

Disposition and Challenges of Alternative to Physical Classroom Teaching and Learning in a Pandemic; an Appraisal of Biochemistry Students COVID-19 Learning with WhatsApp

Peter Agbadobi Uloku Ossai¹, Chukwudi Ogwu², Patrick Chukwuyenum Ichipi-Ifukor³, Fidelis Ifeakachuku Achuba^{3*}

Abstract

The objective of the study was to assess the disposition and challenges of students towards teaching and learning of biochemistry through WhatsApp.

Materials and Methods: The study was a cross-sectional survey which had 200 level (Second Year) and 400 level (Fourth Year) students of biochemistry as respondents. Data collection was done using a self-developed questionnaire administered through the WhatsApp group created for learning and collected through a designated e-mail address. Data analysis was carried out using the mean and standard deviation setting a mean score of 2.5 as a benchmark for accepting or rejecting statements made in the questionnaire.

Results: The study revealed that students had a level of openness to using online teaching resources for biochemistry; they do not believe that the use of WhatsApp for teaching and learning of biochemistry as a means of alternative to face to face classroom interaction will be effective in imparting the right knowledge in biochemistry. Several challenges identified are linked to not just money but is hinged around the curriculum structure of the biochemistry programme.

Conclusion: It is concluded that WhatsApp represents a potential means of instruction but may be hampered by challenges hinged on the curriculum structure of biochemistry

Keywords

Disposition; Challenges; Pandemic; COVID-19; WhatsApp

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Problem statement and analysis of the latest research

The emergence of the global pandemic novel coronavirus disease (COVID-19) affected all facets of human living in the year 2020. The novel coronavirus (SARS COV 2) disease which emerged from the city of Wuhan in China is said to be a respiratory tract disease that is traceable to a family of other coronavirus families [1, 2]. Owing to its high degree of transmission and the rate at which deaths were reported in different parts of the world, the World Health Organization

(WHO) formally declared it as a public health emergency which the entire human race was to put hands together to combat [3]. The outbreak of this pandemic no doubt came with its attendant economic challenge as every nation kept struggling on how to reduce the spread [4].

In the wake of the global struggle, Nigeria announced its incident case COVID-19 on the 27th of February, 2020. Days after days, other cases were announced and in less than one month the cases were running into hundreds [5, 6].

As most nations declared compulsory stay at home orders so as to reduce congregation of people which is a ma-

major factor to the transmission of COVID-19, the Nigerian government also rose up to the task especially after putting the challenge faced by our health sector which led to a declaration of immediate vacation of all institutions of learning including primary and tertiary [6, 7]. In order to stand up to the challenges being faced and the need to continue academic activities in institutions, most primary, secondary and tertiary institutions gradually started transiting into online and distance learning systems by exploring several e-learning tools including the use of social media apps [8–10]. Although this new online learning interface adopted by most school in itself does not end the pandemic, it by all means reduces one on one contact between teachers and students and the proximity of student-student contacts during actual classroom learning since contact and congregation is a major means and factor that promotes the transmission of the disease.

The virulence and rate of transmission amongst people congregating led to the suspension of academic activities in the Nigerian school system which led to transition to various forms of online learning platforms. At the Delta state University, Abraka Nigeria, prior to the development of the Universities Distance Learning Platform, Faculties were encouraged to keep contact with their students through active online teaching and mentoring using the direct messaging app, WhatsApp. The application is known to work across several platforms which can be easily accessible amongst people of different ages. According to Gon and Rawekar [11] the WhatsApp application has features that allow the users to exchange different types of multimedia outside text such as pictures, videos, audios and the feature of dropping offline messages, calls, video calls and group chats of over a 100 persons. It has been successfully employed in the teaching of different courses in higher education which also includes medical education [9, 10]

Biochemistry is one of the important preclinical courses taken by most health professionals during training [13, 14]. The importance of Biochemistry was emphasized in 1977 by Margot Kogut [15] to be the bedrock of clinical practice. It is obvious that the COVID-19 pandemic- stimulated lockdown will impact on the training of health workers who are at the front line in the fight against the disease.

The objective of this research therefore was hinged on examining the disposition and challenges of students towards teaching and learning biochemistry using WhatsApp messenger as an alternative to the face to face interface during the COVID-19 pandemic. Therefore, two major research questions arose: Research question 1: What is the disposition of male and female undergraduate biochemistry students on the use of WhatsApp in teaching and learning? Research question 2: What is the challenge of second year and fourth year level undergraduate biochemistry students on the use of WhatsApp in teaching and learning?

Research Methods

Ethical Statement & Informed Consent

The approval for the research and its protocol was granted by the Departmental ethics and board of studies committee. The study was also conducted according to the declaration of Helsinki involving human subjects who made all participants to sign a written and informed consent.

Recruitment of Study Participants

The present study was a cross-sectional survey which was carried out using the 200 level (second year) and 400 level (final year) students of Biochemistry, Faculty of Science, Delta State University, Abraka, Nigeria as participants. Recruitment of participants was done through the WhatsApp group created for learning purpose and this was done after series of attempts by lecturers to teach the students as directed by the school management.

Instrument of Data Collection

A questionnaire titled Disposition and challenges of online learning through WhatsApp was developed by the researcher. It comprised of three sections. The first section was targeted at collecting the gender and level distribution of respondents. The second and third sections contained 11 items each containing statements that sought students' opinion on their disposition towards the use of WhatsApp and challenges faced for teaching and learning of Biochemistry respectively. The statements were rated on a four point Likert scale of Strongly Agreed (SA), Agreed (A) Disagreed (D) and Strongly Agreed (SD). The respondents were free to tick their responses based on their level of agreement with the statements made.

Validity of the Instrument

The developed instrument for the study was validated by two experts at the Department of Biochemistry, Faculty of Science Abraka, Nigeria. Based on their understanding of the underpinning challenges for the implementation of the biochemistry curriculum, they made necessary inputs and corrections and adjudged the instrument good enough to elicit responses on the disposition and challenges of students towards teaching and learning of biochemistry through WhatsApp. Thus they approve the instruments through face and content validity.

Reliability of the Instrument

The instruments reliability was not tested based on the existing online interface of the school system due to the COVID-19 pandemic. Hence the researchers relied only on the face and content validity.

Instrument Administration and Retrieval

The instrument was administered by attaching the questionnaire as a word document in the WhatsApp group created by each class for online learning. The objective and the aim of the study was explained to the students and they were required to fill the questionnaire and return through a designated email

address within five days. At the end of the five days period, all returned questionnaire through the email was downloaded and printed and was examined for appropriateness and eligibility to be included in the data analysis process. At the end a total of 173 valid questionnaires were selected for analysis.

Method of Data Analysis

Responses of respondents were entered into the template of the computer software Statistical package of the social sciences version 23 (SPSS 23). This was followed by frequency counts and a mean analysis of the individual items. A benchmark of 2.5 was set as the minimum mean score to accept the statements made in each of the items. The choice of the 2.5 benchmark was made based on the average of the 4, 3, 2 and 1 points of the likert scale for scoring the responses (SA, A, D and SD). Based on the scores obtained per item, the researchers made adjudged the students disposition and the challenges faced by them towards the use of WhatsApp for teaching and learning of biochemistry.

Results and Discussion

The respondents were made up of 27.7% males comprising 48 persons and 72.3% of females comprising of 125 respondents. Also, 49.7% comprising 86 200 level students and 50.3% comprising of 87 400 level students participated in the study (Table 1).

Table 1. Distribution of Respondents by gender and class of Study.

Variable		Frequency	Percentage
Sex	Male	48	27.7
	Female	125	72.3
Level of Study	200 Level (2 nd Year)	86	49.7
	400 Level (4 th Year)	87	50.3
Total		173	100

Table 2 presents responses of students regarding their disposition towards use of WhatsApp for teaching and learning of biochemistry. Based on the mean response scores, they rejected social networking as a design for other social activities and not for teaching and that they were not used to any form of electronic learning. It was also rejected by the respondents that learning biochemistry through WhatsApp will enhance students' performance in biochemistry and that WhatsApp is not designed for learning. They were also not of the opinion that biochemistry lecturers cannot effectively use smart phones. On the other hand, respondents agreed that the network strength in Nigeria does not encourage use of WhatsApp in teaching and learning and that proper learning of biochemistry required a face to face contact because the methods used for teaching biochemistry is not applicable to WhatsApp. The respondents were also of the opinion that biochemistry students had no bright future if taught through WhatsApp

and that it can't be used by lecturers to pass all necessary information across to students. Concerns for the possibility of the app expiring at the time it is most needed were also raised by the students.

Previous studies have elicited on the use of WhatsApp and several social media and online platforms in teaching and learning in tertiary institution [16–18]. This assertion agrees with the present investigation that appraised the use of WhatsApp in the teaching and learning of Biochemistry. The observation made in this study reveals that the students quite have a level of positive disposition for teaching and learning. However, it may be hampered by several bottlenecks. Their rejection of the opinion that social networking is not designed for teaching gives a hint to their openness to the innovation of incorporating e-learning into their curriculum (Table 2). This openness of students to WhatsApp teaching has been previously reported by Alloy *et al.* [19] who reported positive attitudes and successful outcomes amongst Saudi Arabia students for the improvement of students-teachers interaction as a classroom support system. Likewise, Studies carried out by Amry [20] reported positive outcomes in the achievement test of a controlled experimental group using WhatsApp relative to classroom interaction. It is important to note that the students did not believe that using WhatsApp to teach will enhance their academic outcomes in Biochemistry. This submission is further given credence by their later agreement that biochemistry requires interaction as methods in biochemistry teaching are not easily applicable in WhatsApp.

The possible reason for this may be likened to the nature and structure of the biochemistry curriculum which most students have to learn several calculations and the drawing of biochemical structures thus lecturers may not be able to pass in detail all needed information that ought to be passed According to the students, they agreed that their lecturers can effectively use smart phones however the poor network strength in Nigeria may not encourage the teaching and learning of biochemistry properly. Their identification of network strength as a limitation to the use of WhatsApp for teaching biochemistry is similar to the limitations encountered by students of pathology in India as reported by Gon and Rawekar [11].

Data presented in Table 3 show details of students' perceived challenges to the teaching and learning of biochemistry through WhatsApp. Challenges identified by the students were lack of money for data subscription purchase, inadequate network, inability to afford smart-phones, instability of unavailability of electrical power for charging of phone, hampering of teaching due to update of WhatsApp application. Other perceived challenges identified include students not being able to always come online for lectures, vulnerability to loss of course contents and materials in smart phones, the presence of several side distractions in smart phones and the inability to teach calculations and drawings via the WhatsApp application.

These identified challenges are similar to the identified problem and limitation faced by University students in Namibia

Table 2. Students Disposition towards use of WhatsApp in Biochemistry Lectures.

S/N	Items	SA	A	D	SD	Mean	SD	Remark
1	Social networking is designed for other social activities and not for teaching and learning	26	45	58	44	2.31	1.01	Reject
2	The network strength in Nigeria does not encourage the use of WhatsApp in teaching and learning	48	69	51	5	2.9	0.83	Accept
3	The method applied when teaching Biochemistry cannot be applied through WhatsApp	89	64	17	3	3.38	0.73	Accept
4	Seeing the lecturer face-to-face is required in learning Biochemistry	69	61	31	12	3.08	0.92	Accept
5	I am not used to any form of electronic learning	25	62	60	36	2.38	0.97	Reject
6	I feel that learning through WhatsApp will enhance students' performance in Biochemistry	8	31	71	63	1.91	0.85	Reject
7	WhatsApp is not designed for teaching and learning	27	53	68	25	2.47	0.92	Reject
8	I feel that Biochemistry lecturers cannot effectively use smart-phone	15	19	85	54	1.97	0.88	Reject
9	Biochemistry students do not have a bright future if taught through WhatsApp	41	62	39	31	2.65	1.03	Accept
10	Lecturers cannot use WhatsApp to pass all necessary information across to students	76	60	27	10	3.16	0.90	Accept
11	WhatsApp application can expire at the time it is needed most.	70	78	14	11	3.20	0.84	Accept

Table 3. Students Challenges in the teaching and learning of Biochemistry via WhatsApp.

S/N	Items	SA	A	D	SD	Mean	SD	Remark
1	Students' need incentives to enable them use WhatsApp in learning	61	83	17	12	3.12	0.85	Accept
2	Lack of money for data subscription discourages students from using WhatsApp to learn	121	45	7	-	3.66	0.55	Accept
3	Inadequate network hampers students' use of smart-phone	88	70	12	3	3.40	0.698	Accept
4	Students cannot afford smart-phones that effectively use WhatsApp	31	65	59	18	2.63	0.90	Accept
5	Students are not able to ask lecturers question through WhatsApp	18	50	84	21	2.38	0.83	Reject
6	Electricity power is not readily available to charge the phone	94	65	10	4	3.44	0.71	Accept
7	Students cannot be online all the time to receive lectures	101	63	7	2	3.52	0.63	Accept
8	Updating an expired WhatsApp application can hamper the teaching and learning process	72	72	19	9	3.20	0.84	Accept
9	Lecturers' materials can easily be lost due to mismanagement of smart phone	61	86	22	4	3.18	0.74	Accept
10	Calculations and drawings in biochemistry is very difficult to understand through WhatsApp	106	48	17	2	3.49	0.72	Accept
11	WhatsApp is surrounded with a lot of distractions	107	49	13	4	3.50	0.74	Accept

that tried to incorporate an online WhatsApp teaching method. They submitted in their study that the WhatsApp teaching impacted negatively on learning outcomes and experiences and that there was a variance on balancing online activities and academic preparations especially as it relates to assignment completion [16]. Also of importance is that the challenges faced in the incorporation of WhatsApp to the teaching of biochemistry in the face of the COVID-19 pandemic is not similar to those experienced by students and instructors in teaching of plastic surgery in the United Kingdom and Pharmacy students

in Pakistan [9, 10].

Conclusions

It can be concluded that although students have a level of openness to using online teaching resources for biochemistry, they do not believe that the use of WhatsApp for teaching and learning biochemistry as a means of alternative to face to face classroom interaction will be effective in imparting the right knowledge in biochemistry. Several challenges identified are

linked to not just money but is hinged around the curriculum structure of the biochemistry programme.

Conflict of Interest

The authors declare that no conflicts exist.

Financial Disclosure

The authors declared no financial support.

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Appendix

A QUESTIONNAIRE ON STUDENT'S CHALLENGES AND THEIR DISPOSITION TOWARD THE TEACHING AND LEARNING OF BIOCHEMISTRY WITH WHATSAPP

Department of Biochemistry,
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Date: _____

Dear Respondent,

Kindly complete the questionnaire below. The information to be provided is strictly for the purpose of research. All responses will be strictly confidential.

Yours Sincerely,
Fidelis Achuba

Section A: Respondents Personal data Instruction: Please tick (✓) in the box provided

(i) Sex: Male [] Female []

(ii) Level of study: 200 [] 400 []

Section B: Please tick (✓) only one option in each of the following statement: note that SA is Strongly Agree; A is Agree; SD is Strongly Disagree while D is Disagree

S/N	Items	SA	A	D	SD
<i>Students' disposition toward use of WhatsApp in Biochemistry lectures:</i>					
1	Social networking is designed for other social activities and not for teaching and learning				
2	The network strength in Nigeria does not encourage the use of WhatsApp in teaching and learning				
3	The method applied when teaching Biochemistry cannot be applied through the use of WhatsApp				
4	Seeing the lecturer face-to-face is required in learning Biochemistry				
5	I am not used to any form of electronic learning				
6	I feel that learning through WhatsApp will enhance students' performance in Biochemistry				
7	WhatsApp is not designed for teaching and learning				
8	I feel that Biochemistry lecturers cannot effectively use smart-phone				
9	Biochemistry students do not have a bright future if taught through WhatsApp				
10	Lecturers cannot use WhatsApp to pass all necessary information across to students				
11	WhatsApp application can expire at the time it is needed most				
<i>Students' challenges in the teaching and learning of biochemistry:</i>					
1	Students' need incentives to enable them use WhatsApp in learning				
2	Lack of money for subscription discourages students from using WhatsApp to learn				
3	Inadequate network hampers students' use of smart-phone				
4	Students cannot afford smart-phones that effectively use WhatsApp				
5	Students are not able to ask lecturers question through WhatsApp				
6	Electricity power is not readily available to charge the phone				
7	Students cannot be online all the time to receive lectures				
8	Updating an expired WhatsApp application can hamper the teaching and learning process				
9	Lecturer materials can easily lose due to mismanagement of smart-phone				
10	Calculations and drawing in Biochemistry is very difficult to understand through WhatsApp				
11	WhatsApp is surrounded with a lot of distractions				



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Patrick Chukwuyenum ICHIPI-IFUKOR currently works in the Laboratory unit of the Department of Biochemistry, Delta State University Abraka. He Holds a Bachelor and Master Degree in Biochemistry and Post graduate Diploma in Education (PGDE) all from the Delta State University, Abraka. He has expertise in laboratory management and possesses excellent presentation skills and qualifications in teaching excellence and student engagement at all levels. Patrick is an outstanding practitioner of virtual learning environment (VLE) via use of digital technologies/ICT to enhance learning experiences. Patrick has expertise in curriculum implementation and measurement and evaluation. Other areas of research interest include toxicology and environmental biochemistry, neuroscience, and phytomedicine.



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