



# COVID-19 Pandemic: Assessing the Effectiveness of Educational Technology Applications on Improvement of Tutor-student Relationships in Ghanaian Colleges of Education

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Aim:** The study sought to investigate the level of effectiveness of Educational technology applications on improvement of the relationship between college of education tutors and students' communication and interactivity, seeking and sharing information in learning during this COVID 19 pandemic era in Ghana.

**Study Design:** This study used descriptive cross-sectional survey research design.

**Methodology:** The main instrument used for the study was questionnaire. The sample size for the study comprised of college of education students. In this study, purposive sampling and stratified sampling techniques were used to select 370 students (made up of level 100 and level 200 students) of which 210 were males and 160 were females.

**Results:** The respondents agreed that there is high level of effectiveness of the relationship between college of education tutors and students' through the use of Educational technology

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applications in the respect of communication and interactivity, seeking and sharing information in learning.

**Conclusion:** From the study it can be concluded that there is high level of effectiveness of using Educational technology applications on improvement of the relationship between tutors and students with respect to communication and interactive learning, seeking and sharing information in this corona virus pandemic era.

*Keywords: CODVID 19 pandemic; educational technology; college of education students; college of education tutors; Ghana.*

## 1. INTRODUCTION

An epidemiological event of interest occurred in the city of Wuhan, Hubei province, in the People's Republic of China, between late November and early December 2019, where a series of reports of unknown origin of pneumonia appeared among its population. As of 30 January 2020, the Director-General of World Health Organization (WHO) declared the outbreak of a new strain of coronavirus to be a public health emergency of international importance, with the aim of preparing healthcare systems to take preventive and contingency measures in the event of a possible global spread of the disease. Consequently, on 11<sup>th</sup> March 2020 the WHO declared COVID-19 a pandemic through the Director-General [1,2].

Almost all government across the world closed down their academic institutions from basic to the tertiary level. Many academic institutions later resulted to an online delivery of lessons through various technological platforms. As higher education institutions integrate technology into the classroom curriculum to improve the academic standards and efficiency, tertiary students were generally quick to adopt these new instructional technology tools in their knowledge-building process. To support their learning, they use diverse educational mobile learning technologies, computer gadgets, electronic devices and ICT tools [3]. The ministry of Education and the National Council for Tertiary Education in Ghana charged all tertiary institutions including Colleges of Education to try as much as possible to engage their students by any means possible through the use of technological tools. Though the integration of these technologies is not a necessarily new trend in the field of education.

Technology is very readily available in modern day and age, in other words it is everywhere, anywhere and at any time. Research suggests that the world is now a global village as per the

current trends of information and communication technology, because ICT enables rapid and easy access to a wide range of information in the world [4]. The most interesting aspect of this phenomenon is the rapid adaptation of the educational systems to the technology. The efforts to introduce Information and Communication Technology (ICT) in our educational system by the Ministries of Education, Agencies of Education Services, development partners and other private sector agencies in Ghana cover over two decade ago [5]. This is increasingly helping the careers of both the students and the teacher. Technology has truly changed the educational landscape of modern day. Internet technology has moved teaching and learning from its immobile state to a more fluid and interactive platform so that information and knowledge accessible to both teachers and learners is no longer connected to the classroom environment, but can be accessed anywhere, including on-the-go [6].

In addition, technology has made in the last few decades incredible improvements to human life. It is slowly yet steadily revamping our education system that seems to have been stuck in the past for a few hundred years. The use of technology in education makes the process of learning fun, and even addictive. It allows less experienced learners to access and participate in classroom activities, graduate from more complex activities and deeper involvement as they gain the experience needed to become expert classroom members [7]. In view of Mangal and Mangal [8], technology in education is concerned with the systematic application of science and technology in the field of education, and can therefore be described as applying technology to education to further the cause of the latter. Teaching is communication, and educational learning technology can play an effective role in teacher-student communication. Examples of such learning technologies are Telegram, WhatsApp, Google classroom, Zoom and so on. Itighise and Wordu [7] proposed that,

educational learning technology encompasses the entire teaching and learning process including the following elements:

- ❖ Selection and organization of the content or subject matter to be learned.
- ❖ Specification of goals and behavior objectives.
- ❖ Analysis of the characteristics of the learners.
- ❖ Methods and strategies of the presentation of the content.
- ❖ Use of aid-materials, software and hardware, mass media and communication techniques.
- ❖ Continuous feedback and evaluation of the results.
- ❖ Effective arrangement of learning situations and learning environment.

Education faces huge challenges in the 21st century, from traditional ways of learning to innovative ways of learning. It also raises high demands for the transformation of teacher positions from the conventional transmitter of information into a modern collection of positions such as facilitator and delegator [9]. In the new era, the application of information and communication technologies (ICTs) has greatly influenced education and learning. According to Richey [10], Educational technology is the practice of using ICT to promote learning by applying correct technical processes and tools and to improve efficiency. King [11] argues that Education technology is a powerful tool for learning transformation. It helps to affirm and advance relationships between educators and students, reinvent our learning and collaboration approaches, shrink long-standing gaps in equity and accessibility, and adapt learning experiences to meet all learners' needs.

A study by Stošić [12] argues that learner skills and cognitive characteristics are enhanced by the application of educational technology. He also argues that the use of computers has an effect on the academic performance of students compared to older traditional methods of learning. Educational technology facilitates interaction among the teachers and the students. Stošić [12] explained three Educational technology Domains to Includes but not limited to:

- ❖ Technology as a tutor (computer gives instructions and guides the user),
- ❖ Technology as a teaching tool and

- ❖ Technology as a learning tool.

Therefore, the proper use of the educational technology tool improves the method of teacher instructional delivery and the retention of lesson content by the learner.

### 1.1 Purpose of the Study

The main purpose of the study was to investigate the effectiveness of using Educational technology applications on improvement of the relationship between college of education tutors and students in Ghana during the CODVID 19 pandemic era. Specifically, the study seeks to determined:

1. The level of effectiveness of using Educational technology applications on improvement of the relationship between college of education tutors and students' communication and interactivity in learning.
2. The level of effectiveness of using Educational technology applications on improvement of the relationship between college of education tutors and students in seeking and sharing information.

### 1.2 Research Questions

The study was guided by the following questions:

1. What is the level of effectiveness of the relationship between college of education tutors and students' on communication and interactivity in learning via Educational technology applications?
2. What is the level of effectiveness of the relationship between college of education tutors and students in seeking information via Educational technology applications?
3. What is the level of effectiveness of the relationship between college of education tutors and students in sharing information via Educational technology applications?

## 2. METHODOLOGY

A descriptive survey cross-sectional design was employed for the study to seek answers to the research questions. The main instrument used for data collection of the study was questionnaire. The questionnaire used for the data collection were closed-ended. Research has suggested the benefits of using a questionnaire as; consistent submission of questions to respondents, assurance of anonymity to respondents, and less time taken to administer

[13,14]. The questionnaire was multi-dimensional in nature with a Likert scale and the items were scaled using 5 point Likert scale which started with "Strongly Agree to Strongly Disagree". The questionnaire consisted of three main sections with the first section soliciting opinion of respondents on the perceived level of effectiveness of the relationship between college of education tutors and students' on communication and interactivity in learning via Educational technology applications. The second section dealt with the perceived level of effectiveness of the relationship between college of education tutors and students in seeking information via Educational technology applications. The third section dealt with the perceived level of effectiveness of the relationship between college of education tutors and students in sharing information via Educational technology applications aside the biographic section.

The section one of the questionnaire consisted of seven items, the second section consisted of five items, and the third section also consisted of six items. The instrument (questionnaire) was validated by three experts in the field of ICT, Educational Technology, Measurement and Evaluation, at University of Education, Winneba, Ghana. A trial test was conducted to establish the internal consistency of the instruments using Crombach Alpha reliability technique and reliability coefficients of 0.79 was obtained.

The sample size for the study comprised of college of education students. They were drawn from colleges of education in Western, Western-North and parts of Ashanti region. Purposive sampling technique was employed to select three colleges for the study in such a way that each school represented a category of a college of education such as mixed school and single sex schools within the population. The sample size for the students consisted of 370 students (made up of level 100 and level 200 students) selected by stratified sampling of which 210 were males and 160 were females. The level 300 classes would have been included in the study but were busy preparing for their final year examination at the time the study was conducted.

### 3. RESULTS

**Research Question One:** What is the level of effectiveness of the relationship between college of education tutors and students' on communication and interactivity in learning via Educational technology applications?

Table 1 shows the respondents perceived relationship between college of education tutors and students' on communication and interactivity in learning through the use of Educational technology applications. The students expressed their perception that; Posing/posting questions and getting feedback from my tutors helps them understand their courses better (89.2%, n=330), Educational technology platforms helps them feel a sense of community relating with their tutors (86.5%, n=320), with the use of Educational technology platforms for academic activities, it increase students participation as they are allowed to contribute in class group discussion (85.2%, n=315), they are able to communicate effectively with their tutors on courses they teach through Educational technology platforms (81.1%, n=300).

These are followed by other students perceptions like; with the use of Educational technology platforms learning becomes interactive for them with their relationship with the tutors (79.2%, n=293), they are able to inquire from their tutors on practical issues when using Educational technology platforms (79.1%, n=293), and with the use of Educational Technology platforms, they are able to get faster feedback from their tutors on academic matters (77.6%, n=287) being among the least perceived level of interaction among students concerning students communication and interactivity in learning.

In addition, a pictorial graph of respondents' perception in relation to the questionnaire items are further indicated below for clarity.

**Research Question Two:** What is the level of effectiveness of the relationship between college of education tutors and students in seeking information via Educational technology applications?

Table 2 shows the respondents perceived relationship between college of education tutors and students in seeking information through the use of Educational technology applications. The students responds indicated the perception that; their tutors encourage them to use Internet communications technology tools when they want to learn about something new (84.3%, n=312), Internet and Educational technology platforms helps them become successful in their courses (81.1%, n=300), Tutors always advice on use of Internet communications technology to keep students updated on topics related to their field of study (79.2%, n=293).

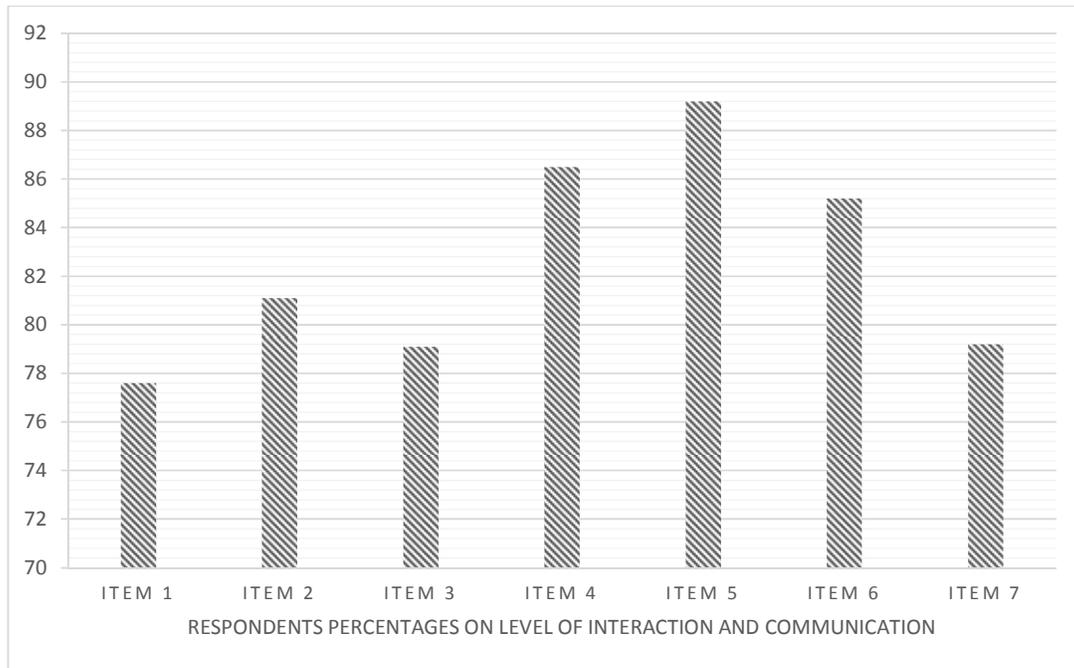
**Table 1. Students perceived relationship between college of education tutors and students on communication and interactivity in learning through the use of educational technology applications**

Item	SA N (%)	A N (%)	N N (%)	D N (%)	SD N (%)	Total
1. With the use of Educational Technology platforms, am able to get faster feedback from my tutors on academic matters	182(49.2)	105(28.4)	58(15.7)	25(6.7)	0(0)	370
2. I am able to communicate effectively with my tutors on courses they teach through Educational technology platforms.	95(25.7)	205(55.4)	52(14.0)	18(4.9)	0(0)	370
3. I am able to inquire from my tutors on practical issues when am using Educational technology platforms.	170(45.9)	123(33.2)	47(12.8)	30(8.1)	0(0)	370
4. Educational technology platforms helps me feel a sense of community relating with my tutors.	105(28.4)	215(58.1)	35(9.5)	15(4.0)	0(0)	370
5. Posing/posting questions and getting feedback from my tutors helps me understand my courses better.	143(38.7)	187(50.5)	15(4.0)	25(6.8)	0(0)	370
6. With the use of Educational technology platforms for academic activities, it increase my participation as I am allowed to contribute in class group discussion.	206(55.7)	109(29.5)	50(13.5)	5(1.3)	0(0)	370
7. With the use of Educational technology platforms learning becomes interactive for me with my relationship with my tutors.	107(28.9)	186(50.3)	46(12.4)	31(8.4)	0(0)	370

These are followed by other students perceptions like; students are allowed to seek further information from tutors via Educational technology platforms after communicating in class groups (77.3%, n=286), and they learn more when they regulate their own learning experience and seek information on things that they want to learn about from their tutors via Educational technology platforms (54.6%, n=202) being among the least perceived level of interaction among students concerning information seeking. Moreover, a pictorial graph of respondents' perception in relation to the questionnaire items are further indicated below for clarity.

**Research Question Three:** What is the level of effectiveness of the relationship between college of education tutors and students in sharing information via Educational technology applications?

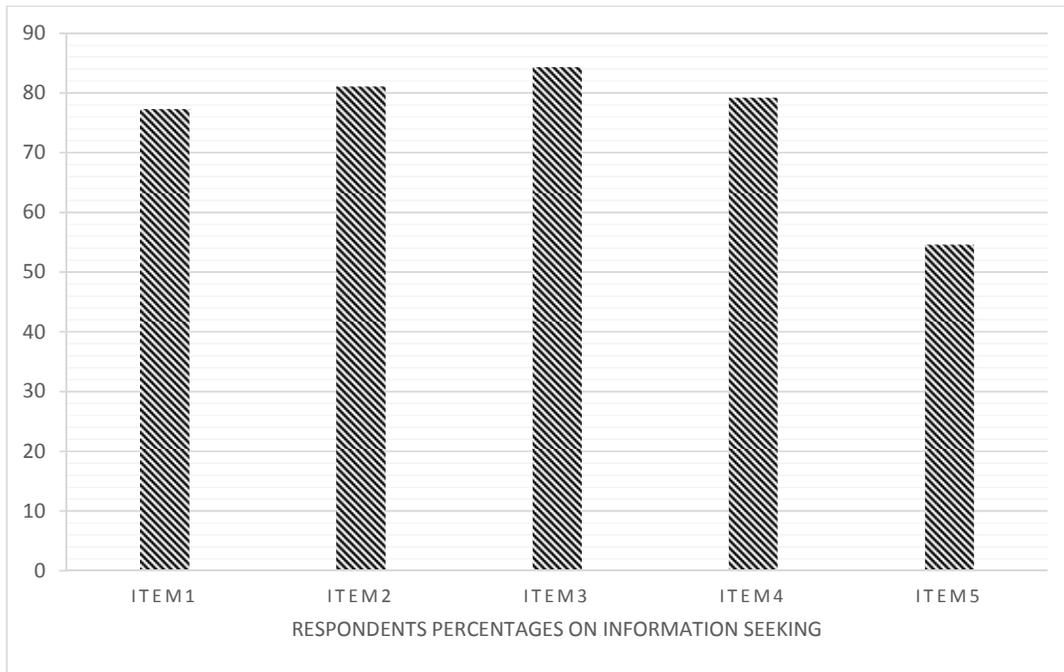
Table 3 shows the respondents perceived relationship between college of education tutors and students in sharing information through the use of Educational technology applications. The students responds indicated the perception that; they use Internet communications/ Educational technology platforms for self-expression when sharing information with their tutors (87.6%, n=324), the tutors are always willing to share interesting information on their courses online via Educational technology platforms (87.5%, n=324), they learn many things by interacting with their tutors via Educational technology platforms (83.8%, n=310), and based on my experience with tutors on Educational technology platforms, more classroom learning in the future should include interactive communication technology experiences (77.9%, n=288).



**Fig. 1. Percentages of respondents' level of interaction and communication between tutors and students through the use of educational technology applications**

**Table 2. Students perceived relationship between college of education tutors and students in seeking information through the use of educational technology applications**

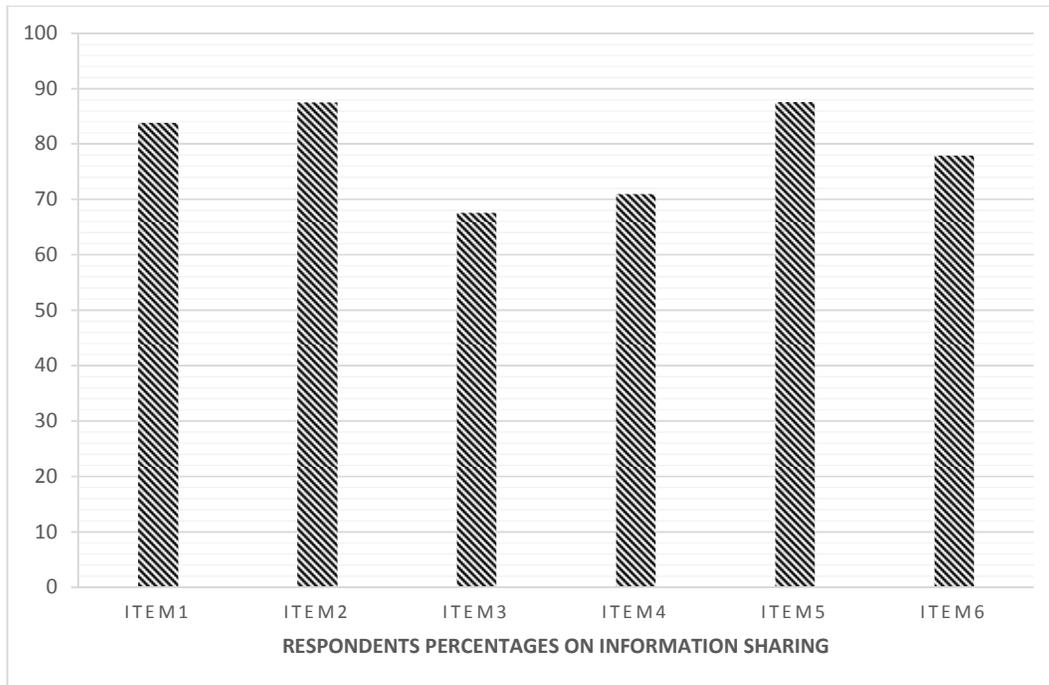
Item	SA N(%)	A N(%)	N N(%)	D N(%)	SD N(%)	Total
1. I am allowed to seek further information from my tutors via Educational technology platforms after communicating in class groups.	152(41.1)	134(36.2)	60(16.2)	24(6.5)	0(0)	370
2. Internet and Educational technology platforms helps me become successful in my courses.	179(48.4)	121(32.7)	52(14.0)	18(4.9)	0(0)	370
3. My tutors encourage me to use Internet communications technology tools when I want to learn about something new.	108(29.2)	204(55.1)	49(13.3)	9(2.4)	0(0)	370
4. Tutors always advice on use of Internet communications technology to keep me updated on topics related to my field of study.	98(26.5)	195(52.7)	53(14.3)	24(6.5)	0(0)	370
5. I learn more when I regulate my own learning experience and seek information on things that I want to learn about from my tutors via Educational technology platforms.	78(21.1)	124(33.5)	50(13.5)	102(27.6)	16(4.3)	370



**Fig. 2. Percentages of Respondents' level of information seeking between tutors and students through the use of educational technology applications**

**Table 3. Students perceived relationship between college of education tutors and students in sharing information through the use of educational technology applications**

Item	SA N(%)	A N(%)	N N(%)	D N(%)	SD N(%)	Total
1. I learn many things by interacting with my tutors via Educational technology platforms.	124(33.5)	186(50.3)	40(10.8)	20(5.4)	0(0)	370
2. My tutors are always willing to share interesting information on their courses online via Educational technology platforms.	114(30.8)	210(56.7)	38(10.3)	8(2.2)	0(0)	370
3. The things I need to know are revealed by my tutors via Educational technology platforms.	94(25.4)	156(42.2)	76(20.5)	44(11.9)	0(0)	370
4. I am allowed to post information that might be of interest to my colleagues.	116(31.3)	147(39.7)	65(17.6)	42(11.4)	0(0)	370
5. I use Internet communications/Educational technology platforms for self-expression when sharing information with my tutors.	118(31.9)	206(55.7)	46(12.4)	0(0)	0(0)	370
6. Based on my experience with tutors on Educational technology platforms, more classroom learning in the future should include interactive communication technology experiences.	92(24.9)	196(53.0)	58(15.7)	24(6.4)	0(0)	370



**Fig. 3. Percentages of Respondents' level of information sharing between tutors and students through the use of educational technology applications**

These are followed by other students perceptions like; we are allowed to post information that might be of interest to my colleagues (71%, n=263), and the things they need to know are revealed by their tutors via Educational technology platforms (67.6%, n=250) being among the least perceived level of interaction among students concerning information sharing. Moreover, a pictorial graph of respondents' perception in relation to the questionnaire items are further indicated below for clarity.

#### 4. DISCUSSION

The result of the findings of the study revealed a very high level of effectiveness of using Educational technology platforms in enhancing effective interaction among college of education tutors and their students with reference to learning communication and interactivity. This finding is in line with a study by Bynum [15] which suggested that appropriate use of the required technology applications (social media) will promote educational approaches such as active, social, and engaging learning by facilitating material sharing, as well as communication between instructor and student, and student and student. The study revealed that for the tutors to be able to communicate and

interact effectively with students, therefore student are;

- ❖ allowed to pose and post questions and get feedback from their tutors,
- ❖ made to feel a sense of community relating with their tutors,
- ❖ allowed to contribute in online class group discussions,
- ❖ able to communicate effectively with their tutors on courses they teach,
- ❖ able to inquire from their tutors on practical issues.

This suggests that using Educational technology platforms during the CODVID 19 pandemic era was more interactive for students and improves students' relationship with tutors which helps them understand their courses better. This is in line with the suggestion that the benefits of students' use of technology applications (social media) in education includes; improving the relationship, improving learning motivation, providing customized course content and developing communication skills [16].

The findings of this study further revealed that there is high level of effectiveness of using Educational technology platforms in enhancing

effective information seeking among college of education tutors and their students in relation to the courses they are offering. This finding is in line with the claimed that this technology applications offers an innovation forum and allows its users to share their opinions about how they feel about the knowledge being published [17], these types of interaction are an essential part of learning new things for the students [16]. The result of the study revealed that to enhance information seeking among the tutors and students, therefore student are;

- ❖ encourage to use Internet communications technology tools when they want to learn about something new,
- ❖ always advice on the use of Internet communications technology to keep them updated on topics related to their field of study,
- ❖ allowed to seek further information from tutors through Educational technology platforms after communicating in class groups,
- ❖ able to learn more as they regulate their own learning experience and seek information on things that they want to learn about from their tutors via Educational technology platforms.

This suggests that using Internet and Educational technology platforms helps students to become successful in their courses during the CODVID 19 pandemic era. In line with the foregoing today, platforms of technology applications provide answers to the causes of the worldwide flexible studies (Atteh et al., 2020a). In addition, flexible learning extends the option of what, where, and how people learn, therefore, it can be undoubtedly concluded that technology applications platforms generate new opportunities for engaging students in education, as they are remarkably effective in connecting people and facilitating information exchange [18,19].

Additionally, the results of this study again revealed that there is high level of effectiveness in information sharing among college of education tutors and their students through using Educational technology platforms to assist them in relation to the courses they are offering. This is in line with a studies by Gajjala's [20], Ellison and Boyd's [21] and Tess' [22] which suggests that, when understood and embraced as a web-based culture, technologies including social media will provide an ideal forum for individuals and

organizations to create content, exchange knowledge, ideas and interests, and engage socially by interacting with others. The result of the study revealed that to enhance information sharing among the tutors and students, therefore;

- ❖ students are encourage to use Internet communications/Educational technology platforms for self-expression when sharing information with their tutors,
- ❖ the tutors are always willing to share interesting information on their courses online through Educational technology platforms,
- ❖ students learn many things by interacting with their tutors through Educational technology platforms,
- ❖ students are allowed to post information that might be of interest to their colleagues,
- ❖ students are always abreast with the things they need to know as they revealed to them by tutors through Educational technology platforms,
- ❖ more classroom learning in the future should include interactive communication technology experiences.

This suggests that using Internet and Educational technology platforms enhances students and tutors information sharing by providing the needed assistance for students to become successful in their courses during the CODVID 19 pandemic era. Miller et al. [23] affirmed in support of the findings of this study that using technology applications (social media) platforms in educational programs is capable of redefining and gradually improving the relationships between students and their teachers. This will help students become active learners and enable them to create and share information more effectively [24,25], most notably in all college of education courses.

## 5. CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it was concluded that, most college of education students at the CODVID 19 pandemic era hold the perception that;

- ❖ there is high level of effectiveness of the relationship between tutors and students with respect to communication and interactivity in learning when using Educational technology applications.

- ❖ there is high level of effectiveness of the relationship between tutors and students with respect to information seeking in learning when using Educational technology applications.
- ❖ there is high level of effectiveness of the relationship between tutors and students with respect to information sharing in learning when using Educational technology applications.

In essence, appropriate training exercise on Educational technology applications should be organize for tutors and students who have challenges in using those platforms with respect to teaching and various learning activities. The following decisions are therefore recommended based on the findings of the study:

1. All college of education tutors should be mandated to start relating with their students through Educational technology platforms on academic and related matters besides the normal face-to-face classroom interaction.
2. Educational technology platforms should be projected in the higher institutions as one of the tools for carrying out academic and research activities in addition to the usual classroom discussions.
3. Effort should be made in ascertaining that the potentiality of Educational technology platforms are explored and used for improving tutor-student relationships in various aspects of the academic and various learning activities including organization of quizzes, tests, and examinations among colleges of education in Ghana.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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