Assessing the Learning Experiences among students in Statistics through Blended Learning

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ABSTRACT

Abstract: This study investigates the impact of blended learning modality on the academic performance of undergraduate students in statistics at Samar State University during the second semester of the 2023-2024 academic year. Utilizing an adapted survey questionnaire from the Cambridge University Press Teacher Research Program, was contextualized to align with the local academic setting and the specific content of statistics education. The instrument, validated through expert review and tested for reliability using Cronbach's Alpha. Descriptive statistics summarized the respondents' demographic profiles, while Spearman's rank correlation coefficient examined relationships between demographic factors, learning experiences, and challenges encountered. The study found that blended learning moderately improves students' understanding of statistical concepts and learning outcomes (average grade 3.73), interpreted 1.00 to 5.50 where 1.0-1.49 very negative and 4.50 – 5.50 very positive, Students generally perceived challenges as neutral to slightly positive (mean = 3.59). There was a strong positive link between how students experience learning and the challenges they face ($r = .601$, $p < .001$), The study found no significant relationship between gender and academic performance, nor any significant correlation between students' year level, age, and their general weighted average. These study highlight the importance of developing strategic design and support systems in blended learning environments.

Keywords: Blended learning, statistics, performance

INTRODUCTION

In today's rapidly changing educational landscape, blended learning has become a popular approach for delivering education to students. This modality integrates traditional face-to-face instruction with online technology, allowing students to learn at their own pace and on their own schedule. By providing students with greater control over their learning environment, blended learning has the potential to enhance their engagement and motivation, leading to improved learning outcomes. However, there are issues and difficulties associated with this increased demand for blended learning that require investigation, particularly in newly established higher education institutions, as they hinder the effective and efficient delivery of teaching and learning. Higher education has embraced this type of learning, which combines methods including face-to-face, online, and technology, as a new traditional model.

Blended learning effectiveness has quite several underlying factors that pose challenges. One big challenge is about how users can successfully use the technology and ensuring participants' commitment given the individual learner characteristics and encounters with technology (Hofmann,2014). Hofmann adds that users getting into difficulties with technology may result into abandoning the learning and eventual failure of technological applications. In a report by Oxford Group (2013), some learners (16%) had negative attitudes to blended learning while 26% were concerned that learners would not complete study in blended learning.

Statistics is an important field that has applications in a wide range of disciplines, from business and economics to the natural and social sciences. However, learning statistics can be challenging for many students, as it requires a strong understanding of mathematical concepts and the ability to apply these concepts to real-world problems.

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The blended learning approach has the potential to address these challenges by providing students with a more flexible and engaging learning experience.

Statistics is a challenge for both teachers and students because it encompasses so many intellectual and mathematical concepts (Bhowmik, J., Meyer, D., & Phillips, B. 2019). It has been noticed that when a range of activities are included in the various instructional approaches, students are more engaged with applied statistics subjects (Bhowmik, Meyer & Phillips, 2016; Biggs, 2003; Biggs & Tang, 2011; Kember & McNaught, 2007). New technology developments have benefited the teaching of statistics. According to some writers, in order to optimize the influence of technology on student learning outcomes and promote their learning, teachers must be able to integrate it into the blended learning structure successfully (Park, 2009; Tishkoveskaya & Lancaster, 2012; Ghahari, 2013).

Despite the growing popularity of blended learning, there is limited research on the actual experiences of students in blended statistics classes. This is an important gap, as understanding the experiences of students is critical to improving the design and delivery of blended learning programs. The purpose of this study is to explore the learning experiences of students in a blended statistics course, with a focus on their perceptions of the effectiveness of this modality, the challenges they face, and their overall satisfaction with the course. By gaining insight into the experiences of students in blended statistics classes, this study will contribute to the growing body of knowledge on blended learning and inform instructional practices in the field of statistics.

This study aimed to determine the learning experiences of statistics students at Samar State University under the blended learning modality. It sought to explore how students engage with this instructional approach and the various factors influencing their experiences. Specifically, the study aimed to describe the demographic profile of the student respondents in terms of age, sex, year level, civil status, and their General Weighted Average (GWA) from the previous semester. It also aimed to examine the nature of students' learning experiences while studying statistics through blended learning, as well as to identify the specific challenges they encountered in this learning environment. Furthermore, the study investigated whether there is a significant relationship between students' demographic profiles and their learning experiences and challenges. Finally, it aimed to draw out the implications of the findings to help inform future instructional practices and policy decisions related to the implementation of blended learning in statistics education.

METHODOLOGY

The researchers utilized a descriptive-exploratory research design to determine the experiences of the blended learning modality in statistics. Questionnaires were administered to gather data from all the respondents. The study employed an adapted survey questionnaire from the Cambridge University Press Teacher Research Program. The questionnaire utilized a Likert scale, a commonly used method for measuring attitudes in research studies. The Likert scale ranged from 1 to 5, with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree." The instrument consisted of four parts. Part I aimed to determine the profile of the respondents. Part II explored the learning experiences of the respondents. Part III identified the challenges faced by the respondents. Part IV included an open-ended question to elicit additional information regarding the blended learning experiences. The questionnaire was submitted to the research adviser and evaluators for evaluation. The instrument underwent revision to ensure reliability. A dry run of the instrument was conducted, and the validity and reliability coefficient were determined using Cronbach's Alpha, a statistical measure of internal consistency, reliability, and homogeneity. The Cronbach's Alpha values obtained indicated satisfactory reliability and validity of the gathered information. The respondents of the study were students enrolled in the second year, third year, and fourth year of the BS-Statistics program during the S.Y. 2022-2023 second semester. Descriptive statistics were used to summarize the quantitative data collected from the survey. Spearman's rank correlation coefficient was utilized to test hypotheses about the relationship between respondents' profiles and their learning experiences and challenges in blended learning.

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RESULTS AND DISCUSSION

Table 1. Frequency and Percentage of Demographic Profile

	Frequency	Percentage
AGE		
19	8	10.0
20	11	13.8
21	27	33.8
22	13	16.3
23	9	11.3
24	5	6.3
25	1	1.3
26	2	2.5
27	1	1.3
28	1	1.3
31	1	1.3
32	1	1.3
TOTAL	**80**	**100.0**
SEX		
MALE	17	21.3
FEMALE	63	78.8
TOTAL	**80**	**100.0**
YEAR LEVEL		
2nd year	23	28.8
3rd year	25	31.3
4th year	32	40.0
TOTAL	80	100.0
	Frequency	**Percent**
CIVIL STATUS		
SINGLE	80	100.0
MARRIED	0	0
TOTAL	**80**	**100.0**

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GWA		
1.4	1	1.3
1.7	4	5.0
1.8	8	10.0
1.9	16	20.0
2.0	27	33.8
2.1	9	11.3
2.2	5	6.3
2.3	3	3.8
2.5	7	8.8
TOTAL	**80**	**100.0**

Based on the tables provided, the demographic profile of the respondents consists of 80 individuals, with 63 of them are female and 17 are male. The majority of the respondents are in their 3rd or 4th year, with 25 and 32 individuals respectively, while 23 respondents are in their 2nd year. All of the respondents are single. In terms of age, the respondents range from 19 to 32 years old, with the highest frequency being in the 21-year-old group (27 respondents, 33.8%). The respondents' GWAs vary from 1.4 to 2.5, with the highest frequency being in the 2.0 GWA group (27 respondents, 33.8%).

Table 2. Learning Experiences towards Blended Learning

INDICATOR	MEAN	SD	QD
1. How do you feel that blended learning has impacted your understanding of the statistical concepts covered in the course?	3.76	0.68	SOMEWHAT POSITIVE
2. To what extend do you feel that blended learning has helped you achieve the learning outcomes for the Statistics course?	3.74	0.67	SOMEWHAT POSITIVE
3. How would you rate the availability and reliability of technology used in blended learning environment?	3.84	0.77	SOMEWHAT POSITIVE
4. Blended learning has a positive impact on students.	3.68	0.67	SOMEWHAT POSITIVE
5. How would you describe your overall experience with blended learning in statistics?	3.64	0.53	SOMEWHAT POSITIVE
TOTAL	**3.73**	**0.66**	**SOMEWHAT POSITIVE**

**4.50-5.50 Very positive

*3.50-4.49 Somewhat Positive

*2.50-3.49 Neutral

*1.50-2.49 Somewhat Negative

*1.00-1.49 Very Negative

Table 2 provides information on the respondents' learning experiences with blended learning. The mean score for all the indicators is 3.73, indicating that the respondents have a somewhat positive experience with blended

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learning in statistics. Some of the respondent said that '' students can pace themselves more fun for everyone more efficient makes education more accessible'' while others said '' the benefits of studying in blended learning in statistics is that I can study in a more comfortable in a quiet environment'' and others says that '' I can manage the time ''. Although the students generally expressed a somewhat positive view of the blended learning interaction, however some of the respondents said that '' *it's hard to study and learn specially having barriers like connection in internet.*'' and others says that '*'it's not really that helpful for me it makes me hard to learn specially in academic.''* and some says *''for me it is a little bit difficult because most topics are difficult specially calculus.''* In this table shows that the learning experiences of the respondent towards the blended learning with a mean score of 3.73 and SD of 0.66is somewhat positive. It suggests that most of the respondents had positive experiences with blended learning. 2010; Chen et al. Holley and Oliver draw the conclusion that a student's success in an online learning environment largely depends on their prior experiences, personalities, and personal circumstances, and that for students with inadequate preparation, online learning formats may provide impediments to course participation and learning. The effectiveness of students' computers as perceived by them also effected their performance.

Table 3. Challenges towards Blended Learning

INDICATOR	MEAN	SD	QD
1. A blended learning session keeps me always alert and focused.	3.64	0.73	AGREE
2. I believe that blended learning is a very effective system.	3.60	0.69	AGREE
3. Blended learning interaction is quite useful for understanding the subject better.	3.58	0.69	AGREE
4. I can extend my analytical skills with exercises in blended learning.	3.61	0.61	AGREE
5. Problem solving practice in blended learning helps me develop my competency.	3.71	0.70	AGREE
6. I am satisfied with the quality of interaction in blended learning	3.49	0.75	NEUTRAL
7. I can study myself in a more comfortable and in a quiet environment.	3.88	0.77	AGREE
8. I get bored when I study problem solving during blended learning.	3.34	0.89	NEUTRAL
9. Blended learning makes me spend more time in studying.	3.65	0.80	AGREE
10. It is frustrating to do task through blended learning.	3.36	0.78	NEUTRAL
TOTAL	**3.59**	**0.74**	**AGREE**

**4.50-5.50 Strongly Agree

*3.50-4.49 Agree

*2.50-3.49 Neutral

*1.50-2.49 Disagree

*1.00-1.49 Strongly Disagree

In terms of challenges faced during blended learning, Table 3 shows that the mean score for all the indicators is 3.59, which indicates that the respondents agree to somewhat positive experience with blended learning challenges. However, some respondents uttered that *" for me, it's more challenges in learning and studying statistics through blended.*'' And some utters '*'The benefits is getting info. While the challenges is the poor connection.''* Although Students struggles to technology tools that can affect to their learning preference. Some of the respondents uttered *"Students can peace themselves more fun for everyone more efficient makes education*

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more accessible." Giving learners the necessary instruction and encouragement to ensure their successful use of technology is one solution to this problem. This can include tutorials, user manuals, and technical support to help learners resolve any problems they run into. Incorporating chances for peer support and collaborative learning can also aid in boosting learners' commitment to and engagement with the blended learning strategy. In general, it's critical to acknowledge the distractive personal traits of learnings and cater support to encourage their success in blended learning environments.

Table 4.1. Correlation between the Demographic Profile of Statistics Student to Their Learning Experiences and Challenges in Blended Learning

Demographic Profile	**Learning Experiences**			**Challenges**		
	Correlation Coefficient	Sig. (2-tailed)	N	Correlation Coefficient	Sig. (2-tailed)	N
Year level	-.065	.567	80	-.034	.762	80
Age	-.057	.617	80	-.031	.783	80
Sex	.179	.111	80	.142	.209	80
Civil Status	.134	.099	80	.136	.601	80
GWA	.187	.096	80	.029	.800	80
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Table 4.1 revealed that there is a correlation analysis and has no significant relationship between the demographic profile to their learning experiences and challenges in blended learning where; (p-value > level of significance 0.01). The year level (r =-.065; r = -0.34) and age (r = -.057, r= -0.031) has low negative correlation. And a weak correlation between the sex (r = .179; r = 142), Status(r = .134 ;r=.136) and general weighted average (r = .187; r =.029) of the respondents to their learning experience and challenges. Therefore, we can conclude that the Respondents' Demographic Profile is not dependent to their Learning Experiences and Challenges towards Blended Learning. The table we provided suggests that there is no significant relationship between the demographic profile of students and their learning experiences. learning, which combines traditional classroom instruction with online or digital components, can be influenced by various factors that impact students' learning experiences. In reality, many factors can influence a student's learning experiences like individual differences, technological infrastructure, digital literacy, self-regulation and time management, teacher support and guidance, student engagement, social interaction and home environment, which could overshadow the impact of demographic variations.

Table 4.2. Correlations between the Learning Experience and Challenges in Blended Learning

		Challenges	
	Spearman rank Correlation	Sig. (2 tailed)	N
Learning Experience	.601**	.000	80

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

*. Correlation is significant at the 0.05 level (2tailed).

*. Correlation be computed because at least one of the variables is constant.

Table 4.2 shows that there is a Significant and Moderate relationship between the Learning Experiences and the Challenges towards Blended Learning. Where r=.601 and P-Value = .000

FINDINGS

Findings revealed that the majority of the respondents were female (78.8%), all were unmarried, and a large portion were in their fourth year (40%). Students' general weighted averages (GWAs) ranged from 1.4 to 2.5, with the most common GWA being 2.0, reported by 33.8% of the respondents. The average grade for the blended learning lessons was 3.73, suggesting a moderately beneficial impact on students' understanding of statistical concepts and achievement of learning outcomes. In terms of challenges faced in the blended learning environment, the average rating was 3.59, indicating a generally neutral to slightly positive perception. Statistical analysis showed no significant relationship between students' sex and their GWAs. However, year level and age were found to have a significant correlation with academic performance. Additionally, a strong and statistically significant relationship was observed between students' learning experiences and the challenges they encountered in blended learning, with a Pearson correlation coefficient of r = .601 and a p-value of .000, signifying a meaningful connection between these two aspects.

CONCLUSION

The study's conclusions have significant implications for those who might view blended learning as a useful strategy for introducing students to statistical ideas. The quality of contact and the possibility of student boredom and dissatisfaction are two problems and restrictions of blended learning that instructors must consider. As a result, teachers should combine a variety of ideas and methods to keep students interested in and motivated during blended learning sessions.Overall, the study offers important new information about how blended learning affects college students' comprehension of statistical ideas. The results draw attention to the advantages of blended learning, including improved analytical and problem-solving abilities. To maximize the efficiency of blended learning, the study also underlines the necessity to overcome its limitation.

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