



Students' perceptions and experiences of remote learning amid covid-19 pandemic in Ghana

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Background: The COVID-19 pandemic had a significant impact on students, instructors, and educational organisations all around the world. Remote learning was an emergency response by most universities in Ghana during this pandemic to ensure the continuation of their academic calendar. Conducting this study among Ghanaian undergraduate students is crucial because factors like socioeconomic status, technological resources, and individual learning preferences can significantly impact their experience and the perception of remote learning, which may differ from studies conducted elsewhere.

Objective: To determine the perceptions and experiences of remote learning among allied health sciences students during the COVID-19 pandemic.

Methods: This cross-sectional study involved 218 second, third, and final year Allied Health Sciences students in the University of Ghana. A questionnaire was used to obtain data concerning health professions students' perception and experience of remote learning. The readiness of students in respect to the emergency remote learning, attitudes towards remote learning, perception of remote learning, satisfaction, and the level

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of anxiety was calculated using mean and mean percentages. Kruskal–Wallis test was used to analyse differences between programmes of study and the perceptions and experiences of remote learning.

Results: One hundred and fifteen (53.1%) of the participants had moderate perceptions of independence and responsibility in their learning experiences while 80 (36.7%) students reported that their satisfaction levels regarding remote learning was high. Seventy-seven (38.4%) students reported that they had a burden of anxiety. There was no statistically significant difference between anxiety level and programme of study.

Conclusion: Ghana Allied Health Sciences students had positive perceptions and experiences towards remote learning. They could adapt to the new teaching method with appropriate technology integration. Despite a number of students who were anxious about using remote learning. Adequate support towards transitioning into the use of technology may be a good consideration.

Keywords: Remote learning; coronavirus; pandemic; online learning; emergency.

Introduction

The COVID-19 pandemic posed daily problems across the world,¹ many of which contemporary civilization has never faced. The pandemic had an impact not only on human life but also on education. An overwhelming majority of the world's enrolled students experienced the temporary closing of school during the COVID-19 pandemic in an attempt to encourage social distancing and therefore decelerate the transmission of the virus.²

In response to government's call for schools' closure, educators shifted their mode of teaching from the traditional classroom teaching to remote teaching.³ Remote learning is a form of education where students and instructors, or sources of information, are physically separated by time and distance, and instruction is delivered through technology like discussion boards, video conferencing, and online assessments.⁴ To curtail the spread of the deadly virus, all public gatherings were interdicted by the government of Ghana. In addition, both public and private basic and senior high schools as well as colleges and universities were closed down temporarily. In addition to the problems created, the pandemic resulted in some beneficial changes (such as greater focus on personal hygiene and self-care) in behaviours and mindsets.⁵

There are a variety of technologies available for remote teaching, but they can be challenging to use at times. Downloading failures, login issues, and audio as well as video issues are just a few of the challenges and problems that come with contemporary technology.⁶

Remote learning hinders student cohesiveness, peer-to-peer, and student–lecturer interaction

beyond the real-time video or chat interactions. This promotes student disengagement and drop-out.⁷ Saavedra⁸ argued that developed countries are at a gain in introducing remote teaching, but this may not be valid for every country. Adam⁹ indicated that it is only students who have proper access to internet who will profit the most from this remote instruction or online learning. Although remote learning takes place online, remote learning is different from online learning. As students' study through the internet, remote learning attempts to replicate the classroom atmosphere. This means the student uses video conferencing platforms like Zoom, Microsoft Teams, and Blackboard Collaborate to connect into the virtual classroom environment at set times to participate in virtual classroom learning activities.¹⁰

Remote teaching and learning were the anticipatory preventive measures adopted by most universities in Ghana in order to complete their academic calendar. Remote learning draws on various learning theories like Cognitivism, Connectivism, Heutagogy, Social Learning, Transformative Learning Theories, and Vygotsky's Zone of Proximal Development (ZPD).¹¹ The selection of relevant theories is vital for effective online instruction, tailored to the specific context. For example, integrating Connectivism through social networks can improve student motivation and engagement.¹² Emphasizing Heutagogy encourages self-directed learning, fostering critical thinking, and problem-solving skills.¹²

Some Arabian students appreciated the flexibility and convenience of remote learning,¹³ while students in the United Kingdom, Europe, and the United States, primarily engaged in synchronous remote instruction, demonstrated higher motivation, and

engagement,¹⁴ enabling them to manage their schedules and study at their own pace. However, challenges such as internet connectivity issues, lack of necessary technology, and difficulties staying motivated and engaged with online coursework were commonly reported among students in Europe, United States, United Kingdom, and Saudi Arabia.^{13,14} The abrupt shift to remote learning presented emotional and psychological challenges, including feelings of isolation from peers and teachers in Saudi Arabia¹³ and Europe¹⁴ which, raised concerns about the quality of instruction and the effectiveness of virtual learning compared to traditional in-person methods.¹⁴ Given the variations in perceptions and experiences due to factors like socioeconomic status, technological resources, and individual learning preferences,¹⁵ the aim of this study was to explore the perceptions and experiences of Allied Health Science students in Ghana during the COVID-19 pandemic.

Materials and Methods

This cross-sectional study was conducted among allied health sciences students (i.e., dietetics, occupational therapy, medical laboratory sciences, respiratory therapy, radiography, and physiotherapy) at the School of Biomedical and Allied Health Sciences, University of Ghana. Students who were in their second, third, and final (fourth) year were included in the study while first year students were excluded because they had no experience of remote learning. The minimum sample size of 212 was calculated using Taro Yamane's (1967) formula: $n = N/(1 + Ne^2)$.¹⁶

Instruments for data collection

A questionnaire designed by Almoayad *et al.*¹⁷ to assess health professional students' perceptions and experiences of remote learning was adopted for this study. The questionnaire measures students' perceptions and experiences of remote learning. The 34-item questionnaire (Appendix A) consists of four sections. Appendix A.1 focused on the sociodemographic and participants' characteristics while Appendix A.2 addressed perceptions of responsibility in learning during remote teaching. Appendix A.3 assessed perceptions of the impact of remote teaching on learning goal achievement and learning quality. Appendix A.4 assessed students' anxiety levels during remote teaching and learning.

All components of the research tool were tested for validity by six academic teachers involved in e-learning at Princess Nourah Bint Abdulrahman University (PNU), Saudi Arabia in 2010.¹⁷ It took about 18 min to complete the questionnaire. The questionnaire's reliability using Cronbach's alpha coefficient were 0.91, 0.72, and 0.82 for anxiety, responsibility, and goal achievement, respectively with a good internal consistency.¹⁸ The questionnaire's feasibility is piloted with 10% of similar participants for which minor modifications were made.¹⁷

Procedure for data collection

As a result of the COVID-19 pandemic, the questionnaire was converted to electronic format and was designed using google forms. Relevant information about the study was included on the first page of the google form to provide participants an idea about the study. Copies of the questionnaire were distributed to participants through emails, telegram, and all class groups via WhatsApp. Follow ups were made by calls and text messages after the questionnaire was distributed to the participants. Those who agreed to take part in the study signed an electronic consent form, which was included in the google form. An automatic response is received once the questionnaire is completed and submitted by a participant. Data were collected between July and August 2021.

Data analysis

The data were analysed using STATA version 15. Descriptive statistics was employed to determine means, proportions, percentages, and frequencies of demographic characteristics and other independent variables (age, programme of study, and level of study) of participants. Kruskal–Wallis tests were used to assess differences in perceptions and experiences of remote learning (specifically general anxiety disorder) among the programmes and levels of study during the COVID-19 pandemic.

Ethical consideration

Ethics approval (SBAHS/AA/PT/10662911/2020-202) (Appendix B) was sought and obtained from the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences, College of Health Science, University of Ghana

Table 1. Background characteristics of the participants.

Variable	Frequency (<i>n</i> = 218)	Percentage
Age (years)		
18–20	61	28.0
21–24	142	65.1
25–27	7	3.2
provided	8	4.4
Level of study		
Second year	69	31.7
Third year	61	28.0
Fourth year	88	40.3
Programme of study		
Physiotherapy	58	26.6
Occupational therapy	19	8.7
Respiratory therapy	10	4.6
Dietetics	17	7.8
Radiography	62	28.4
Medical laboratory sciences	52	23.9

before the study was conducted. The students consent was sought and obtained via the platform used before participating in the study.

Results

A total of 450 undergraduate students from the six departments in the school were approached for this study, of which 218 completed questionnaires were received (a 48% response rate). The average age of the respondents was 25 years (range, 18–27 years). Most of the respondents were radiography students (28.4%), followed closely by physiotherapy students, as shown in Table 1. Respondents' demographics including age, level (the stage or year of the academic programme that a student is currently enrolled in), and programme of study are also depicted in Table 1. Table 2 shows the frequency of blackboard features, online applications,

Table 2. Frequency of blackboard features, online application, and course instructor interaction before shifting to remote learning.

Blackboard features you have experienced, before the emergency shifting to remote learning	Yes (<i>n</i> = 218)	%
Virtual classes	73	33.3
Discussion board	42	19.2
Quizzes/exams	118	53.9
Downloading course material	158	72.2
Submit assignment	159	72.6
Online applications you have used to support your learning before the emergency shifting to remote learning		
Microsoft Teams	21	9.6
Zoom	83	37.9
Telegram	78	35.6
WhatsApp	163	74.4
Blackboard	32	14.6
How did you interact with course instructor before shifting to remote learning?		
Office hours	100	45.7
Email	165	75.3
Blackboard	35	16.0
Telegram	8	3.7
WhatsApp	118	53.9
Did you have an electronic device to access blackboard and other online application before the emergency shifting to remote learning?	204	93.6
Did you have proper network (internet) to access blackboard and other online application before the emergency?	133	61.3

Table 3. Student perception of responsibility and independence in learning, general anxiety disorder, and satisfaction level of remote learning.

Variable	Frequency (<i>n</i> = 218)	Percentage
Perception of responsibility and independence in learning		
Low	61	27.9
Moderate	115	53.1
High	42	19.0
General anxiety disorder		
None	128	61.5
Mild	55	26.4
Moderate	16	9.1
High	6	2.9
Level of satisfaction in remote learning		
Satisfied	80	36.7
Moderately satisfied	92	42.2
Unsatisfied	46	21.1

and course instructor interactions utilized by students before the emergency shift to remote learning.

More than half of participants 115 (53.1%) had moderate perception of responsibility and independence in learning, while 77 (38.4%) had a burden of general anxiety disorder and 80 (36.7%) were satisfied with the shift to remote learning respectively, as shown in Table 3. Table 4 shows

Table 5. Comparison of anxiety level among programmes and levels of study.

Anxiety level	<i>n</i>	Mean rank	<i>P</i> -value
Programme of study			
Physiotherapy	58	110.8	0.473
Occupational therapy	19	101.88	
Respiratory therapy	10	93.56	
Dietetics	17	123.53	
Radiography	62	101.31	
Medical laboratory sciences	52	97.80	
Level of study			
Second year	69	105.84	0.435
Third year	61	110.41	
Fourth year	88	99.26	

Note: Data were analysed using Kruskal–Wallis equality rank test of association.

students' attitudes towards remote learning and Table 5 indicates that there was no significant difference between General anxiety disorder and programme, and level of study.

Discussion

The findings of this study revealed that blackboard features used mainly by Allied Health Sciences students in the University of Ghana before shifting

Table 4. Attitude towards remote learning.

Attitude towards ERT	SA/A	%	N	%	SD/D	%
Remote learning motivates better learning.	77	[35.3]	74	[34.1]	66	[30.3]
Remote learning helps to understand the subject material well.	68	[31.2]	78	[35.8]	72	[33.0]
Remote learning help in knowledge and skills development.	97	[44.5]	78	[35.8]	43	[19.2]
Remote learning is more enjoyable than face-to face.	65	[29.8]	43	[19.7]	110	[50.5]
Shifting to remote learning make me prefer to have more courses delivered through remote learning.	80	[36.7]	53	[24.7]	82	[37.6]
Shifting to remote learning make me prefer to have more courses delivered through face-to-face mode.	133	[61.0]	45	[20.7]	39	[17.9]

Note: SA/A = Strongly agree/agree; N = Neutral; SD/D = Strongly disagree/disagree; ERT = Emergency remote teaching.

to remote learning was to submit assignments, download course materials, and access quizzes/examinations. The University of Ghana has an online portal known as Sakai Learning Management System (Sakai LMS), which includes features such as assignment submissions, quizzes/examinations, and resource folder, where students could download course materials, submit their assignments, and take part in tests and quizzes. The Sakai LMS probably accounted for students' engagement in online education before shifting to remote learning. The crucial factor that impacts student satisfaction is that the learning features available on Sakai LMS meet their needs and facilitate its use. Rubin *et al.*¹⁹ hypothesized that continuous placements of course materials on LMSs will lead students to read more of the course materials and navigate the course more efficiently, thus reducing frustration and increasing cognitive presence. WhatsApp was the most widely used online application by students to support their learning before the emergency shift to remote learning. This may be because the primary mode of communication among students is through WhatsApp. This application enables them to form groups, share learning materials, and some vital information easily among themselves. Tawiah²⁰ showed that students preferred to use WhatsApp applications instead of mobile voice calls for their day-to-day communication.

This study revealed that email was the most frequent mode of communication between students and their lecturers. The findings on Psychology students in a United Kingdom University on their preferences of face-to-face, email, virtual learning environments, and social networking sites, showed that one's preference in communication mode relied on the type and depth of the information exchange, the addressee, and the amount of time available to the students.²¹ Email's characteristics contributing to this depth include its text-based platform, formality, capacity for documentation, support for file attachments, and the privacy it affords, all of which encourage in-depth, formal, and documented academic discussions and facilitate the conveyance of complex ideas, feedback, and supplementary materials. This is a possible reason why most students preferred emails as the mode of communication. The addressee and style of writing probably explains why e-mail is the option with the highest response rate, followed by WhatsApp.

The findings of this study revealed that half of the students considered the effect of switching from traditional classroom setting to remote teaching and learning on their responsibilities and independence as average. Esterhuyse *et al.*²² reported that the effectiveness of the online learning process is preceded by students' fulfilment. The satisfaction of learning regarding their goals was strongly related to the perception of independence in learning in this study and this could be because most of the students were satisfied with what they learnt during the period of remote teaching and learning. According to Mulyvanti *et al.*,²³ students showed high satisfaction with remote learning. The similar outcome in this study may be due to the replacement of supervised examinations with open book examinations, projects, and assignments. Students are given more freedom in completing their assessments as compared to examinations in classrooms in which they are monitored (invigilated) throughout the sessions.

The level of anxiety might interfere with everyday functioning like studies, their daily activities, and social life among students. Anxiety is a major predictor of academic performance.²⁴ This study revealed that less than half of the students had a burden of anxiety during remote learning. The negative significant correlation found between the level of anxiety and the perception of learning effectiveness was that the lower the anxiety, the higher the students' satisfactory level regarding remote learning. You and Kang²⁵ reported significant relationship between anxiety and academic control. Anxiety is one of the most frequent emotions reported from e-learning.²⁶ Among University and college students in Hong Kong, the prevalence of moderate and severe anxiety was 12.2%, and 5.8%, respectively,²⁷ while in Portugal, 15.6% and 8.3% suffered from moderate and severe anxiety, respectively.²⁸ This outcome was due to increasing academic pressure after major reforms of the education system in Hong Kong.²⁸ College students face many obligations that can potentially lead to increased levels of stress and anxiety. According to the American College Health Association, 66% of college students reported experiencing overwhelming anxiety during the 2019 spring semester (American College Health Association [ACHA]).²⁹

Motivation is a crucial element for students to engage in remote learning. This study showed that less than 50% of the surveyed students had positive views regarding their attitudes towards remote learning. While some students acknowledged that

the remote learning could improve motivation and understanding of subject material, a good number were either neutral or negative. Additionally, less than half found that the remote learning were more enjoyable than face-to-face instruction, with a majority preferred traditional in-person interactions for the future. These findings raise concerns about the overall acceptance and effectiveness of remote learning among students, prompting the need to explore influencing factors that could improve the students' perception, and experience of remote learning in educational settings.

Only 35.3% of students who participated in this study reported that remote learning motivates better learning. Although the percentage of students who agreed to the statement 'Remote learning motivated better learning' was not high, this did not reflect their overall perception regarding the satisfaction of learning goals. In our study, we observed a striking diversity of opinions among students regarding the transition to remote learning. While some students expressed that remote learning allowed them to complete assignments with increased efficiency, another group held a contrasting view, asserting that remote learning lacked the enjoyment they experienced in face-to-face instruction which is corroborated by Muilenburg and Berge's study.³⁰ This could be because of the "isolation" involved in remote learning, which restricted physical interaction between the students and their lecturers. The minimal interaction and direct contact with instructors in the e-learning environment influenced student's perception of effectiveness considerably.³¹ Muilenburg and Berge³⁰ indicated that a lack of social interaction is a major barrier in terms of student perception of e-learning effectiveness. In contrast, Shin and Hickey,³² revealed that, the negative experiences and challenges shared by students of their study were, a struggle to stay motivated, the disruption in learning, a lack of communication and feedback, a difficulty to foster creativity, and insufficient workload adjustment. This divergence of perspectives prompts us to delve deeper into the underlying factors and implications of these sentiments, shedding light on the multifaceted nature of the remote learning experience.

In the context of this study, the shift towards e-learning was sudden and without prior planning, which may have increased students' concerns for their education. The temporary suspension of all practical and clinical training may also have contributed to students' disagreement on the quality

of their study. The alternatives provided for practical and clinical training could not replace to alleviate students' concerns regarding their clinical-skill acquisition and may also be related to students' preference to have more courses delivered through the face-to-face mode as compared to courses delivered through remote learning.

There was no significant difference between general anxiety disorder and programme of study as well as level of study, which implies that anxiety levels had no impact on students' learning regardless of programme or level of study. Across programmes and levels of the study, students experienced similar perceptions towards remote learning. According to Savitsky *et al.*,³³ even in normal circumstances, students experienced anxiety. Programmes and the students' level of study did not create an additional anxious environment for the students during the remote learning as a result of the COVID-19 pandemic.

Considering the impact of the sense of loss within a country is crucial. This feeling, encompassing the loss of normalcy, routine, social interactions, and even loved ones due to the pandemic, can greatly influence students' perception and experience of remote learning. Hence, educators and policymakers must take these effects into account when designing and implementing remote learning strategies.

Limitations

The data obtained relied on self-reporting, which could have introduced biases. In addition, this study did not extensively explore factors like access to technology, personal circumstances, family support, and external factors that could influence the outcomes. There was also no control group to compare with and the response rate was less than 50%, hence the findings may not be fully representative of Allied Health Sciences students in Ghana or other countries.

Conclusion

This study revealed that students generally had positive perceptions and experiences of remote learning with moderate anxiety levels, which, can be attributed to the challenges of remote education during the COVID-19 pandemic and the resulting lockdown measures. Allied health students could adapt to the new teaching and learning method with appropriate technology integration and adequate support that can facilitate a smooth transition.

Conflict of Interest

There were no competing interests from all authors in this study.

Funding/Support

None

Author Contributions

Rockson Kumi, Jonathan Quartey and Emmanuella Dufie Oppong contributed to the study design, collected data, cleaned, and analysed the data obtained. Jonathan Quartey and Samuel Koranteng Kwakye sourced and reviewed relevant literature. Rockson Kumi, Jonathan Quartey, Samuel Koranteng Kwakye and Emmanuella Dufie Oppong wrote and reviewed this paper for important intellectual content, revised the draft, and approved the final version of this paper.

Acknowledgment

We would like to acknowledge all Allied Health Sciences students at University of Ghana who took time off their busy schedules to participate in this study.


Ethics


Ethics approval was sought from the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences, University of Ghana.


Disclaimer


The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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Appendix A. Questionnaire

Student Questionnaire					
DEMOGRAPHICS					
Age:					
Program of study					
Level of study					
Readiness (5)					
1. Which of the following blackboard features you have experienced, before the emergency shifting to remote learning (you can select more than one).	Virtual classes	Discussion board	Quizzes/ exams	Downloading course materials	Submit Assignments
2. Which of the following online applications you have used to support your learning before the emergency shifting to remote learning (you can select more than one).	Microsoft teams	Microsoft teams	Telegram	WhatsApp	Blackboard
3. How did you interact with course instructor before shifting to remote learning (you can select more than one)?	Office hours	Email	Blackboard	Telegram	WhatsApp
4. Did you have an electronic device to access blackboard and other online application, before the emergency shifting to remote learning?	YES	NO			

5. Did you have proper network (internet) to access blackboard and other online application, before the emergency shifting to remote learning?	YES	NO			
Indicate to which extent you agree that the following statements Shifting to remote learning affected my learning...					
Effectiveness/ usefulness (11)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6. Shifting to remote learning make me more responsible about my own learning.					
7. Shifting to remote learning gave me a positive learning experience.					
8. Shifting to remote learning improved the quality of my studies.					
9. Shifting to remote learning helped me to be better organised.					
10. Shifting to remote learning improved the interaction between me and the course instructor.					
11. Shifting to remote learning helped me to become an independent learner.					
12. Shifting to remote learning helped me to work at my own pace.					

13. Shifting to remote learning enabled me to accomplish assignment more quickly and efficiently.					
14. Shifting to remote learning introduced me to different online applications which helped my learning.					
15. Shifting to remote learning introduced me to a variety of assessment methods which affected my learning in a positive way.					
16. Shifting to remote learning make me manage my time more effectively.					
Attitude (7)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
17. Remote learning motivates better learning.					
18. Remote learning helps to understand the subject material well.					
19. Remote learning help in knowledge and skills development.					
20. Remote learning is more enjoyable than face-to face.					

21. Shifting to remote learning make me prefer to have more courses delivered through remote learning.					
22. Shifting to remote learning make me prefer to have more courses delivered through face-to-face mode.					
Overall, how satisfied are you with remote learning					
Satisfaction (5)	Strongly satisfied	Satisfied	Neutral	Unsatisfied	Strongly unsatisfied
23. Overall, how satisfied are you with the remote learning experience.					
24. Overall, how satisfied are you with the clarity of remote learning instructions.					
25. Overall, how satisfied are you with the accessibility of remote learning materials.					
26. Overall, how satisfied are you with the simplicity of remote learning tools.					
27. Overall, how satisfied are you with instructor feedback during remote learning.					
During the shift to remote learning, how often have you been bothered by the following problems?					
Stress/anxiety (GAD-7)	Not at all sure	Several days	Over half the days	Nearly every day	
28. Feeling nervous, anxious, or on edge.					

29. Not being able to stop or control worrying.					
30. Worrying too much about different things.					
31. Trouble relaxing					
32. Being so restless that it's hard to sit still.					
33. Becoming easily annoyed or irritable.					
34. Feeling afraid as if something awful might happen.					

Appendix B. Ethical Approval



UNIVERSITY OF GHANA
SCHOOL OF BIOMEDICAL AND ALLIED HEALTH SCIENCES
OFFICE OF THE SCHOOL ADMINISTRATOR

23rd June 2021

Mr. Rockson Kumi
Department of Physiotherapy
SBAHS, Korle-Bu.

Dear Mr. Kumi,

ETHICS CLEARANCE

Ethics Identification Number: SBAHS/AA/PT/10662911/2020-2021

Following a meeting of the Ethics and Protocol Review Committee of the School of Biomedical and Allied Health Sciences held on June 16th 2021, I write on behalf of the Committee to approve your research proposal entitled:

“Students’ perceptions and experiences of remote learning amid covid-19 in Ghana”.

This clearance is valid for three years and requires that you submit three-monthly review reports of the protocol to the Committee and a final full review to the Committee on completion of the research. The Committee may observe the procedures and records of the research during and after implementation.

You are required to report all serious adverse events related to this research to the Committee within seven (7) days verbally and fourteen (14) days in writing.

Please note that any significant modification of the research must be submitted to the Committee for review and approval before its implementation.

As part of the review process, it is the Committee's duty to review the ethical aspects of any manuscript that may be produced from this research. You will, therefore, be required to furnish the Committee with any manuscript for publication.

Please always quote the ethics identification number in future correspondence regarding this protocol.

Thank you. Yours sincerely,

Yours sincerely,

David Nana Adjei (PhD)
 Chairman, Ethics and Protocol Review Committee

CC: Dean, SBAHS
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