Students' perception toward mobile-based blended pedagogy: an emerging paradigm in a post-pandemic Nigerian tertiary institution

*Jacinta Benjamin-Ohwodede[1] and Nyemike Simeon Awunor[2]

[1]English and Literature Department, Faculty of Arts, University of Benin
[2]Department of Community Medicine, Faculty of Clinical Medicine, Delta State University, Abraka, Nigeria

ABSTRACT

This study focuses on the perception of undergraduate students towards the use of the Telegram software application; a cloud-based social network channel for mobile devices and work station. The purpose of this investigation is to determine whether undergraduate students in the University of Benin, Edo State, Nigeria support the blending of this mobile-based technology with the regular face-to-face classroom lectures. Research design for this study involves a cross sectional online survey with data collection from four hundred and one (401) students. Findings reveal that majority of respondents 386 (96.3%) were within the 15-30 year age group, a quarter of the respondents described the overall effect of the online lectures compared to the physical teaching style as excellent 112 (27.9%) with a majority of the students 322 (80.3%) supportive of blending the Telegram software application with the regular face-to-face classroom teaching. In conclusion, where blended learning is employed, academic performance can be improved. Policy and curriculum modification, and infrastructure to fully embrace blended learning approaches to lecture delivery in public universities in Nigeria are recommended.

Introduction

Researchers in the field of education have proposed that in order to facilitate educational development and student learning outcomes; instructional methods in tertiary institutions should incorporate the amalgamation of classroom activities with technology-assisted pedagogical tools. This approach is what is referred to as blended or hybrid learning; a mixture of the traditional face-to-face or brick and mortar learning with computerized, digital or mobile assisted pedagogical tools. This technique entails employing online and in-person learning methods for pedagogical purposes. Friesen (2012) suggests that this instructional style of learning and tutoring is a contemporary paradigm shift in a long history of technology-based training and that it should be viewed as the combination of internet and digital media/mobile-based technology with the face-to-face pedagogical styles. This model encourages student and tutor constant interactions which enhances student active engagement and subsequently, effortlessness in retention of course work. In this sense, employing instructional digital tools such as the Telegram application; this study's focus, becomes paramount to improved students' outcome.

Technology-based training is often viewed as the combination of internet and digital media/mobile-based technology with the face-to-face pedagogical styles. This paradigm encourages student and tutor constant interactions, which enhances student active engagement and subsequently, effortlessness in retention of course work. A blended learning model context is significant because of its impact on both students and tutors where twenty-first century pedagogy is dynamic and struggling to keep up with changes associated with the Covid-19 pandemic. Herein lies the significance of this study's investigation. Such changes have affected learning spaces of educational systems globally. All of such changes with reference to pedagogy at all levels point toward safe learning environment, student autonomy, accessibility to tutors/course content and student commitment. In this sense, employing instructional digital tools, in this case the Telegram application becomes paramount to improved students' outcome.

The Telegram application is a cloud-based instant messaging application, produced in 2013. It is intended for digital communication; both desktop and mobile devices generally for sending and receiving of media files of all sort, audio and video calls including online group (with a minimum of 200,000 memberships) tutoring/learning. As a pedagogical device, it performs practical eLearning tasks and recognises multiple Telegram accounts. Its pedagogical properties include the programming of lectures and delegating group activities that encourage communalism. Prompt feedback from both students and tutor is also an added advantage of employing this device for pedagogical purposes. Above all, the Telegram application is adequately protected against online predatory activities.

Ultimately, this study is focused on answering the several research questions. Firstly, is it likely that students in the University of Benin favour blended learning modalities that incorporate the Telegram application over just the brick-and-mortar pedagogy? Secondly, what percentage of students in the University of Benin favour blended learning modalities that incorporate the Telegram application over just eLearning using the telegram application? Thirdly, do students in the University of Benin favour the respective roles of brick-and-mortar learning and eLearning using the telegram application? Finally, has the deployment of the Telegram application to undergraduate coaching and eLearning been able to positively influence students' academic performance? The descriptive statistics of this study's survey variables answers these questions and establish the implication of this study; the need to enhance curriculum modification to fully embrace blended learning approaches to lecture delivery, especially in public universities in Nigeria.

Literature Review

A familiar theme that runs through studies on blended learning is the issue of students' perception toward integrating a technology-based tool into the face-to-face pedagogical method. This study's review however, is centred on studies that focus on the effective use and the adoption of the Telegram application as an eLearning tool. Some of the studies reviewed are related to this current investigation in terms of an ESL/EFL context. Then again, a number of them differ in contextual, methodological and theoretical approaches, which help justify this present study.

While demonstrating the pedagogical potential of the Telegram application, Faramarzi *et al* (2019) submit that this user-friendly application has ways in which it can be used by instructors in engaging students in online language learning projects. Based on this fact, they submit that the application has become

quite popular amongst instructors and undergraduates. The popularity of the Telegram application as an instructional tool could be as a result of several instructional activities that can be employed to enhance students' interactions, as identified by Aladsani (2021) where he suggests that the application has several instructional activities that can be employed to enhance students' interactions. Findings from a study carried out by Adesope & Nwaizugbu (2018) in their investigation on the use of the use of the Telegram application in the University of Port Harcourt, Rivers state, Nigeria also corroborate results from Faramarzi *et al*. They, in an attempt to determine the perception of students regarding the application of Telegram for teaching and learning, reveal that the application is indeed a valuable extension of the traditional pedagogical methods in the sense that it not only offers a clean interface and security but it also provides forms of secured group and private communication. Guided by several research questions; what the experiences of PGDE students in the use of the Telegram app for delivery of learning modules in Winneba Study Centre, UK are and the suitability of the application, Owusu-Mensah *et al* (2020) present numerical results from quantitative data obtained from online questionnaire that suggest the effectiveness and convenience of the use of the Telegram app in the delivery of lesson modules.

In an EFL study, Salehpour (2018) investigates the effect of deploying the Telegram application in the listening and comprehension ability of selected Iranian EFL students. This he does by comparing two groups; those who received instructions regarding listening and comprehensibility skills in the regular classroom instruction method and those instructed through the Telegram app. Data analysed through independent sample t-test to compare both groups reveal results that indicate that the use of the app had a statistically significant effect on improving the listening and comprehension ability of the selected students. In a similar study on students' perception, Abu-Ayfah (2019) investigated data derived from responses (generated through a survey questionnaire) of selected EFL students from the department of English and Translation at Tibah University in Saudi Arabia. Results show that majority of the students agree that the Telegram application is a useful tool for learning English vocabulary. Just like Abu-Ayfah, Alakrash *et al* (2020) has results from an experimental post-test that also reveal the effectiveness of the use of the Telegram application in instructing EFL Arabic students in English vocabulary. Their findings demonstrate that the Telegram application is effective as a pedagogical tool for English vocabulary tutoring. In a related study on the efficiency of the Telegram application regarding improving the reading skills of EFL learners from a Jordanian university, Al Momani (2020) provides statistical evidence from pre and post-tests over two students groups that the application is effective in improving students' reading skills. Further studies that talk about the effectiveness of the Telegram application as a pedagogical tool include that of Alahmad (2020) who focuses on studies done on the use of the app as an effective method for teaching EFL/ESL learners of English based on the its variety of features. Similarly, Mahzoun & Zohoorian (2019) in a post-test quasi-experimental study submit that in employing the Telegram application in vocabulary learning and vocabulary delayed retention, results of their investigation reveal that using the app does not have a significant effect on the retention of the vocabulary of learners but a significant effect of online vocabulary practice on learners who had a positive attitude towards its use.

Finally, Tang & Hew (2022) provide evidence that reflects how mobile instant messaging devices; in this instance, the Telegram app, serves as an instructional design but should be improved to support learning experiences of students vis-à-vis emotional, behavioural and cognitive behaviours.

Research Methodology

This research uses a cross sectional survey design to evaluate learners' perception toward the adoption of mobile-based technology, in this case, the Telegram app in a blended learning situation. Thus, this section provides details on the process involved in the collection and quantifying of data. Here, objectivity and accuracy override a qualitative analysis based on the fact that this study systematically measures a limited number of variables.

The population for this investigation is made up of undergraduate and postgraduate students from the English and Literature Department (ENL), the Department of Educational Foundation (DEF) and Adult Education (ADT) students of the University of Benin, Benin City, Edo State, Nigeria during the 2019/2020, 2020/2021 and 2021/2022 academic sessions. The study sample was derived from students enrolled in Spoken English and English Phonetics and Phonology courses. With an estimated population of approximately 1,055 potential students, the estimated sample size is 401.

Data was collected through a structured online questionnaire with sections for demographic characteristics of respondents and their perception towards online learning using the Telegram application. Logically appropriate questions were generated with the use of a structured questionnaire sent out by posting a link via email and social media. The online questionnaire was expected to be completed by respondents and sent back within a one-week period. Responses and feedback gathered through this method were recorded. Data was analysed using the Statistical Package for the Social Sciences (IBM SPSS v. 22) and was represented in appropriate tables and figures.

Findings and Discussion

This study is a systematic investigation of undergraduate students' perception regarding blending the traditional teaching style with the Telegram application as a technology-assisted tool in eLearning. Consequently, this inquiry can only be achieved by statistically evaluating and examining the responses of undergraduates based on their learning experiences of mobile-based blended pedagogy; specifically, the adoption of the Telegram application in a blended learning context.

From table1 below, our findings reveal majority of the respondents, 386 were within the age group, 15-30 years; (96.3%). A greater part of the respondents were undergraduate students; 398 (99.3%). The highest proportion of students, that is, 130; (32.4%) was in the freshmen year. 76.3% of students, that is, 306 were from the Faculty of Arts, Department of English and Literature.

Table 1: Demographic characteristics of respondents (n=401)

		Male		Female		Prefer not to say		Total		χ^2	p-value
		n	%	n	%	n	%	n	%		
Age group (years)	15 – 30	74	91.4	311	97.5	1	100.0	386	96.3	10.529	0.230
	31 – 45	1	1.2	3	0.9	0	0.0	4	1.0		
	Undisclosed	6	7.4	5	1.6	0	0.0	11	2.7		
Level of Education	Undergrad.	80	98.8	317	99.4	1	100.0	398	99.3	0.329	0.848
	Postgrad.	1	1.2	2	0.6	0	0.0	3	0.7		
Level of study	Freshman	25	30.9	105	32.9	0	32.9	130	32.4	5.371	0.865
	Sophomore	29	35.8	100	31.3	10	31.3	129	32.2		
	Penultimate	13	16.0	50	15.7		15.7	63	15.7		
	Final year	14	17.3	62	19.4	62	19.4	77	19.2		
	Just graduated	0	0.0	1	0.3	1	0.3	1	0.2		
	Spill over	0	0.0	1	0.3	1	0.3	1	0.2		
Department	Arts/Eng.	59	72.8	246	77.1	1	100.0	306	76.3	0.985	0.912
	ADT	6	7.4	21	6.6	0	0.0	27	6.7		
	DEF	16	19.8	52	16.3	0	0.0	68	17.0		

Undergrad. = Undergraduate | Postgrad. = Postgraduate
Arts/Eng. = Arts/English and Literature | ADT = Education/Adult Education |
DEF = Education/Department of Educational Foundation

Table 2 below clearly indicates that familiarity with and adoption of the telegram app as a learning tool is way above average within the study population. This is because most of the students, a total of 324; (80.8%) had been taught using the Telegram application during the Post-Covid 19 periods of 2019/2020, 2020/2021 and 2021/2022 academic sessions. In a related study on the Telegram app as a tool that supplements online tutoring of medical undergraduate students in College of Medicine, Bin Faisal University Saudi Arabia, during the Covid 19 crisis, Iqbal *et al* (2020) also recorded a high adoption of the Telegram app. The similarity in the high adoption rate of the Telegram application in both studies could be as a result of the ease in its functionality as an e-learning tool.

In this present study, table 2 below reveals that 239 (59.6%) reported the learning environment as being conducive. However, despite this high percentage of students admitting that the learning environment was conducive, just a quarter of the respondents described the overall effect of the online lectures compared to the physical teaching style as excellent 112 (27.9%) with about 42% saying the overall effect was good. Accordingly, these results reinforce this study's submission; the emerging paradigm of mobile-based blended learning in tertiary institutions. That is, there is the need to create an integrated/hybrid classroom where learners of all abilities can study according to their individual pace; self-paced learning.

Table 2: Students' Experience with Telegram

		Frequency	Percentage
Have you ever been taught using the Telegram application?	Yes	324	80.8
	No	77	19.2
Was the Learning environment conducive?	Yes	239	59.6
	No	72	18.0
	Maybe	90	22.4
What was the overall effect of the online lecture compared to the physical classroom teaching style?	Excellent	112	27.9
	Good	168	41.9
	Fair	121	30.2

Figure 1 and figure 2 below support data in table 2 above and help to visually illustrate relationships and numerical interactions in this study's data. They also serve as clearer indicators of information embedded in the above tables.

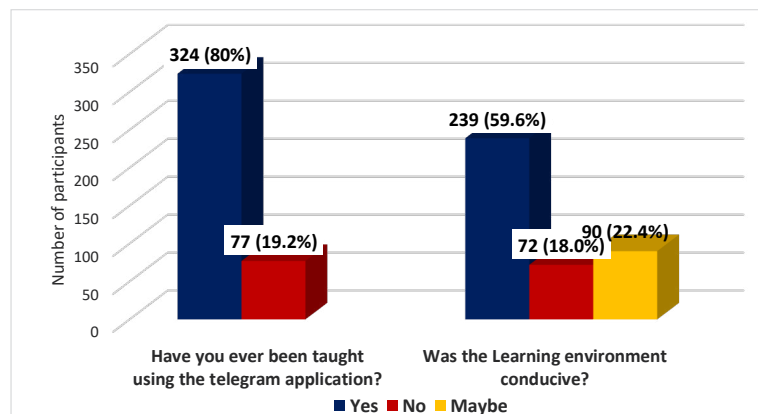**Figure 1**: Students' Experience with Telegram

Figure 2: The Overall Effect of the Online Lecture Compared to the Physical Classroom Teaching Style
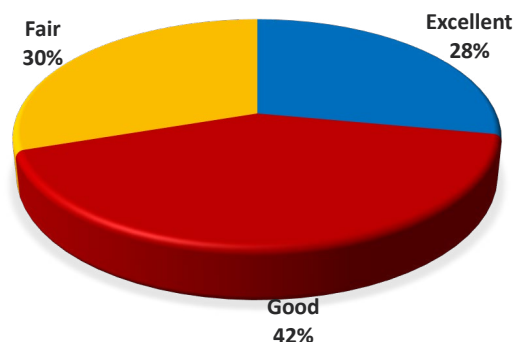

Table 3 below is undoubtedly a strong indication that the study population, undergraduate students demonstrated a marked preference for a synergy of online learning using the Telegram application and the traditional brick and mortar teaching style. We see a total of 322 students (80.3%) suggesting an adoption or an integration of the Telegram application into the conventional classroom teaching style.

Almost 20% of students; 19.5% (78) of the study population showed the predilection for online learning. Just 22.2% (89) students indicated a preference for face-to-face learning method while slightly over 68% did not opt for the alternative. As a consequence of the above findings, this study suggests that online learning supplements brick and mortar pedagogy. That is, adopting a mobile-based assisted pedagogy is a strong improvement on the traditional classroom teaching method.

Regarding the availability and effectiveness of instructional voice and audio messages, 78.6% (315) of students, responded affirmatively to the Telegram application aiding understanding of course content. Similar to this finding, Iqbal *et al* (2020), Egielewa (2021) and Olabisi *et al* (2017) report the effectiveness of the Telegram application as an effective mobile learning platform for students. Also, Wahyuri's (2018) findings during an investigation into students' perspective on the use of the telegram app indicate a high percentage of respondents positively agreeing to adopting its use. Figures 3 and 4 below adequately capture the numerical correlation vis-à-vis the varied sets of data indicated in the preceding table 3. The vertical bars in figure 3 and the slices or arc length in figure 4 are numerically proportional to the values they represent.

Table 3: Preferred Lecture Pattern of the Participants

		Frequency	Percentage
COMBINATION OF both online classes and face to face lectures?	Yes	322	80.3
	No	48	12.0
	Maybe	31	7.7
ONLY ONLINE classes using the Telegram application?	Yes	78	19.5
	No	277	69.1
	Maybe	46	11.5
ONLY THE PHYSICAL face-to-face lectures?	Yes	89	22.2
	No	274	68.3
	Maybe	38	9.5
Did the available instructional voice and audio messages help to better understand the course content?	Yes	315	78.6
	No	24	6.0
	Maybe	62	15.5

Figure 3: Preferred Lecture Pattern of the Participants
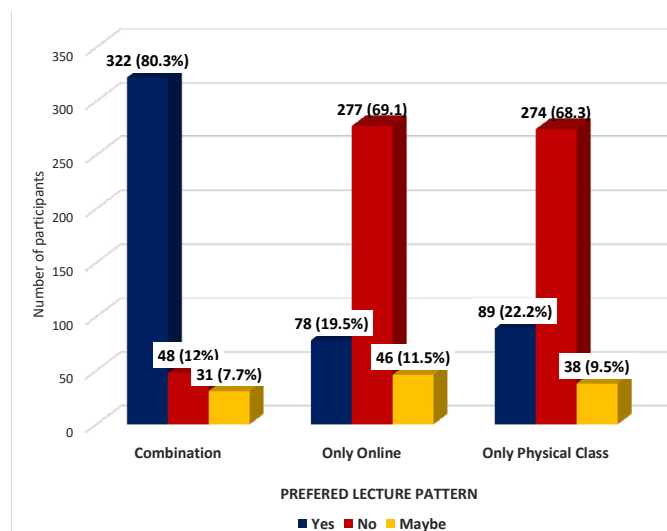
Figure 4: Showing Helpfulness Available; Instructional Voice and Audio Messages in Understanding the Course Content
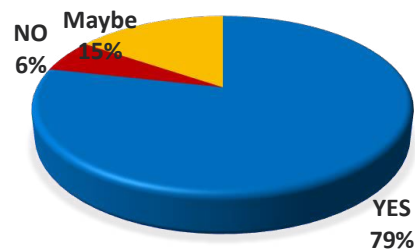

Table 4 below displays some selected demographic parameters that feature the advantages and effectiveness of online learning using the Telegram application in comparison with physical classes. A high proportion of respondents, 311 (77.6%) agreed that there was greater flexibility in scheduling weekly lecture hours. This is finding is probably due to the fact that students can effectively map out their individual physical space; learning environment that best suits them. This outcome corroborates the high aggregate of 59.6% (239) of students who described the online learning environment as being conducive. While 49.6% of students attested to having easy access to lecture notes and teaching materials during physical classes, over 35% disagreed and 15.2% were uncertain. However, regarding ease of access to study materials during online classes, a high percentage of students (72.5%) responded in the affirmative while just 13% were of an opposing view. These findings are similar to that of Kusuma & Suwartono's (2021) investigation into students' response to the use of Telegram in English classes during Covid 19 pandemic, where 92% of their study population affirmed the ease of accessing study materials. These advantages of online classes are well-defined indications for the necessity of incorporating this mobile-assisted device as an institutional methodology for reinforcing learning/retention with the principal objective of better student-outcome.

In this study, the high level of students attesting to the ease of access to study materials during online classes justifies why a good number of them; 314 (78.3%) agreed that such a teaching style promotes learning. Accordingly, if 78.3% and 57.2% (online and physical classes respectively) students of the study population agreed that both teaching styles promote learning, it presupposes that there is a general consensus towards integrating the Telegram application into the conventional face to face teaching method. Also, in table 4, the difference in the students' responses to whether online or physical classes provided the opportunity to become more actively involved in class activities was marginal. While 55.9% agreed to being actively involved in online classes, 59.1% confirmed same for physical classes. This further strengthens this study's argument towards blended learning.

A vast majority of respondents, 79.6% received prompt feedback from tutors. Incorporating the Telegram application as a pedagogic device into the regular face to face teaching method therefore assists students in gaining more profound insight into some of complex aspects of course content. Just about a third of respondents (36.2%) were comfortable asking questions during physical lectures, while 54.4% admitted that they were not comfortable asking questions. This could probably be as a result of several internal factors like low self-esteem and the fear of taking risks. In relation to students asking questions during online lectures, 311 students (78.1%) responded positively to being comfortable asking questions during classes while only 16% were of an opposing view. Based on the above fact, online teaching, using the Telegram

application, therefore provides several means through which introverts or anxious students can easily voice their concerns and handle their personal interests. For instance, there is the advantage of student anonymity when sending direct messages (DM) or voice notes regarding complex areas within the course content to the instructor or through e-mails. Complementing this advantage with physical classes, where extroverts or risk-takers have lower walls of inhibitions, is what this study promotes and ultimately, increased teacher engagement with learners. Mahmud (2015) in a study on questioning the powers that students possess in a physical classroom setting discovered that the questioning power or ability of students in a physical class was influenced by several factors namely the learners' English proficiency, psychological factors and teachers' demeanour. In his study, a high percentage of students, 72% admitted to being afraid to ask questions in a physical classroom. This present study has 54.4% admitting to being uncomfortable asking questions in a classroom. Thus, there is the need to merge both teaching methods so as to encourage increased student-teacher engagement.

Table 4: Frequency Distribution of Selected Demographic Parameters

		Online classes		Physical classes	
		n	**%**	**n**	**%**
Is there a greater flexibility in scheduling weekly lecture hours?	Yes	311	77.6	193	48.1
	No	33	8.2	137	34.2
	Maybe	57	14.2	71	17.7
Is there easy access to lecture notes and teaching materials?	Yes	291	72.5	199	49.6
	No	52	13.0	141	35.2
	Maybe	58	14.5	61	15.2
Are there opportunities to become more actively involved in class activities?	Yes	224	55.9	237	59.1
	No	107	26.7	94	23.4
	Maybe	70	17.5	70	17.5
Are you comfortable asking questions during lectures?	Yes	311	78.1	145	36.2
	No	64	16.1	218	54.4
	Maybe	23	5.8	38	9.5
From your experience, does this pattern of teaching promote learning?	Yes	314	78.3	229	57.2
	No	23	5.7	88	21.9
	Maybe	64	16.0	84	20.9
Where the lectures effectively organized?	Yes	306	76.3	221	55.1
	No	31	7.7	104	25.9
	Maybe	64	16.0	76	19.0
Did you receive prompt feedback from your tutors whenever you asked them questions?	Yes	304	75.8	319	79.6
	No	32	8.0	19	4.7
	Maybe	65	16.2	63	15.7

The bar chart, figure 5 below uses horizontal rectangular bars that represent the distinctions and comparisons between two discrete categories of light (indigo) shade; representing physical (face-to-face) lectures and dark (sapphire) shade; signifying online (Telegram) lectures. This data visualization technique of results helps to make recommendations regarding the purpose of this study; evaluation of undergraduate students' perception of amalgamating the traditional teaching style with the mobile telegram application as a technology-assisted tool in eLearning. Consequently, the categories of values displayed reveal that the darker shade (sapphire); signifying Telegram lectures wins in terms of greater degrees, vis-à-vis better organized lectures (76.3%); enhanced learning (78.3%); tendency to question tutors (78.1%); easy access to study materials (72.5%) and the flexibility in scheduling lectures (77.6%). The light (indigo) shade; representing physical (face-to-face) lectures wins in just two parameters; better class participation (59.1%) and prompt

feedback (79.6%). From the forgoing, this study suggests an inclusion of the mobile-assisted device in the conventional teaching method obtainable in Nigerian tertiary institutions; since both pedagogical styles are complementary in terms of practicality.

However, we must note that the lesser values in Figure 5, namely 75.8% and 55.9% representing 'prompt feedback from tutors' and 'better class participation' respectively, vis-à-vis online classes are indications of the need for well-trained tutors who are accredited as good online instructors as a prerequisite for blended learning. Also, the fact that table 4 shows that 16.1% of students are not comfortable asking questions and 13.2% do not recommend the use of the Telegram application as a pedagogical tool, also questions how adequate the delivery methods of tutors are, despite the fact that the values are low. This necessitates effectively training instructors in the area of online tutoring for the purpose of blended learning programs. This recommendation aligns with that of Lalima (2017) whose study also suggests the necessity for qualified instructors with scientific attitude towards achieving enhanced delivery methods in classroom and mobile assisted/ICT supported learning.
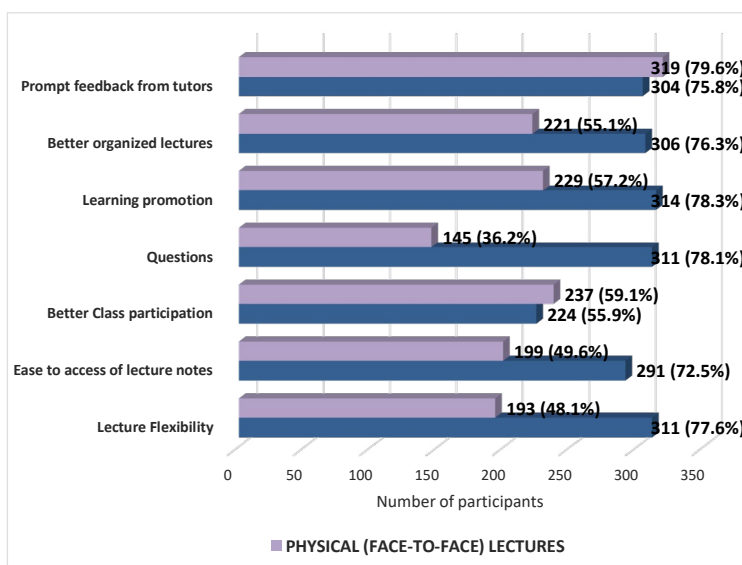
Figure 5: Preferred Lecture Pattern of the Participants

Table 5: Effects of Telegram Application as a Pedagogical Tool on Students' Performance

		Frequency	Percentage
Did you experience occasional lack of data and network issues during the online classes?	Yes	251	63.4
	No	94	23.7
	Maybe	51	12.9
Did lack of data and network issues affect your overall performance in the end of semester examination?	Yes	77	19.6
	No	256	65.1
	Maybe	60	15.3
Did the Telegram app, as a pedagogical tool used by your tutor POSITIVELY affect your end of semester results?	Yes	232	57.9
	No	76	19.0
	Maybe	93	23.1
Did the Telegram app, as a pedagogical tool used by your tutor NEGATIVELY affect your end of semester results?	Yes	36	9.0
	No	299	74.6
	Maybe	66	16.4
Was there a positive difference in your result when you used the Telegram app as a learning tool compared to when your lecturer only applied the face-to-face method?	Yes	219	56.0
	No	76	19.4
	Maybe	96	24.6
Do you recommend the use of the Telegram application as a pedagogical tool for online lectures in your institution?	Yes	300	74.8
	No	53	13.2
	Maybe	48	12.0
Do you recommend the use of the Telegram app to be used with the regular face to face lectures in your institution?	Yes	332	82.8
	No	34	8.5
	Maybe	35	8.7

Table 5 above displays feasible recommendations regarding the adoption of the Telegram application as a pedagogical tool for undergraduate students. The table also indicates the improved performance of students' output despite the online challenges faced by learners during online classes. Such challenges include the high cost/lack of data and persistent network glitches. Results reveal that two-thirds of respondents experienced occasional lack of data and network issues during the online classes. Only about a fifth of students (19.6%) stated that the lack of data and epileptic network coverage, which is a prevalent challenge for online students domiciled in universities in developing countries like Nigeria, negatively affected their overall performance during the end of semester examination. However, 256 students (65.1%) countered that the shortage of data did not in any way affect their overall performance negatively during the end of the semester examination. Such a positive outcome could probably be, beside other factors, as a result of the instructor incorporating the concept of micro learning; teaching in bytes while using the Telegram application. This, according to Suresh & Srinivasan (2018), deals with small learning units that encourage learning within a short duration and reduces cognitive weight of knowledge. Also, micro learning fosters long-term retention and improved learning ability for up to 18% compared to the traditional method (Mohammed *et al*, 2018).

Observe from the table also that about half of the students (57.9%) reported that the use of the telegram app positively affected their end of semester results. Hence, majority of the students (74.8%) recommend the use of Telegram application as a pedagogic tool for online lectures in their institution. Findings in several studies like that of Iqbal *et al* (2020), Momani (2020), Wahyuri (2018) and Lalima (2017) align with this study's findings indicating the positive response of students regarding the adoption of the Telegram application in pedagogical activities in tertiary institutions. Specifically, the finding regarding better student outcome is similar to an investigation carried out on the Telegram application as a pedagogical device for improving students' reading skills in Ajloun University, Jordan where the author reports that the Telegram application provides a student-centred educational environment that is more or less congruent with modern learning theories that concentrate on the significance of student active participation which will yield positive results (Al Momani, 2020, p. 377).

Just like several other scholarly studies on students' perception toward blended learning, majority of the respondents (82.8%) in this present study recommend the use of the mobile-based app with regular face to face lectures in their institution. Nevertheless, as earlier stated Lalima (2017) recommend that certain prerequisites like easy access to the internet and availability of well-trained teachers with scientific attitude are needed for blended learning. Looking at the high percentage of students (82.8%) who propose the use of the Telegram application alongside with brick and mortar learning, our submission therefore is that online learning has certainly added to improved student performance output. Using only a mobile-assisted device as the Telegram or only the traditional method of teaching is not adequate; hence, the suggestion for the amalgamation of both teaching styles. That being the case, although the mobile-based assisted pedagogical app like the Telegram is a strong improvement on the traditional method of teaching, there is still the need to consolidate or strengthen it with the conventional face-to-face pedagogy.

Consider figures 6 and 7 below. They are graphical representations of the data in table 5, which are clearer visualisations of the study's significant figures. These figures show the challenges of lack of data and network issues also, they indicate the resultant effect (positive and negative) on student performance and the marked preference of the study population for blended learning. Specifically, figure 7 displays a simple layout of

the students' preference for the blended teaching style; 82.8% prefer an amalgamation of both methods and 74.8% recommend its use as a pedagogical tool for online lectures. Such preference for the Telegram application as a pedagogical tool is also echoed in Iqbal *et al* (2020) where they submit that since it serves as an operational mobile-assisted learning device and offers more functionalities and less drawbacks (as also observed from our data) when compared to other applications, the Telegram app, is feasible as an application for online distance learning.

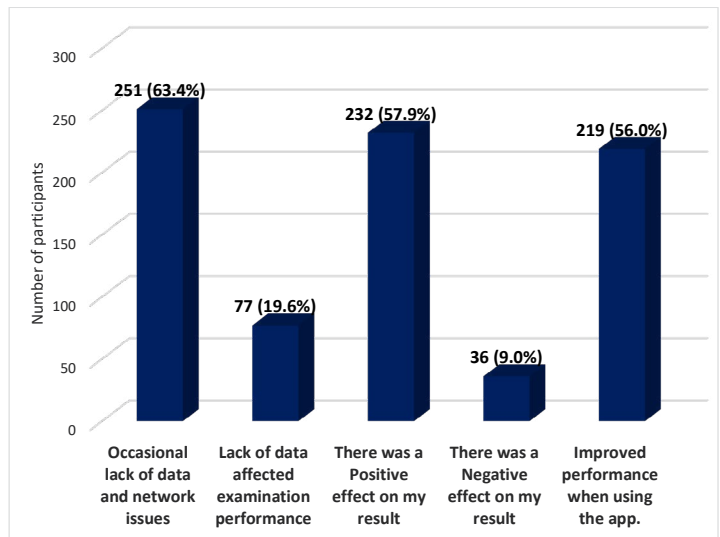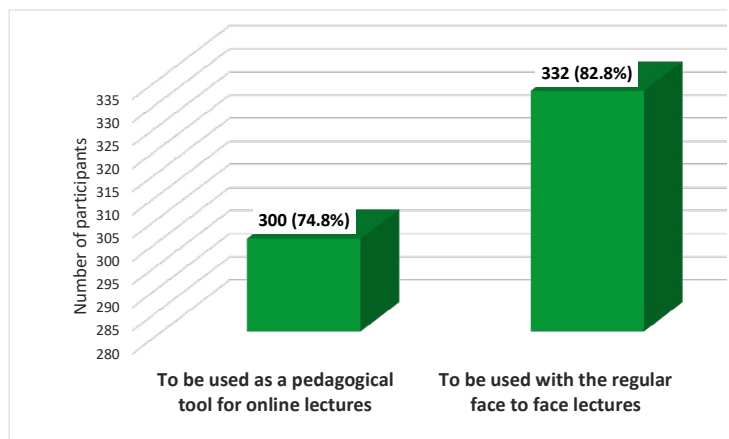**Figure 6**: Effect of Lecture Patterns on the Participants

Figure 7: Recommendation on the Use of the Telegram App

Conclusion

Majority of the undergraduate students are supportive of blending mobile based educational pedagogy with the regular face to face classroom lectures.

Students perceive the use of the Telegram application, in a course where it is deployed for e-learning, as capable of positively influencing their academic performance at the end of semester examinations.

Respondents, however, complain of the cost of data and operational network issues as factors limiting the effective use of mobile based educational pedagogy in their respective settings.

Recommendations

Policy and curriculum modification to fully embrace blended learning approaches to lecture delivery especially in public universities in Nigeria should be enhanced.

Institutions of higher learning in Nigeria should deliberately inculcate training of teachers and students on the effective use and adoption of information and communication technology (ICT) in higher education. The government should work synergistically with the companies involved in energy, ICT and mobile telephony to improve energy and ICT infrastructure, and consequently improve internet services whilst reducing the cost of data. Innovative data packages subsidising internet services for students and academics should be continuously encouraged to enhance the educational sector.

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