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Instructional Methods and Students' Academic Performance in Ghana: Does the Mode of Study Matter

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ABSTRACT

This paper seeks to establish how the mode of study (regular or weekends) impacts students' academic performance in the Catholic University of Ghana. The study employs a case study and quantitative approach (independent sample t-test) to analyze 603 students' data observations. The study rejects the null hypothesis that equal students' academic performance exists between regular and weekend students in face-to-face and online instruction. But rather accepts the null hypothesis that equal students' academic performance exists between regular and weekend students in blended instruction.

INTRODUCTION

The cost constraints and flexibility for maintaining larger classes due to the proliferation of study programs, courses, and student enrolment, as well as their effect on student learning outcomes, have become a topical issue. Stakeholders have raised red flags about the cost, flexibility, and learning outcomes trade-off. This has led to the adoption of online and blended instruction by higher learning institutions in Ghana as a means of minimizing the cost of administering education, widening student enrollment, and ensuring flexible teaching and learning activities (Wang, 2023).

Also, advancements in technology and innovations have caused diversification and change in the mode and medium of knowledge transfer and acquisition. Universities and other higher learning institutions have reduced their overdependence on face-to-face instruction and are gradually shifting towards the use of online and blended methods of teaching and learning. Currently, the acquisition of knowledge and instruction content is not confined only to the four corners of classrooms and also in textbooks but also through online, internet, and digital learning platforms (Abubakar & Muhammed, 2023). Online and blended instructions allow learners to search and read various instructional materials on digital and online learning platforms (Abubakar & Muhammed, 2023). Sultan et al., (2023) postulate that the use of online and/or blended instruction has necessitated a change in curriculum content design and brought about more flexibility in personal interaction and mode of class attendance. Nevertheless, poor and inadequate technological infrastructure coupled with the high cost of internet and accessibility issues have also made face-to-face instruction very relevant in Ghana. Alabdulaziz and Tayfour (2023) regard face-to-face instruction as the earliest form of instruction that has stood the test of time before the incorporation of IT Technology into teaching and learning.

Face-to-face instruction involves the instructor and the learner having interpersonal interaction within a confined classroom context on a particular instructional content in which the instructor takes center stage in the teaching and learning process (D'Abundo & Sidman, 2018). It is mostly a teacher-centered approach to teaching and learning and ensures the creation of interpersonal relationships through physical contact. Alabdulaziz and Tayfour (2023) opined that face-to-face instruction is the most effective way of controlling, managing, and supervising teaching and learning activities and outcomes. Online instruction involves the conduct of teaching and learning via the Internet using technological platforms such as Zoom, Google Class, Dashboard, and learning management systems. This form of instructional method does not involve physical interaction between the instructor and the learner and it is often student-centered. Charytanowicz (2022) asserts that online instruction can be either asynchronous or synchronous. Asynchronous entails the instructor providing instructional materials online for students to access at their own convenient time without both parties interacting simultaneously. Synchronous offers a real-time avenue for both the teacher and the learner to interact personally via the Internet (Rawat & Singh, 2020). Blended instruction entails the fusion of both face-to-face and online instruction in the teaching and learning process. This method of instruction is meant to resolve the lack of physical interpersonal contact between the learner and instructor and older to foster bonder creation. Yick et al. (2019) identified

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blended instruction as student-centered learning where the learner manages their learning activities and accepts more learning responsibilities compared to face-to-face. Yu, XU, and Sukjairungwattana (2022) observed that blended instructions demand learner adherence to task schedules and ensure active participation.

Universities across the world offer programs in two streams regular/full-time and weekend/part-time. Regular stream is mainly meant for students who are not working and have time to access education throughout the week. However, the weekend stream is meant for the workforce who are mainly occupied during the weekdays but available to access education during weekends (Saturday and Sundays). Irrespective of the mode of study/program stream you apply the content of the academic curriculum and the quality of instructional delivery is the same and hence equal academic outcomes are aspired. Nevertheless, whether or not the quality of teaching and learning and academic performance of students are similar across the mode of study/program stream is quite debatable. This has drawn the attention of researchers to establishing the most appropriate method of instruction that ensures parity in students' academic performance irrespective of students' mode of study/program stream.

Prior studies (Ali, Khan, & Alouraini, 2023; Aoe et al., 2023; Cavanaugh, Jacquemin, & Junker, 2023; Ghosh, Khatun, & Khanam (2023); Perez et al., 2023; Varachotisate et al., 2023; Zhang et al., 2023; Pasawano & Quainoo, 2023; Fischer et., 2020; Goode et al., 2018) are predominantly centered on identifying the best instructional methods that guarantee the highest student academic performance. Few studies (Charytanowicz, 2023; Pokorný, 2023; Wang et al., 2023; Keith, 2022) have focused on how instructional methods (face-to-face, online, and blended) influence regular and weekend students' academic performance. Pokorný (2023) study focused on only online instruction whereas Wang et al (2023) study was also centered on blended instruction. The scarce studies (Charytanowicz, 2023; Keith, 2022) which covered face-to-face, online, and blended instructions produced conflicting findings. Charytanowicz (2023) observed that face-to-face instruction produces higher students' academic performance in weekend students compared to regular students. Contrary, regular students performed better in online instruction than weekend students. However, Pokorný (2023) findings contradict Charytanowicz (2023) in the sense that he argued that regular and weekend students' academic performance in online instruction are statistically significantly equal. Interestingly, Charytanowicz (2023) and Wang et al. (2022) revealed that equal students' academic performance exists between regular and weekend students in blended instruction. Keith (2022) found that face-to-face instruction produced the highest students' academic performance in both regular and weekend students than online and blended instruction.

Emphasis must be made that these aforementioned studies were carried out in developed economies where technological investment and related infrastructure are well advanced compared to emerging countries like Ghana. There exists no study in Ghana that tries to establish which instructional method is the most appropriate for regular and weekend students about their academic performance. Hence, findings from this study will contribute to identifying an instructional method that can ensure parity in the quality of delivery in teaching and learning among regular and weekend students and the same time maintain enhanced students' academic performance.

LITERATURE REVIEW

Theoretical Review

The theory of technology-mediated learning proposes that technology can assist learning. It exposes how online instruction can provide a fruitful and conducive learning environment. It argues that internet-based teaching can be used for personalized learning outcomes and experiences and ensures optimum engagement between instructors and learners. Technology-mediated theory provides more insight into how technology can be embedded in teaching and learning activities to promote high academic performance. The theory proposes that in online instruction learner differences must be identified. Thus, different learners may respond differently to similar/same online instructions. Because online instruction is a personalized learner-centered form of learning, the learner traits must be well taken into consideration when designing the instruction.

Also, the learning engagement theory links online instruction, interaction, and technology. This theory offers a conceptual framework for how to conduct teaching and learning online. Wiseman et al. (2017) see cognitive, behavioral, and affirmative commitment to learning tasks through technology as a means of achieving successful learning outcomes. Tomovic (2021) also identifies technology, social, and intellectual engagements as the core pillars of learning engagement theory which makes online instruction effective. Intellectual engagement encompasses the cognitive and psychological commitments of the learner to his/her academic task (Willms et al., 2009). The instructor can ensure this through the personalization of the learning experience through the adoption of technological mediums such as Google Classroom, Zoom, Blackboard, YouTube, and Dashboard. Social engagement involves the interactions between the instructor, learner, and community (Martin, 2011). Social media and digital channels and devices offer great opportunities for such interactions. Zoom, Google Meet, and Google Classroom expedite teaching and learning interactions. Behavioral engagements entail the motivation of learners to fully participate in online teaching and learning activities ((Davis et al., 2012). Tomovic (2021) believes that behavioral engagement helps

students understand the benefit of online instruction and encourages them not to be passive learners but rather active learners.

The didactical 3C theory and media synchronicity theory offer great insight into how blended instruction is supposed to be organized. The didactical 3C theory suggests that blended instruction should be anchored on three (3) key facets (content, constructiveness, and communication). Content is the specific subject area on which actual teaching and learning are centered in online instruction. Constructiveness and communication maintain cognitive learning engagement carried out using face-to-face instruction. The theory further posits that apportioning learning activities between these three (3) elements and instructional methods should be based on the learning objectives. These apportionments and designs of blended learning are further enhanced by media synchronicity theory. Dennis, Fuller, and Valacich (2008) claim that the quality of communication depends on the balance between organizing learners' information needs and offering affordable digital media learning platforms. It defines communication as a means of maintaining cooperation and understanding which entails a sequence of learning activities. It believes that every learning activity contains two elements (conveyance and convergence). Conveyance of the actual transfer of learning instructions and materials to the learner and the learner's ability to customize information to his/her cognitive learning arrangement. Convergence entails authenticating and adjusting cognitive learning patterns and expediting common understanding.

Media synchronicity theory suggests that in blended learning, it is appropriate to carry out conveyance tasks online via synchronous media. Thus, the instructor transfers learning materials through online platforms to engage learners' cognitive understanding before actual teaching. However, the actual teaching requires resolving any doubt in cognitive learning patterns using face-to-face instruction (convergence).

Empirical Review

Charytanowicz (2023) examined full-time and part-time students' academic performance at Lublin University of Technology in Poland. The study was based on students from the computer science program from 2019 – 2022. A machine learning model was used to test the difference in academic performance based on 1827 scores in a final test. The study findings observed that using face-to-face instruction, part-time students' achieved higher academic performance than full-time students. Inversely, when online instruction (synchronous) was employed, full-time students performed better than part-time students. However, the difference in students' academic performance was deemed not to be significant. In the case of blended instructions, no significant difference was identified in students' performance for both full-time and part-time students. Indicating their performance was at par.

Pokorný (2023) studied the use of online instruction in learning mathematics and its impact on students' academic performance. His study covered the 2021/2022 academic year for 75 students made up of 47 regular students and 28 weekend students. The performance of the students was measured using their test scores in a final exam. The test score was a scale of 100 points. The study employed the Mann-Whitney U test to establish the difference in academic performance between regular and weekend students because the data was not normally distributed. The results revealed that the academic performance of regular and weekend students was statistically indifferent.

Keith (2022) examines students' academic performance in level 100 seminar courses between full-time and part-time students. The data collated covered the 2021/2022 academic year for 11,396 students. The study employs factorial ANOVA to establish the difference in full-time and part-time students' academic performance. The findings suggest that part-time students admitted to a face-to-face module academic performance is better than those admitted to online or blended instruction.

Wang et al. (2022) assessed full-time and part-time students' academic achievements in a blended law degree program. This study employed a mixed method to assess how academic performance differs among these two groups. A total number of 971 students were covered in this study. The study results show that academic performance between full-time and part-time students in a blended instructional program is statistically not different.

METHODOLOGY

The case study is centered on students' academic performance at the Catholic University of Ghana based on a particular instructional method. A quantitative approach to research was employed. Due to the large sample size of 603 students, the study assumed that the data was normally distributed and hence adopted a parametric test (independent sample t-test) for analyzing the data set. A purposive sampling technique was used in selecting 405 regular students and 198 weekend students which make up the sample size of 603. Students included in the sample were those pursuing programs affiliated with the University of Ghana and the University of Cape Coast who were assessed based on the same semester grade point average (SGPA) of 4.0 scale.

Secondary data covering students' academic performance measured using semester grade point average (SGPA) for the 2019/2020 and 2020/2021 academic year was gathered. Students' academic performance was categorized under three (3) main instructional methods. The variables for measuring instructional methods were face-to-face, online, and blended. Students' academic performance in the first semester of 2019/2020 before COVID-19 was classified as face-to-face instruction. This is because face-to-face instruction was solely used. The second semester of 2019/2020 was classified as blended

instruction. This is because during this period blended instruction was implemented to curtail the spread of the COVID-19 virus. The first semester of the 2020/2021 academic year was strictly online because schools in Ghana were closed. IBM SPSS Statistics version 27 used analytical software to conduct the descriptive statistics and independent sample t-test. A deductive research approach was used to deduce logical inference from the statistical output derived from the analysis of the data set.

RESULTS

Group Statistics for Regular and Weekend Students' Academic Performance Based on Instructional Methods

Table 1: Group Statistics for Regular and Weekend Stream (Students) based on the Instructional Methods

Instructional Methods	Program stream	N	Mean	Std. Deviation	Std. Error Mean
Face-to-Face	Regular	405	2.990	0.672	0.033
	Weekend	198	2.857	0.662	0.047
Online	Regular	405	3.029	0.725	0.0360
	Weekend	198	2.892	0.695	0.049
Blended	Regular	405	3.112	0.617	0.0301
	Weekend	198	3.049	0.600	0.0427

Source: Catholic University Exams Database (2019/2020 – 2020/2021 Academic Year).

Table 1 outlines the mean and standard deviation of regular and weekend students' academic performance using face-to-face, online, and blended instructions. Under face-to-face instructions, it can be observed that regular students with a mean of 2.990 and standard deviation of 0.679 [M = 2.990, SD = 0.679] performed better than the weekend students with a mean of 2.857 and standard deviation of 0.662 [M = 2.857, SD = 0.662]. Also, from the results for online instruction, it can be observed that regular students with a mean of 3.029 and standard deviation of 0.725 [M = 3.029, SD = 0.725] performed better than the weekend with a mean of 2.857 and standard deviation of 0.662 [M = 2.892, SD = .695]. Lastly, based on blended instructions, the results depict the academic performance of the regular students having a mean of 3.112 and standard deviation of 0.617 [M = 3.112, SD = 0.617] was slightly higher than the academic performance of weekend students with a mean of 3.049 and standard deviation of 0.600 [M = 3.049, SD = 0.600].

Establishing Whether There are Statistically Significant Differences in Students' Academic Performance of Regular and Weekend Students in Face-to-Face, Online, and Blended Instructions

Table 2: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Face-to-Face	Equal variances assumed	.025	.874	2.287	601	.023	.133	.058	.019	.246
	Equal variances not assumed			2.299	396	.022	.133	.058	0.129	.246
Online	Equal variances assumed	.041	.840	2.202	601	.028	.137	.062	.015	.258
	Equal variances not assumed			2.234	406	.026	.137	.061	.016	.257
Blended	Equal variances assumed	.341	.559	1.197	601	.232	.063	.053	-.041	.168
	Equal variances not assumed			1.208	401	.228	.063	.053	-.040	.167

The null and alternate hypotheses set for the study are outlined below.

H0

There are no significant differences in the student's academic performance of regular and weekend students in face-to-face, online, and blended instructions.

H1

There is a significant difference in the student's academic performance of regular and weekend students in face-to-face instructions, online, and blended instructions.

The independent sample t-test as shown in Table 2, revealed that all three (3) instructional methods (face-to-face, online, and blended) met Levene's test of the

equality of variance assumption. Thus, Levene's test was not statistically significant [face-to-face: F = 0.025, p = 0.874; online: F = 0.041, p = 0.840; and blended: F = 0.341, p = .341]. Thus, their p. values were greater than the alpha value of 0.05.

Face-to-face instructions had a test statistic of 2.287 with 601 degrees of freedom and a p-value of .023 [t_{601}= 2.287, p = .023]. Because its p-value is greater than the alpha value of 0.05, the test is significant. Hence, the null hypothesis is rejected and, concludes that there is a significant difference between the academic performance of regular students and weekend students using the face-to-face instructional method.

Likewise, for the online instructions the test statistics is 2.202 with a degree of freedom of 601 and p. value of .028 [t_{601}= 2.202, p = .028]. Since the p. value is lesser than the alpha value of 0.05, the test is also significant, so the null hypothesis is rejected, and concludes that there is a significant difference between the academic performance of regular students and weekend students using the online instructional method.

Contrarily, for blended instructions, the test statistic is 1.197 with degree freedom of 601 and a p. value of 0.232 [t_{601}= 1.197, p = 0.232]. Because the p-value is greater than the alpha value, the test is not significant, so the study fails to reject the null hypothesis and concludes that there is no significant difference between the academic performance of regular students and weekend students using the blended instructional method.

DISCUSSION

It was observed that there is a significant difference between the academic performance of regular students and weekend students using face-to-face instructional methods. Thus, the mean academic performance for regular students is 2.990 and that of weekend students is 2.867 representing a mean difference of 0.133. This suggests that under face-to-face instruction, regular students' academic performance is higher than that of weekend students. This outcome can be attributed to the fact that regular students have ample time and/or no job schedule which enables them to partake in teaching and learning activities in person and can result in an increase in their performance. This finding contradicts Charytanowicz (2023) and Wang et al. (2022) whose results proposed no significant difference in the academic performance of regular and weekend students.

Similarly, a significant difference is recognized in students' academic performance between regular and weekend students under online instructions. This finding can be best explained by regular students' mean academic performance of 3.029 compared to weekend students' mean academic performance of 2.829. The mean difference between the two groups' academic performance is 0.137. This proves that regular students' academic performance is higher than weekend students' academic performance. These findings can also be linked to the fact that full adaptation of online instruction by the university without a supporting learning management system places weekend students at a disadvantage position. This is because the loaded work schedule and activities of the weekend groups, who are mainly parents compared to regular groups makes it difficult for them to pay critical attention to online lectures without being distracted. Also, poor internet connectivity disrupts the smooth flow of instructions, impacting their learning and ability to perform. These findings contradict Pokorný (2023) who suggested that online instruction does not guarantee enhanced students' academic performance for both regular and weekend students.

However, blended instruction witnessed no significant difference in students' academic performance between regular and weekend students. The evidence of this result is anchored on the fact that the mean difference of 0.063 between regular and weekend students' academic performance is narrowed and not statistically significant. These results can be attributable to the fact that the face-to-face aspect of blended instructions creates the opportunity for learners to interact with instructors to address issues that they find difficult to comprehend during online instructions. This finding, however, affirms Charytanowicz's (2023) assertion that the difference in regular and weekend students' academic performance is not statistically significant.

CONCLUSION

The study rejects the null hypothesis that equal students' academic performance exists between regular and weekend students in face-to-face and online instruction. But rather accepts the null hypothesis that equal students' academic performance exists between regular and weekend students in blended instruction. Emphasis must be made that Catholic University offers educational programs across two streams (regular and weekend). Based on the outcome of the results above, to ensure parity in students' academic performance across the program streams and at the same time ensure the maintenance of higher academic performance, blended instruction is the best instructional method to use. This will not place the weekend stream at a disadvantage position given their numerous commitments aside from educational duties compared to the regular stream. There is also the need for the management of the University to complement teaching and learning with a suitable learning management system to facilitate effective teaching and learning. This can be best achieved if the management of the University commits.

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