Students Barriers and Satisfaction in Distance Learning in Mathematics

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ABSTRACT

The main purpose of the study was to determine the extent of barriers and satisfaction of students in senior high school. The participants involved in this study were the one hundred senior high school students of Dumingag National High School S.Y. 2022-2023.The study employed a descriptive-correlational research design, utilizing a survey questionnaire checklist as the primary research tool. The collected data underwent statistical analysis using descriptive and inferential statistical methods, including frequency, percentage, Weighted Arithmetic Mean (WAM), and Spearman rho Correlation.

The study reveals that senior high school students are increasingly using blended learning, particularly in Mathematics, despite the need for in-person interaction. Students are satisfied with the feedback provided, and there is a significant relationship between barriers and satisfaction. The findings suggest that curriculum planners should continually evaluate the effectiveness of distance learning, while school administrators should provide a secure environment. Teachers should encourage students to engage in a learning community, and future research should focus on developing effective strategies for improving distance learning in Mathematics.

KEYWORDS: *Students, Barriers, Satisfaction, Distance Learning, Mathematics*

INTRODUCTION

The education sector globally has experienced substantial transformations due to the impact of the COVID-19 pandemic. To prevent the spread of the virus, schools have been closed, and have made a shift towards adopting distance learning as their primary mode of education. Distance learning has become the sole means for educational institutions to continue conducting classes amidst the pandemic.This method of education exposes students to different learning situations and opportunities, offering them a diverse array of course knowledge and online materials. It encourages individualized learning and addresses the limitations of traditional classroom-based learning in terms of time and physical constraints. Distance education can be categorized into three distinct types, which revolve around varying online learning settings:real-time learning, self-paced learning, and a combination of both synchronous and asynchronous approaches. Each of these approaches possesses its own merits, and several factors ought to be taken into account while determining the most suitable instructional method(Liu et al.) [1].

In addition to the required implementation of distance education, numerous courses are being delivered via online learning platforms and diverse teaching management systems. Many students and educators are facing this situation for the first time. While the surge in online learning opportunities enables students to access courses online, this rapid expansion also

gives rise to concerns regarding the quality of education (Patterson & McFadden) [2].This is especially true in mathematics education. When teaching mathematics, the teacher and the students must engage in discussions, make presentations, and elaborate on the learning objectives, and the teacher must also write words and symbols on the boardto establish communication with the students. Distance learning makes this challenging.

The quick change from a traditional classroom setup to a home-based learning environment has caused students to feel anxious. They have experienced a range of emotions, including confusion, loneliness, and helplessness. Moreover, students who lack access to a dedicated physical space for distance learning may face disruptions because of the presence of noise and other distracting factors (Baticulon et al.) [3].

Additionally, the teaching methodology has undergone changes, particularly with certain parts of the syllabus requiring independent learning from students. The capacity of students to comprehend and engage with course materials during asynchronous sessions presents challenges for online learners. These obstacles have been recognized as barriers to the effective execution of distance learning. There is growing concern about the satisfaction and competence of students in distance education courses are under consideration. Based on a study conducted by Irons, Keel, and Bielema [4], providing students with a range of communication tools has been shown to significantly increase student satisfaction. When given the choice, students' individual characteristics, such as their learning preferences and personal traits, often influence their decision on whether and how to utilize technology for their learning needs. Settle and Settle [5] conducted a study with the purpose of evaluating the satisfaction of graduate students who were enrolled in an online discrete mathematics course. The results of their research indicated that their satisfaction level was statistically comparable to the performance of students in the conventional in-person sections.

Furthermore, numerous research studies have been carried out during the pandemic to evaluate the degree of satisfaction experienced by students in higher education across different learning modalities, including online and remote learning. These studies identified various challenges, instances comprise of technical and financial concerns, logistical constraints, technologies utilized in online learning, delayed response times, and lack of social interaction typically found in traditional classroom settings. These difficulties were particularly evident in developing countries, highlighting the global impact of online learning challenges. Looking at the positive aspect, it is worth acknowledging that the ongoing pandemic presents a chance for educators and students to improve their utilization of educational resources, thus enabling more enriching teaching and learning encounters (Kedraka et al.) [6].

In the Philippines, in-person classes have been limited and often get suspended due to the surge of positive cases of the deadly disease. The majority of schools in the Province of Zamboanga del Sur are still implementing modular, online, and blended distance learning to continue providing different learning opportunities for students, as the schools must follow the IATF's health protocols and to guarantee the well-being and security of the students.

This assessment is regarded as a road map for institutions to follow-up on and improves the organizational and educational flaws they encountered. Considering the aforementioned justifications, the researchers intend to embark on this study with the aim of identifying the barriers and levels of satisfaction experienced by Senior High School students participating in

distance education in Mathematics at Dumingag National High School for the academic year 2022-2023.

THEORETICAL FRAMEWORK

This study is anchored on the distance education theory proposed by Desmond Keegan, which underscores the importance of replicating the teaching-learning interaction within the distance learning system and reintegrating it into the instructional process (Schlosser and Anderson) [7]. According to this theory, education presents a paradox as it necessitates a shared experience where the teacher and learner are united by a mutual enthusiasm. While distance education can be facilitated, it cannot be precisely replicated using a comparable approach to traditional face-to-face instruction.

One of the primary principles of Keegan's theory is learner autonomy. According to Keegan, distance learners must take ownership of their learning process and engage in self-directed study. They are expected to leverage available resources, support systems, and technologies to achieve their educational objectives. This aspect highlights the importance of learners being proactive and responsible for their own learning outcomes.

Keegan also highlights the need for a pedagogical transformation in distance education. He argues that distance learning should not merely replicate traditional classroom instruction. Instead, it requires innovative pedagogical approaches that leverage technology and instructional design strategies to engage learners effectively. This transformation entails designing learning experiences that align with the distinctive attributes of distance education and capitalize on the affordances of technology.

Interaction and communication are critical components of Keegan's theory. He underscores the significance of recreating teaching-learning interactions within distance education contexts. This involves leveraging various communication technologies, such as online discussions, virtual classrooms, and multimedia resources, to foster meaningful the engagements among students and between students and instructors. These interactions serve to facilitate knowledge exchange, cooperative learning and the sense of social presence within the distance learning setting.

Technological mediation is another key aspect emphasized by Keegan. Technology serves as a mediator, enabling communication and providing access to learning resources in distance education. Advancements in technology have expanded the possibilities for delivering educational content, fostering connectivity, and supporting collaborative learning. Keegan recognizes the transformative role technology plays in overcoming the barriers of time and space, thereby enhancing accessibility and flexibility in distance education.

In summary, the distance education theory proposed by Desmond Keegan delves into the theoretical underpinnings and principles that guide effective distance learning practices. It emphasizes learner autonomy, pedagogical transformation, interaction and communication, technological mediation, and flexibility. By considering these aspects, distance education practitioners can design and implement strategies that facilitate meaningful teaching and learning experiences for remote learners.

STATEMENT OF THE PROBLEM

This study aims to ascertain the barriers encountered and the level of satisfaction experienced by Senior High School students at Dumingag National High School during the 2022-2023 academic years while engaging in distance learning in Mathematics.

Specifically, this study aimed to obtain answers to the subsequent inquiries:

1. What type of distance learning is available to the students?
2. What is the extent of the barriers experienced by the students in distance learning?
3. What is the level of satisfaction of the students as regards distance learning?
4. Is there a significant relationship between the extent of the student's barriers and level of student's satisfaction in distance learning in Mathematics?

METHODS

The researchers employed a quantitative-correlational research design to conduct the study. This design aimed to determine the type of distance learning utilized by students, assess the extent of barriers they encountered within the distance learning program, and assess their satisfaction level with distance learning in Mathematics. Numerical data were gathered, examined, and contrasted in accordance with the requirements of a quantitative-correlational study.

The study conducted at Dumingag National High School located in Dumingag, Zamboanga del Sur. Dumingag National High School is an accredited public secondary educational institution by the Department of Education (DepEd). It is dedicated to providing high-quality and affordable education to the residents of Dumingag, Zamboanga Del Sur. The school offers comprehensive secondary education, including junior high school, and follows the K-12 curriculum. It offers specialized strands in the fields of STEM (Science, Technology, Engineering, and Mathematics), ABM (Accountancy, Business, and Management), GAS (General Academic Strand), and TVL (Technical-Vocational Livelihood Course).

The research sample comprises 100 students from senior high school in Dumingag National High School. The participants were selected using random sampling, ensuring that they meet the specific criteria for this study.

For this study, the participants were chosen using a simple random sampling method, which is considered the most straightforward and effective approach among probability sampling methods. This method ensures strong internal validity by reducing the influence of confounding variables. In simple random sampling,each individual in the population has an equal chance of being chosen as a sample participant. The purpose of employing this method is to eliminate bias in the selection process and obtain representative samples.

In order to respond to the research inquiries, an investigation was conducted utilizing a questionnaire-based survey. The questionnaire consisted of 20 items divided into two domains, which were the variables of interest in the study. The first domain focused on students' barriers and was based on a questionnaire adopted and modified from Muilenburg and Berge [8]. The second domain focused on students' satisfaction and was adapted and modified from Davis [9]. Each item within the variables was measure using a five-point

Likert scale, where a rating of 5 denoted strong agreements and a rating of 1 indicated strong disagreement.

The collected data using various tools such as frequency, percentage, Weighted Arithmetic Mean (WAM), and Spearman rho Correlation were utilized as analytical tools.

RESULTS AND DISCUSSIONS

Table 1 displays the type of distance learning utilized by students in senior high school at Dumingag National High School.

According to Table 1, one hundred percent of the participants answered blended learning. This implies that students at Dumingag National High School predominantly utilize blended learning as their mode of instruction. Blended learning offers numerous advantages for students, including flexibility and convenience, as they havethe autonomy to learn at their preferred pace and timetable. They canhave the flexibility to access educational resources at any given time and from any place, ensuring convenience and accessibility. Additionally, blended learning provides personalized instruction tailored to individual student needs. Furthermore, students can engage in collaborative activities with their peers and participate in interactive learning experiences. The widespread adoption of blended learning in senior high schools is positive development thathas the ability to improve both the quality and availability.As educational institutions persevere through the obstacles presented by the pandemic and its aftermath, blended learning will likely remain a crucial tool for educators to deliver effective and engaging instruction to students.

Table 1.*Type of Distance Learning Available to theStudents*

Learning Modality	F	P (%)
Blended Learning	100	100.00

As shown in the table 2, the mean response of the participants ranges from 3.55-4.31. The highest mean is item number 10; this implies that the participants need to learn in person is a very serious barriers in distance learning. Followed by item number 2, which means that the participants having difficulty to understand the subjects especially in the event of limited or lacking classroom interaction is also a serious barriers in distance learning. Next is item number 5, which suggest that the participants having significant interruptions during their study at home is the "serious" barriers in distance learning in mathematics.

The overall mean of 3.78 with a 0.8957 standard deviation, indicating the participants agreed that the extent of barriers experienced during distance learning is serious which aligns the study of Sweet [10]. The study suggests that students' recognition of these barriers presents an opportunity to improve distance learning programs by addressing the identified challenges. It is important to address these barriers in order to prevent the occurrence ofdistance learners exhibit higher rates of attrition compared to their counterparts in traditional education settings. By making meaningful changes, educational institutions can enhance distance education quality and accessibility, ultimately improving student retention and success rates (Sweet) [10].

Table 2.*Extent of the Barriers Experienced by theStudents in Distance Learning*

Statements	WAM	SD	R	I
1. Low motivation for me to learn from distance learning	3.75	0.8689	A	S
2. It is difficult for me to understand the subject especially in absence of interaction in the classroom	3.94	0.8625	A	S
3. I must take on more responsibility for distance learning	3.75	0.8211	A	S
4. Distance learning cuts into my personal time	3.60	0.9847	A	S
5. I am having significant interruptions during study at home	3.80	0.7914	A	S
6. I am having insufficient time to learn during distance learning courses	3.78	0.7328	A	S
7. I am having difficulty contacting my teacher in particular subject	3.68	0.8976	A	S
8. I am afraid of feeling isolated in distance learning	3.55	1.0481	A	S
9. I am lack of electronic devices and poor technological skills	3.63	1.1251	A	S
10. I prefer to learn in person	4.31	0.8250	SA	VS
Overall mean	3.78	0.8957	A	S

Legend:

Scale	Weighted Continuum	Response	Interpretation
5	4.21-5.00	Strongly Agree (SA)	Very Serious (VS)
4	3.41-4.20	Agree (A)	Serious (S)
3	2.61-3.40	Moderately Agree (MA)	Moderately Serious (MS)
2	1.81-2.60	Disagree (D)	Less Serious (LS)
1	1.00-1.80	Strongly Disagree (SD)	Least Serious(LES)

Level of Student's Satisfaction in Distance Learning

The level of satisfaction of students of senior high school in Dumingag National High School with distance learning is presented in the table 3 below.

As reflected in the table 3 below, the mean response of the participants on their level of satisfaction ranges from 3.42-3.91. The highest mean is item number 1, this implies that the participants are satisfied with distancelearning experience is enhanced due to the continuous provision of effective feedback, which offers clarification on students' questions and concerns regarding the subject matter. The next highest mean is item number 8, which implies that the participants are highly satisfied with distance learning experience because the distance learning experience is enriched as the distance learning environment provides a secure space where students can confidently engage in collaborative group work with their peers in the

class. It followed by item number 5, which implies that the participants are highly satisfied with distance learning experiencedue to the fulfillment of their individual needs as students within the distance learning setting.

The overall mean of 3.67 implies that the participants are highly satisfied in distance learning experience with standard deviation of 0.8961 which suggest that the participants are highly variated. This indicates that distance learning has effectively met their needs and expectations. However, continuous evaluation and improvement of distance learning programs are crucial to ensure they cater to all learners. Previous studies, such as the one conducted by Kuo, Walker, et al. [11], have shown that learner interaction significantly influences student learning satisfaction. This underscores the importance of promoting active engagement and interaction among students to enhance their overall learning experience and satisfaction with distance learning.

Table 3.*Level of Satisfaction of the Students in Distance Learning*

Statements	WAM	SD	R	I
1. I am satisfied with my distance learning experience because effective feedback related to my class work is constantly provided to me in terms of clarification for my questions about the subject(e.g. assignments)	3.91	0.6831	A	H
2. I am satisfied with my distance learning experience because discussion boards make me more comfortable in participating than traditional modes of discussion	3.66	0.8315	A	H
3. I am satisfied with my distance learning experience because it is more convenient to my schedule than traditional discussions	3.64	0.9377	A	H
4. I am satisfied with my distance learning experience because I have plenty of time to think and draft my responses for distance discussions	3.69	0.8955	A	H
5. I am satisfied with my distance learning experience because my personal needs as a student are met in the distance learning environment	3.73	0.8391	A	H
6. I am satisfied with my distance learning experience because many aspects (features) of distance education are enjoyable to me as a learner	3.67	0.9853	A	H
7. I am satisfied with my distance learning experience because I still get the same explanation from distance education instructors as I do from traditional instructors	3.54	0.9579	A	H
8. I am satisfied with my distance learning experience because the distance learning environment is a safe place where I can be confident in completing group work with other students in the class	3.74	0.9059	A	H

9. I am satisfied with my distance learning experience because I am able to communicate effectively with my instructor throughout the semester	3.71	0.8324	A	H
10. I am satisfied with my distance learning experience because overall, I would rather take online courses than traditional courses	3.42	1.0934	A	H
Overall Mean	3.67	0.8961	A	H

Significance of the Relationship between the Extent of the Barriers Experienced and the Students' Satisfaction in Distance Learning

Table 4. *Significance of the Relationship between the Extent of the Barriers Experienced and the Students' Satisfaction in Distance Learning*

Variables	N	Df	Spearman's	p-value
Barriers Satisfaction	100	98	rho 0.451**	0.000

**. Correlation is significant at the 0.01 level (2-tailed).

The positive correlationobserved in Table 4 indicates a significant relationship between the students' perceived obstacles and their satisfaction level in relation to distance learning. The strength of the correlation coefficient, as indicated by the significant correlation coefficient (rs) of 0.451**, it also indicates that this relationship is moderately strong.

The rejecting of the null hypothesis signifies the presence of a significant correlation between the variables being investigated, indicating that students can still experience satisfaction with distance learning despite facing barriers. This finding is similar to the result of the study conducted by Hettiarachchi, et.al. [12], which explored the effect of barriers on students' perceptions of their learning experienced. Hettiarachchi's study revealed that students' satisfaction and perceptions are not solely determined by the barriers they encounter. This suggests that even though students may face challenges in distance learning, they can still find satisfaction in the overall learning experience, emphasizing the significance of recognizing and resolving obstacles to improve the overall excellence of distance learning programs.

CONCLUSIONS AND RECOMMENDATIONS

The study finds that senior high school students are utilizing blended learning as their mode of learning. Despite their need to learn in person as the barrier in distance learning, particularly in Mathematics, the students express high satisfaction with theprovision of effective feedback, which offers clarification on students' questions and concerns regarding the subject matter. Moreover, the study discovers a significant relationship between the extent of barriers faced by students and their level of satisfaction with distance learning. The

findings suggest that despite challenges, blended learning is a viable and effective mode of instruction for senior high school students.

Curriculum planners shall continuously evaluate the effectiveness of distance learning and will make improvements as student needed to have physical interaction once in a while with their teachers. Moreover, the school administrators and supervisors may provide an effective instruction that make students fulfill their needs and actively involves a secure distance learning environment. Teachers shall encourage students to engage in an effective learning community where they provide effective feedback, valuable guidance and support, especially in a distance learning environment. Learners may identify the barriers that hinder their learning and find ways to overcome them by setting clear goals, establishing a routine, and taking breaks to maintain their focus to achieve their goals. Finally, for future researchers, may utilize further studies to better understand this issue and develop effective strategies to improve distance learning in Mathematics.

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