their counterparts who had a solid grounding in the topic, researchers discovered.

Furthermore, ineffective teaching methods have also been demonstrated to make mathematics knowledge gaps worse, according to a study. Knowledge gaps may result, for instance, if instructors rush through the subject too rapidly without making sure that students fully grasp the underlying ideas (Zawojewski et al., 2017).

1.3 Mathematics Motivation Gaps

Motivation is a key factor in determining student success in academic settings, and when students lack motivation, they are more likely to experience learning gaps. Erese, A. and Inot, R. (2017) brought attention to the significance of student motivation in mathematics. The researchers discovered that mathematics learners who were motivated outperformed arithmetic learners who lacked drive. According to the report, educators could use techniques like adopting interactive teaching practices and real-world examples to encourage student enthusiasm and involvement.

Pekrun, Elliot, and Maier's (2009) investigation into the connection between academic achievement and motivation and emotions in pupils has revealed that students who experienced negative emotions, such as anxiety and boredom, were more likely to experience low levels of motivation and achievement; while, students who experienced positive academic emotions, such as enjoyment and interest, were more likely to experience high levels of motivation and achievement.

Consequently, Jansen, Louw, and De Beer (2017) concluded in their research that there is a positive predictive effect for mathematics achievement for the sub categories of internalized and identified regulation of motivation. The study demonstrated how students' motivational orientations can affect their mathematical performance.

1.4 Mathematics Environmental Gaps

Gurney (2020) investigated the idea of learner gaps and pinpointed the causes of the accomplishment gap. According to the author, the complex interplay between social, environmental, and individual factors leads to achievement inequalities. Understanding the various factors that contribute to learner gaps is crucial to address them.

Family background is one of the crucial variables mentioned by Gurney (2020). The resources and support networks that are accessible to their wealthier counterparts are frequently unavailable to students from impoverished families. This can include having access to a good early education, a healthy diet, and secure housing. Additionally, students from underprivileged homes may go through more stress and trauma, which might hinder their capacity to study.

Additionally, the classroom setting is one of the main elements that can cause mathematics learning gaps. According to Ponnusamy and Manian (2018), there is a direct relationship between the learning gaps in mathematics and the classroom environment. The study discovered that the student’s motivation, engagement, and attitudes toward mathematics were impacted by the classroom setting, which in turn affected their learning outcomes.

1.5 Mathematics Communication Gaps

For students to learn and be taught face-to-face, the teacher must speak with them, discuss topics with them, and demonstrate things. It is commonly known that effective face-to-face learning necessitates cooperation between educators and students as well as between educators and students. On the other hand, the structure of face-to-face instruction does not change. Lessons are first scheduled for a particular day, time, and place. The scheduled time requires the attendance of both teachers and pupils. The ability to address the unique issues of the students is, however, always constrained while managing a full class.

According to John M. Ackerman's research (Education, 2009), this communication gap is caused by a variety of variables, including different communication preferences and styles as well as professors' use of jargon and technical language that some students may not be familiar with. Students also mentioned that they were reluctant to speak up in class or ask questions, which makes the communication gap even worse.

For both students and educators, the change to online education has brought up a new set of difficulties. The communication gap that might occur in online learning contexts is one of the most urgent problems. Multiple factors, according to Wilkins and Bradley (2015), can lead to a communication gap in online learning environments. These include time restraints, technological problems, and a lack of face-to-face communication. They pointed out that these elements may make it challenging for instructors and students to connect deeply and communicate effectively.

1.6 Mathematics Skill Gaps

A student skills gap is the difference between the information and skills that students now possess and those that they should have at a certain educational level. It may happen for several reasons, including inadequate instruction, inadequate curriculum development, or a lack of resources. A student's academic development may be hampered by a skills gap, which may eventually limit their future chances.

Any arithmetic ability that a pupil ought to have acquired in the past but didn't is referred to as a math skill gap. Learning gaps include things like a fifth-grader who didn't understand what a fraction's numerator means or a tenth-grader who doesn't understand when algebra's commutative property applies. It can be a student in the fourth grade who still mostly adds and subtracts ones using their fingers, dots, or mental tally marks. (Garcia et al, 2017)

1.7 Equity in Blended Learning

Equity is the fair and just equitable distribution of resources, opportunities, and advantages among people or groups, especially those who have historically been marginalized or underprivileged. It entails recognizing and eliminating structural and systemic obstacles that keep some groups from making use of the same chances and advantages as others. (Walker et al., 2016))

Every student, regardless of race or ethnicity, or socioeconomic background, should be able to study, belong, contribute, and succeed. Equity, in the definition of the OECD (2018), "does not imply that all students achieve equal educational outcomes, but rather that differences in students' outcomes are unrelated to their background or to economic and social circumstances over which students have no control."

The concept of "education equity" refers to giving all people the same educational opportunity, regardless of their ethnicity, gender, ideologies, or mental or physical disabilities. Therefore, making sure there is equality in online learning enables inclusive and equitable quality education and supports possibilities for everyone to continue learning throughout the students' lives.

Blended learning, which includes online and in-person instruction, has been increasing in acceptance as a means of improving the educational experience for students in recent years (Garrison & Vaughan, 2008). According to research, blended learning may provide both students and teachers with a variety of advantages. For instance, blended learning can promote student involvement and motivation (O'Neil & McMahon, 2005), increase learning flexibility and accessibility (Means et al., 2010), and offer options for personalized learning (Graham, 2013

Online learning is efficient, reasonably priced, and flexible. It may accommodate many learning styles when used as a teaching strategy. Online learning has an impact on students' morals and values as well, both positively and negatively. When learners participate in online learning, the characteristics of perseverance, self-control, and respect are some that can have a good influence on their values. However, other consequences are unfavorable to learners' morals, such as online academic fraud. Equity in online education in the Philippines is still a work in progress since not every learner has access to a dependable internet connection, a device to utilize, and technological knowledge. All teachers are required to complete online teaching preparation courses with an emphasis on equity problems.

Since it provides a variety of instructional methods and activities, blended learning can also be a useful strategy for supporting different learning preferences and styles (Bawa, 2016). Since students can collaborate both online and in person, blended learning can also foster communication and collaborative learning skills (Hrastinski, 2008).

While blended learning has a lot of potential advantages, it also has a lot of challenges that need to be addressed. Determining sure students have proper access to technology and a resource is a typical concern, especially in locations with limited resources (Pineda, 2019).

Another difficulty is managing the time and workload demands of online and in-person components. Additionally, instructors must be ready to modify their teaching strategies and approach to the blended learning environment, which may necessitate additional education and support (Salazar, 2018).

Furthermore, blended learning is a common teaching and learning approach in the field of education today. As a result, several schools have started incorporating blended learning into their regular academic programs. However, some schools in remote and isolated locations struggle to retain teachers since they do not use an effective teaching strategy in their regular lesson plans. Due to this, many schools have been forced to close permanently, while others have chosen to implement blended learning, a hybrid instructional strategy that perfectly combines traditional and modern approaches and has greatly aided in resolving the problem in remote and rural communities. While other organizations have their particular definitions, blended learning is usually defined as "a combination of traditional face-to-face and online training" (Graham, 2012). Neumeier (2005) also uses this definition: "a combination of face-to-face and computer-assisted learning in a single teaching and learning environment." As a result, children use technology to learn both in and outside of the classroom while they are in school. In the same context, Hockly (2018) asserted that "the usage of 'computer technology' as part of blended learning is widely assumed to take place in a different location from the face-to-face teaching, and most usually in the learners' own time. Teachers are the most important component of high-quality education because they manage instructional interactions with and among students that are concentrated on subjects related to learning. In a perfect world, classroom exchanges like these have an impact on students' learning (Nordstrum, 2016). The K–12 curriculum, which attempts to increase educational standards, made it difficult for teachers to adjust to changes in the educational system.

Moreover, in a blended learning environment, equity refers to the fair and equitable distribution of opportunities and resources. This implies that all students have equal access to the tools, materials, and assistance required to fully engage in blended learning and succeed academically. To achieve equity in blended learning, it is also necessary to address the academic demands and difficulties of all students, including those with varying backgrounds, learning preferences, and aptitudes. To ensure that all students may advance and achieve in the blended learning environment, this involves providing differentiated instruction, specific educational pathways, and targeted support. In general, making sure all students have equitable access to high-quality education and maximize their potential involves equity in blended learning.

According to Cavanagh, Chen, and Garrison (2015), ensuring that all students have equal access to the technology, resources, and support required to succeed in a blended learning environment is known as equity in blended learning. The digital divide must be addressed, opportunities for students from different backgrounds must be made available, and inclusive learning environments must be developed to support equity and diversity.

1.8 Impact of Mathematical Learning Gaps to Equity of Blended Learning

A teaching strategy called blended learning mixes online and traditional classroom instruction. Students who have difficulty with mathematics may find it difficult to follow the curriculum and participate in the online parts of blended learning. This could exacerbate concerns about equality in education by increasing the accomplishment gap between pupils who possess good mathematics skills and those who do not.

To achieve fairness in blended learning, research has demonstrated that closing the mathematics learning gap is essential. The association between school climate and achievement inequalities in mathematics was examined in a study by Kulikowich and Kirby (2018). They discovered that schools with a positive school culture and encouraging teachers were better able to close the achievement gap in mathematics and advance educational equity. Similar findings were made by Ponnusamy and Manian (2018), who discovered that the classroom setting might have a big impact on mathematics learning gaps. Teachers can contribute to the reduction of disparities and the advancement of equity in blended learning by fostering a positive and stimulating learning environment.

Achieving equity in blended learning requires addressing disparities in mathematics learning. Teachers can help decrease the achievement gap and guarantee that every student has an equal chance to succeed by offering focused support and fostering a good learning environment.

Blended learning has gained popularity in educational settings due to its potential to combine face-to-face instruction with online learning platforms. Mathematical motivation refers to the intrinsic and extrinsic factors that influence students' engagement and interest in learning mathematics. In a blended learning environment, equity plays a crucial role in ensuring that all students have equal access to resources and opportunities, which can significantly impact their mathematical motivation. According to Wang and Hannafin (2017), when students perceive equitable treatment and have access to high-quality instruction and resources, they are more likely to be motivated to learn mathematics and achieve better academic outcomes.

Blended learning environments can also introduce a communication gap, particularly for students from disadvantaged backgrounds or those with limited access to technology. Equity in blended learning aims to bridge this gap by providing equal access to learning materials, technologies, and instructional support. Research by Chiu et al. (2019) found that when students have equitable access to communication tools, such as discussion forums and online collaboration platforms, they are more likely to engage in effective communication, share ideas, and collaborate with their peers, reducing the communication gap.

Several strategies can be employed to promote equity in blended learning and mitigate the impact of the communication gap on students' mathematical motivation. One approach is to ensure access to technology and reliable internet connections for all students, regardless of their socioeconomic background. Providing inclusive and culturally relevant content can also foster equity in blended learning environments, as it acknowledges and addresses the diverse needs and experiences of students (Sawyer et al., 2021).

2. Methods

This study focused on Mathematics learning gaps and equity in blended learning. This was conducted at Nueva Ecija University of Science and Technology – Gabaldon Campus during the school year 2022-2023. The descriptive-correlation method was used to determine the mathematics learning gaps during blended learning. The regression analysis was utilized in the study. One hundred eighty-five students from the Laboratory High School were the respondents to the study. The respondents were selected using stratified random sampling. Questionnaires were used as the main instrument of the data collection.

3. Results and Discussions

3.1. Description of the Socio-Demographic Profile of the Students

The majority of respondents were females, aged 15 to 17, in Grade 10; their parents are college undergraduates, their fathers are farmers, their mothers are simple housewives, their family's monthly income was ₱10,000 or less, and they had two children.

3.2. Mathematics Learning Gaps Mostly Encountered by the Students During Blended Learning

In terms of content/knowledge gaps, most of the respondents agreed on having difficulty remembering mathematical concepts. They also agreed that remembering mathematics formulas is difficult. They, as well, agreed on having difficulty understanding math problems. Respondents also agreed to have a hard time understanding mathematical terms. They were struggling to analyze mathematics problems. They cannot easily understand math concepts in one discussion. Respondents also agreed when operating on sign numbers, they get easily confused. However, respondents disagreed on difficulty understanding math concepts and topics by reading type-in discussions that are sent by the teachers. They also disagree on lacking conceptual understanding to solve math problems. Respondents disagreed having difficulty understanding math concepts and topics by watching video tutorials sent by their teachers. Respondents also disagreed with having difficulty knowing the rules in performing the four fundamental operations. They also disagreed that after one discussion about the topic, the teacher moves to the next topic even when they do not fully understand the recent lesson.

In terms of motivation gaps, most of the respondents agreed to worry about failing math tests. They also agreed that they are nervous about how they will do on the math test. Respondents agreed that they become anxious during math tests. Respondents were concerned that their classmates are better in math.

However, respondents disagreed that they are not confident that they can do well on math tests. Respondents believed that they could earn a grade of "90" in math. They are confident enough that they will do well on math assignments and projects. Respondents believed that they could master the knowledge and skills in math courses. Also, they said to like math which challenges them. Respondents disagreed that they do not think about how they will use the mathematics they learned. They disagreed that they do not use strategies that ensure they learn math well. They enjoyed learning mathematics. They think learning math could help them get a good job. Respondents tried to find ways to understand it better when they are having trouble learning math concepts. They think about how the math they learn would be helpful to them. They think learning math could help their career. Respondents put enough effort into learning mathematics.

In terms of environmental gaps, most of the respondents agreed that they tend to easily lose focus when reading modules using mobile phones because they are distracted by social media apps. Respondents agreed that they are distracted by loud noises when studying. They also agreed that when doing some schoolwork, their parents ask them to do household chores. Respondents also agreed they feel sleepy when doing schoolwork in the room or bed. They have been distracted in some gatherings of their family. They do not have enough time to practice math problems to understand them fully. Also, they could not focus on doing schoolwork at home due to limited space. They do not have time management. They have a slow internet connection. Also, respondents agreed that the environment is not conducive to learning. However, respondents disagreed that they have no study area in their house.

In terms of communication gaps, respondents agreed that the math teacher asks the class if they understand the lesson. The teacher taught the previous lesson for them to remember before the lesson ended. The teacher will ask the class if they understand the lesson. They also agreed that the teacher is easy to approach if they have concerns about the topic. It is effective for them to learn by having communication with their teacher and classmates on a topic that has been discussed. Respondents also agreed that they ask their classmates through Messenger about the lesson that they do not understand. They learn effectively through video presentations that were provided by their teacher. Through the use of Messenger, they would chat with their teacher about the lesson they did not understand, and they do have a group study with their classmates after the discussion. However, respondents disagreed that they would message their teacher to ask for a module copy to read in advance about the next topic and that the teacher discussed lessons via Messenger.

In terms of skills gaps, the respondents disagreed that they find it hard to master mathematical skills in a blended learning setup. They were having a hard time following steps in solving math problems. They do not have strategies to easily solve math problems. They were having difficulty in practicing the rules and performing the four fundamental operations and they could not answer the given math problems on their own. Also, they could not apply the method to solve the math problem. They were unable to perform step-by-step procedures in solving math problems. Respondents also disagreed that they do not practice math problems to enhance their math skills. They were having difficulty performing addition, subtraction, multiplication, and division of integers correctly. They were unable to add, subtract, multiply, and divide numbers.

3.3. Students' Description of Equity in Learning Mathematics during Blended Learning

Equity in terms of technology, the respondents agreed that they have access to mobile devices and gadgets to support their learning needs with a weighted mean of 2.85; they have access to stable connections to support their learning needs which has a weighted mean of 2.80; they could also access the online materials provided by their teacher which has a weighted mean of 2.75; they have enough load to access learning resources sent by the teacher to meet their learning needs and they could work the lesson through the video presentation given by their teacher which has a weighted mean of 2.74; they could work on individualized materials provided by the teacher at their own pace which has a weighted mean of 2.71; they could easily access online video tutorials that their teacher sends which has a weighted mean 2.69; they could easily access online video tutorials that the teacher sends which has a weighted mean of 2.57.

3.4. Mathematics Learning Gaps' Impact on Equity in Blended Learning

There is no significant impact on equity in blended learning due to the content learning gaps. This is because of the Sig. value is 0.073, which is more than the acceptable limit of 0.05. There is a significant impact on equity in blended learning due to the motivation gaps. This is because of the Sig. value is 0.001, which is more than the acceptable limit of 0.05. There is no significant impact on equity in blended due to the environmental learning gaps. This is because of the Sig. value is 0.418, which is more than the acceptable limit of 0.05. There is a significant impact on equity in blended learning due to communication gaps. This is because of the Sig. value is 0.000, which is more than the acceptable limit of 0.05. There is no significant impact on equity in blended learning due to the skills gaps. This is because of the Sig. value is 0.750, which is more than the acceptable limit of 0.05. These data imply that the influence of blended learning on skill development gaps may be context and program design dependent. More study is needed to develop successful blended learning strategies for bridging skill learning gaps and promoting educational equity.

Estimated Model Coefficients

$$Equity = 0.922 - (0.408 \times Ct) - (-0.353 \times Mt) - (0.058 \times En) - (0.578 \times Co) - (0.026 \times Sk)$$

Whereas:

Ct= Content

Mt= Motivation

En= Environment,

Co= Communication

Sk= Skill

Estimated model coefficients whereas Equity is equal to the constant (0.922) minus the product of 0.408 and content minus the product of -0.353 by motivation minus the product of 0.058 and environment minus the product of 0.578 and communication minus the product of -0.026 and skill. Therefore, for an increase in motivation, there is a decrease of equity by 0.353; for an increase in skill there is a decrease of equity by 0.026; for a decrease in content there is an increase in equity by 0.408; for a decrease in the environment there is an increase in equity by 0.058; for a decrease in communication, there is an increase in equity by 0.578.

4. CONCLUSIONS AND RECOMMENDATIONS

From the findings of the study, the following conclusions were drawn: the most encountered learning gap by the respondents during blended learning was the communication gap; motivation and communication were learning gaps that cause equity in blended learning; motivation and communication learning gaps significantly impact equity in blended learning. Based on the aforesaid findings and conclusions, the following recommendations were made: students may be aware of the mathematics learning gaps that have been experienced and may apply learning techniques to overcome learning gaps; teachers may address mathematics learning gaps that affect students' learning. Furthermore, teachers may use a variety of strategies during blended learning; school administrators may provide professional learning development to teachers in the different educational practices and trends in blended learning; future researchers may conduct similar studies to find out the impacts of mathematics learning gaps and the equity in blended learning.

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