DOI: https://doi.org/10.33193/JALHSS.95.2023.900
ISSN online: 2414 - 3383
ISSN print: 2616- 3810
مجلة الفنون والأدب وعلوم الإنسانيات والاجتماع
Journal of Arts, Literature, Humanities and Social Sciences
www.jalhss.com
Volume (95) September 2023
العدد (95) سبتمبر 2023

Using Online Teaching Methods and Smart Learning Techniques to encourage Undergraduates to Study Sciences at Bethlehem University

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ABSTRACT

The main goal of the current study is to explore how well online teaching and smart learning strategies worked to encourage students to pursue scientific courses at Bethlehem University. The study's sample consisted of 55 male and female from the faculty of Science at Bethlehem University. The questionnaire was administered by the researchers using a quantitative research methodology. The findings reveal a statistically significant correlation between the degree of learning advantage from using software and technology and students' ideas for changing the teaching and learning process. Nevertheless, there is not enough information to correlate performance before COVID-19 with students' overall online learning experience. There is also no correlation between students' expectations of the educational benefit of utilizing technology and software and their desired passion for learning the sciences.

Keywords: Smart Learning, Online Teaching Techniques, Smart Devices, Bethlehem University.

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Introduction

In just fifty days, a coronavirus pandemic that began in Wuhan, China, in late 2019 killed thousands of Chinese (Shereen et al., 2020). Then, as the virus spread across the globe and turned into a global epidemic, going to school in about 120 nations was suspended, having a devastating impact on people's lives and all sectors. E-learning was used throughout this pandemic (Azzi-Huck and Shmis, 2020; Shahzad et al. 2021). The educational system in many universities around the world has changed from face-to-face teaching to online learning "distance learning" as a result of the coronavirus pandemic and the preventive measures of social divergence, including in Palestine. This change was motivated by a belief in the continuity of the educational process. Distance learning was utilized at universities, including Bethlehem University, since this was the first time that the educational system had switched from face-to-face instruction to electronic teaching. The learning process during COVID-19 is primarily mediated by networked smart devices, which call for digital literacy and support smart learning (Pérez-Escoda et al., 2021).

A variety of science courses are among the many undergraduate and graduate programs Bethlehem University provides. The institution has been trying to get more undergrads to study sciences in recent years. Utilizing online teaching strategies and smart learning approaches is one way to achieve this. Online education techniques have the potential to be more participatory and engaging than traditional lectures. Additionally, they can provide students with more freedom and control over their education. Students may customize their learning and maintain motivation by using such effective learning strategies.

There are several reasons why smart learning approaches and online teaching methods can effectively encourage undergraduates to keep studying scientific courses. First, they can increase the accessibility of science for students who might not have the chance to enroll in regular scientific classes. Second, they can assist students in understanding how science relates to their own life. Thirdly, they can assist students in acquiring the abilities and skills required for success in such a field.

Therefore, this article goes over some of the innovative teaching strategies Bethlehem University has implemented to entice undergraduates to major in the sciences. It also investigates how these strategies and tactics help both the institution and the students. The study focuses on the efficiency and abilities used in connection to the usage of smart learning tools and settings, as well as on online teaching strategies.

The following hypotheses will guide our investigation:

Hypothesis 1: There is a statistically significant correlation between students' perspective of level of beneficence of using technology and software in learning and their desired passion for learning sciences.

Hypothesis 2: There is a statistically significant correlation between students' recommendation of adapting the teaching and learning process and level of beneficence of using technology and software in learning.

Hypothesis 3: There is a statistically significant correlation between students' overall experience with online teaching and their performance before COVID -19.

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Literature Review

Smart learning is the efficient and organized use of information and communication technology tools to the attainment of learning objectives via the use of suitable online resources and smart devices. These alternate teaching strategies aim to raise students' intellectual and practical knowledge. A new educational paradigm known as "smart learning" gives students access to a productive learning environment with individualized mobile material and simple model modification. Additionally, it gives students access to a useful communication setting and an extensive body of knowledge. Syahmani & Supardi (2020) aimed to identify how well SMART learning and online education may enhance students' metacognitive skills and scientific comprehension. The motivation of students and their educational experiences in university-level online learning settings are covered in their paper. The emphasis is on creating online learning environments that inspire students to be active learners, empower them to stick with academic objectives, and help them make the most of the content. What variables motivate university students to stick to their academic goals, and what online learning activities increase learner motivation and persistence, could be discussed in relation to pertinent motivation and research. If online education encourages student enthusiasm while equipping them with the necessary skills for success, students are more likely to carry their learning strategies and productive work habits into future coursework and beyond. Online learners can be better equipped for success no matter where their futures lead them.

When trying to encourage students to study in online contexts, educators encounter a variety of challenges and possibilities. Regardless of where they study, students are expected to be more autonomous learners in higher education. However, not every student in higher education is equally ready to study in various settings. According to research, students with the drive and ability to concentrate, do tasks, and persevere through obstacles are more likely to succeed in online or distance learning courses (Randi & Corno, 2022).

According to Dneprovskaya et al. (2020), the higher education system needs to provide relevant educational material, a time-consuming process that calls for an immediate fix, in order to promote the growth of the digital economy.

Due to technology breakthroughs and their applications that penetrate all areas of education, there is a greater need for "smart" learning environments that are digitally enhanced and are social, interactive, adaptive, and learner-centered (Cheung & Wang, 2021). As a result, the way that students are taught may have a big influence on their motivating beliefs, which in turn encourages learning and critical thinking (Khozaei et al., 2022).

The effectiveness of instruction and the timing of student-teacher interaction, as well as the accessibility of technical support, organization, and ongoing adaptations to practical instructional sessions, are the factors that have the greatest impact on teacher and student satisfaction with e-learning, according to Nambiar (2020). Wang et al. (2021) also shown that smart interactive technologies utilized online may aid students in more effectively achieving their educational objectives.

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According to Gambo and Shakir (2022), students were able to follow the learning process, and the smart learning environment supported their online learning activities. General education platforms, according to Alneyadi et al. (2023), promote students to master certain courses and improve their performance, retention, critical thinking, and future thinking skills. Although students' enthusiasm to learn science is declining, Bulić and Blažević (2020) noted that this trend is not statistically significant. We may draw the conclusion that employing current active teaching methods in the classroom can be just as compelling as using online training in science and biology as a learning tool.

Additionally, Randi and Corno's (2022) research has demonstrated that how effectively students learn in online courses is influenced by their motivation and learning styles, the learning environment, and pertinent hypermedia. If college professors provide online education to target their students' motivation and work habits, they can successfully guide students into an implementation attitude.

In contrast to traditional instruction, digital learning, according to Lin and Chen's (2017) research, has a favorable effect on learning outcomes and motivation. In order to build smart instructors that have critical knowledge and abilities for 21st century learning, Zhu et al. (2016) studied the reality of smart learning through four tiers of smart teaching techniques and 10 essential features of smart learning settings. According to Kholifah et al. (2020), blended learning is successful in inspiring students in vocational fields. This is so that students may feel the assistance of the Internet as a source of learning and the blended learning system is more adaptable.

Methodology

Sampling Method and Data Collection

A lot of work has been put into confirming the validity and accuracy of the approach adopted, the accuracy and representativeness of the research sample, and the reliability of the data obtained. Students at Bethlehem University were among the target population for the study, which has been designed and modified using a quantitative research methodology. The study's sample was made up of (55) male and female students who were enrolled at Bethlehem University in the fall of 2021 in one of the faculty of science's four different departments: software engineering, medical labs, chemistry, and computer simulation in science and engineering. This sample was chosen at random from 425 science students, representing 13% of the total population. Table 1 shows the results of the targeted sample according to gender:

Table 1: Gender

Gender		
	Frequency	Valid Percent
Male	**20**	**36.4**
Female	**35**	**63.6**
Total	**55**	**100.0**

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Furthermore, there were 20 items in the survey, which were separated into two sections: smart learning strategies and online educational methods. The researchers carefully planned the questions in order to get complete and accurate information that would allow them to develop and improve online teaching strategies at Bethlehem University.

Links to the survey were sent to students via Gmail, and it was carried out using a Google form. The e-learning survey was completed by Bethlehem University science students. The online survey was conducted from December to January 2021, students from the first year represented (16.4%) of the total sample size, second year (25.5%), third year (21.8%), and fourth year (36.4%) participated, as shown in Figure 1.

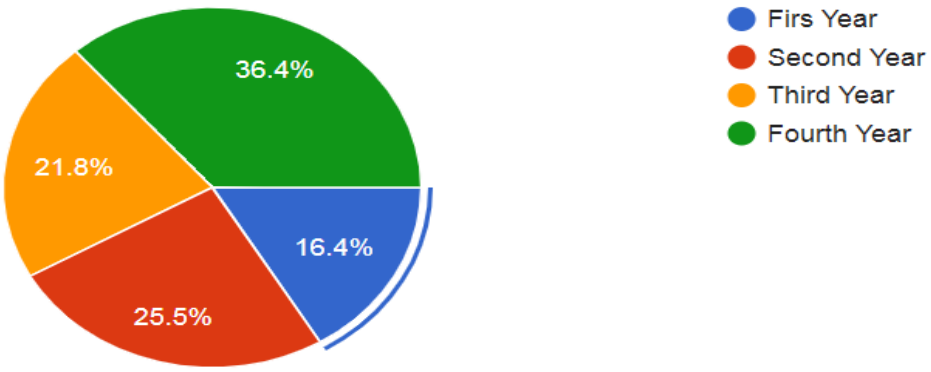

Figure 1: Student Participated in the Survey based on the year level

Method of Data Analysis

SPSS software was used to analyze the gathered data according to certain standards that matched the research's analytical strategy. Due to the latent variable, the small sample size that requires statistical power, and the lack of concern for the normality of the data distribution, this approach is deemed appropriate for the current study.

In order to test the hypotheses of this current study, two types of statistical tests were adopted to get accurate results in this regard. Consequently, Spearman's rho and Pearson Chi-Square were used to test hypotheses. The following table shows the two types of statistical tests which were utilized to examine the hypotheses of this current study.

Table 2 Analytical techniques

Hypotheses	Type of statistical tests by (SPSS)
Hypothesis 1	Spearman's rho
Hypothesis 2	Pearson Chi-Square

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Hypothesis 3	Spearman's rho

It should be noted that the researcher has manipulated the independent and dependent variables to create strong relationships and make meaningful comparisons between various contexts related to using online teaching methods and smart learning techniques to encourage undergraduates to study sciences at Bethlehem University. These measures were taken in light of the available literature and relevant research conducted within the same framework. This analytical approach makes a big difference in getting more precise findings. Therefore, it is feasible to avoid the prejudice that affects the objectivity of the research by making use of the existing factors and developing clear and straightforward hypotheses. As a result, we can better understand the effect of using online teaching methods and smart learning techniques on undergraduates at Bethlehem University.

Results and Discussion

The results of this study illustrate statistical analysis techniques by looking at the variables and current hypotheses using the methods used in this investigation. As a result, the researchers first introduce the hypothesis before testing it using the chosen analytical framework. A better grasp of the circumstances, links, and interconnections connected to the chosen quantitative approach is also provided by the researchers.

Hypothesis 1: There is a statistically significant correlation between students' perspectives of the level of beneficence of using technology and software in learning and their desired passion for learning sciences.
Since we have two ordinal variables, Spearman's rho is used to test this hypothesis. The following table shows the results of Spearman's rho:

Table 3: Spearman's rho results

Correlations				
			The students' desired passion for learning sciences.	Students' perspective of level of beneficence of using technology and software in learning
Spearman's rho	The students' desired passion for learning sciences.	Correlation Coefficient	1.000	.230
		Sig. (2-tailed)	.	.091
		N	55	55
	Students' perspective of the level of	Correlation Coefficient	.230	1.000
		Sig. (2-tailed)	.091	.

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	beneficence of using technology and software in learning	N	55	55

We fail to reject the null hypothesis since the p-value (0.091) is higher than the significance level we've selected (0.05). We come to the conclusion that the data is insufficient to prove our hypothesis that students' perceptions of the educational benefits of employing software and technology and their desired passion for learning sciences are related.

The statistics could merely indicate a link between students' expectations for their enthusiasm in learning sciences and how they see the instructional value of software and technology. Causation cannot be inferred from correlation alone. It's likely that other elements, such as previous science interests or teaching strategies, influence students' views and passion without directly affecting either.

Hypothesis 2: There is a statistically significant correlation between students' recommendation of adapting the teaching and learning process and the level of beneficence of using technology and software in learning.

Since both variables are categorical, Chi-square is utilized to test this hypothesis. The following table shows the results of the Chi-square tests:

Table 4: Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.792	2	0.012

We reject the null hypothesis because the p-value (0.012) is lower than the significance level we specified (0.05). In light of the following graph, we conclude that there is sufficient evidence to support our claim that there is a statistically significant difference at the rate of 0.05 in students' recommendations for changing the teaching and learning process due to the usefulness of using technology and software in learning.

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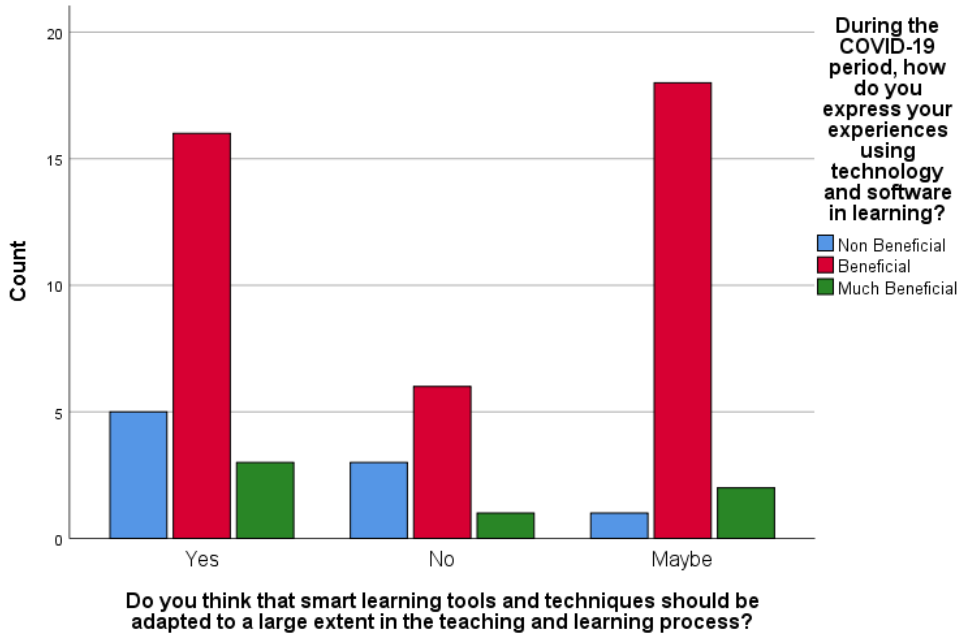

Hypothesis 3: A statistically significant correlation exists between students' overall experience with online teaching and their performance before COVID-19.
Basically, Spearman's rho test was used to examine this hypothesis. By using SPSS the results show that P value of this correlation (0.109) > alpha (0.05), so we fail to reject the null hypothesis and find that there is not enough evidence for a significant correlation between students' overall experience with online teaching and their performance before COVID -19. The following table shows the results of the current hypothesis by using SPSS analysis.

Table 5: Spearman's rho Results

Correlations				
			Students' overall experience with online teaching	Their performance before COVID – 19
Spearman's rho	Students' overall experience with online teaching	Correlation Coefficient	1.000	.221
		Sig. (2-tailed)	.	.109
		N	55	54
	Their performance before COVID–19	Correlation Coefficient	.221	1.000
		Sig. (2-tailed)	.109	.
		N	54	54

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Since the p-value (0.109) is greater than our chosen significance level ($\alpha = 0.05$), we fail to reject the null hypothesis. We conclude that there is not enough evidence to support our claim that there is a correlation between students' overall experience with online teaching and their performance before COVID–19.

A crucial factor in validating the findings is the limited experience with online instruction. Most students were accustomed to traditional face-to-face classroom settings, so their exposure to online instruction was likely limited, resulting in a smaller impact on their performance.

The degree to which students are comfortable and familiar with the learning environment often affects their performance. Students were accustomed to the traditional classroom setting and had developed habits and methods specific to that context. The transition to an online format presented additional difficulties and required adjustment to new tools and procedures.

Conclusions

The encouragement of undergraduates to study sciences at Bethlehem University can be achieved by utilizing online teaching methods and smart learning strategies. From this approach, several conclusions may be made.

The degree of benefit from employing technology and software in learning and students' suggestions for changing the teaching and learning process are statistically correlated, indicating a link between these two factors. However, there is little data to conclusively link students' overall online learning experience with performance prior to COVID-19. This is supported by Randi and Corno's (2022) assertion that teachers face various challenges, as not all higher education students are equally prepared to study in different environments. The differences in these environments increase the difficulty of adapting such contexts. Dneprovskaya et al. (2020) also emphasized the need for higher education systems to provide relevant educational materials. This process takes a long time and requires immediate improvement. This explains students' difficulties due to their unfamiliarity with online learning and the sudden change resulting from the COVID-19 pandemic. These findings align with Cheung and Wang's (2021) conclusion that there is a greater need to enhance and improve smart learning environments to be suitable for students to adapt to.

As a result, performance may have been briefly influenced by the learning curve associated with the switch to online instruction, regardless of the student's overall performance. The findings are consistent with Gambo and Shakir (2022), who stated that students are capable of following the learning process, supported by the smart learning environment that facilitates online learning activities. They also align with Wang et al.'s (2021) assertion that interactive smart technologies used online can help students achieve their educational goals more effectively. This is further supported by Bulić and Blažević (2020), who emphasized that the current active teaching methods,

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such as using online training in sciences and biology, can be convincing educational tools.

It is particularly challenging to demonstrate the correlation between students' expectations of the educational value of using software and technology and their desired passion for learning the sciences. However, students have increased accessibility and freedom thanks to online instructional techniques. Bethlehem University may reach a broader audience by providing scientific courses online, including students who might be unable to attend conventional classroom-based courses due to geographic or logistical restrictions. Because online learning is flexible, students may study at their own speed and on their own timetable, meeting their own requirements and circumstances.

Student collaboration can be facilitated via online learning environments. Bethlehem University may encourage a feeling of community and cooperation among scientific students through discussion boards, online group projects, and peer-to-peer contacts. This may result in greater interest, more involvement, and a better comprehension of scientific concepts.

Limitations and Recommendations

It is essential to conduct studies with larger and more diverse samples, using accurate and valid measurement instruments, accounting for confounding variables, taking causality into consideration, and, if feasible, conducting longitudinal research in order to establish a stronger relationship between students' perceptions of educational benefits of software/technology and their desired passion for learning sciences.

Undergraduates can be effectively inspired to study sciences at Bethlehem University by using online teaching strategies and smart learning approaches. The university can develop an engaging and inclusive learning environment that motivates and supports students in their quest of scientific knowledge by utilizing the advantages of accessibility, flexibility, engagement, personalization, cooperation, and constant improvement.

References

1. Alneyadi, S., Wardat, Y., Alshannag, Q., & Abu-Al-Aish, A. (2023). The effect of using smart e-learning app on the academic achievement of eighth-grade students.
2. Azzi-Huck, K., & Shmis, T. (2020). Managing the impact of COVID-19 on education systems around the world: How countries are preparing, coping, and planning for recovery. World Bank Blogs, 18.
3. Bulić, M., & Blažević, I. (2020). The impact of online learning on student motivation in science and biology classes. Journal of Elementary Education, 13(1), 73-87.
4. Cheung, S. K., & Wang, F. L. (2021). The continuous pursuit of smart learning. Australasian Journal of Educational Technology, 37(2), 1-6.

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www.jalhss.com
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5. Dneprovskaya, N. V., Komleva, N. V., & Urintsov, A. I. (2020). The knowledge management approach to digitalization of smart education. In Advances in Artificial Systems for Medicine and Education II 2 (pp. 641-650). Springer International Publishing.
6. Gambo, Y., & Shakir, M. Z. (2022). Evaluating students' experiences in self-regulated -smart learning environment. Education and Information Technologies, 1-34.
7. Kholifah, N., Sudira, P., Rachmadtullah, R., Nurtanto, M., & Suyitno, S. (2020). The effectiveness of using blended learning models against vocational education student learning motivation. International Journal, 9(5), 7964-7968.
8. Khozaei, S. A., Zare, N. V., Moneghi, H. K., Sadeghi, T., & Taraghdar, M. M. (2022). Effects of quantum-learning and conventional teaching methods on learning achievement, motivation to learn, and retention among nursing students during critical care nursing education. Smart Learning Environments, 9(1), 18.
9. Lin, M. H., & Chen, H. G. (2017). A study of the effects of digital learning on learning motivation and learning outcome. Eurasia Journal of Mathematics, Science and Technology Education, 13(7), 3553-3564.
10. Nambiar, D. (2020). The impact of online learning during COVID-19: students' and teachers' perspective. The International Journal of Indian Psychology, 8(2), 783-793.
11. Nguyen, L. T., Kanjug, I., Lowatcharin, G., Manakul, T., Poonpon, K., Sarakorn, W., & Tuamsuk, K. (2022). How teachers manage their classroom in the digital learning environment–experiences from the University Smart Learning Project. Heliyon, 8(10), e10817.
12. Pérez-Escoda, A., Lena-Acebo, F. J., & García-Ruiz, R. (2021). Digital Competences for Smart Learning during COVID-19 in Higher Education Students from Spain and Latin America. Digital Education Review, 40, 122-140.
13. Randi, J., & Corno, L. (2022). Addressing student motivation and learning experiences when taking teaching online. Theory into Practice, 61(1), 129-139.
14. Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. Quality & quantity, 55(3), 805-826.
15. Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). COVID-19 infection: Emergence, transmission, and characteristics of human coronaviruses. Journal of advanced research, 24, 91-98.
16. Syahmani, S., & Supardi, Z. I. (2020). Effectiveness of i-SMART learning model using chemistry problems solving in Senior High School to improve metacognitive skills and students' conceptual understanding. Pedagogika, 138(2), 37-60.
17. Wang, P., Ma, T., Liu, L. B., Shang, C., An, P., & Xue, Y. X. (2021). A Comparison of the Effectiveness of Online Instructional Strategies Optimized With Smart Interactive Tools Versus Traditional Teaching for Postgraduate Students. Frontiers in Psychology, 12, 6154.
18. Zhu, Z. T., Yu, M. H., & Riezebos, P. (2016). A research framework of smart education. Smart learning environments, 3(1), 1-17.