The Influence of Information Systems on Students' Academic Performance At The University of Professional Studies, Accra During the Period of Covid-19

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Abstract:

This research aims to examine the Influence of Information Systems on Academic Performance at the University of Professional Studies, Accra during the Covid-19 period. A quantitative methodology was used to assess how the use of information system tools has influenced the performance of students. The study's goals were to determine how UPSA students have adapted to using information system tools, particularly during the pandemic, to identify the benefits and drawbacks of going virtual for UPSA students, and to look at how the use of information systems and students' academic performance are related. In participant selection,192 students from the Faculty of Management Studies were the study's intended target, with a little above 96 per cent (185) response rate. The convenience and purposive sampling techniques were employed. To analyze the data, SPSS Statistics 20 was employed. The results showed that the majority of students have adapted well to using information systems, which has enhanced their study habits, participation in groups, and cumulative grade point average. As a result, the study found a marginally positive link between information system use and academic achievement. In addition, the study found that online learning with information technologies is more expensive than face-to-face instruction, with network issues and high data costs being the two biggest difficulties for students. As a result, it was suggested that the Students' Representative Council and management provide students with credit packages and take into account students in underprivileged areas.

Keywords: Information System, Academic Performance, COVID-19

1.0 INTRODUCTION

The emergence of Information Systems (IS) has had a great influence on business organizations. Research shows that organizations that use technology perform better than those that do not use technology (Bughin et al., 2011). This is because organizations that fail to adopt information system tools usually face the perils that hinder the smooth flow of their work. Information Systems is a set of interrelated components that collect, process, store and distribute information to support decision-making in an organization

(Laudon & Laudon, 2004). In Ghana, virtually all public organizations make elaborate use of information systems or technology on which their productivity is pivoted (RLG, 2013).

During the COVID-19 period, organizations had a much greater need for information systems. Businesses embraced the use of information systems to run their operations because of the virus's nature, which made it difficult for individuals to interact in person. The pandemic accelerated the need for efforts to deploy cutting-edge technologies to deal with the toll COVID-19 took on human life (O'Leary, 2020). Many businesses in Ghana have eliminated the standard manual methods they used to perform their jobs to constantly master the use of IS tools in the workplace.

In the educational sector, the University of Professional Studies, Accra (UPSA) extensively used information systems in its instructional activities during the pandemic period. For instance, lectures, examinations, matriculations, and other events were virtually held. This integration of technology in teaching aligns with the assertion by Arkorful et al. (2021) that in the educational sector, there is the need for the incorporation of information and communication technology in teaching. Despite this trend, the literature currently available lacks sufficient attention to the topic of technology adoption in Ghanaian educational institutions. This gap in knowledge prompted the researchers to investigate how the University of Professional Studies, Accra (UPSA), by employing information systems during the COVID-19 period, has impacted the academic performace of its students. Therefore, the main aim of this study is to address and close the existing knowledge gap related to the adoption of technology in educational institutions.

1.1 Research Objectives

The study sought to assess the influence of information systems on academic performance. The study specifically sought to address the following objectives;

1. To examine how UPSA students have adapted to the use of information system tools.
2. To identify the advantages and challenges of UPSA students emanating from going virtual.
3. To examine the relationship between the use of information systems and students' academic performance.

2.0. LITERATURE REVIEW

2.1. Theories of Information Systems

2.1.1. Social Cognitive Theory (SCT)

According to Bandura (1986), the Social Cognitive Theory (SCT) takes into account how people behave and respond during the innovation development process. SCT depends on identification, feedback, and vicarious learning. SCT includes three types of components in terms of reciprocal determinism: environmental influences, individual factors, and behavioural factors (Bandura, 1986). In light of these aspects, the emphasis of SCT was effectively moved from social learning to social "cognitive" to emphasize the significance of cognition in people's perceptions and responses. Bandura proposed that the process of observational learning was driven by four important factors: attention, retention, reproduction, and motivation. This was done to demonstrate the adoption of behaviour through a full grasp of innovation, qualities, and network architecture. According to Wood and Bandura (1989), attention is a process whereby individuals selectively monitor and retrieve information from ongoing modelling activities, knowledge is transformed and reorganized into rules and ideas as part of the retrieval process, which next involves storing the knowledge in memory. The act of replicating the observed behaviour during COVID-19 is known as reproduction. The learner's motivation, which drives their focus, practice, and recall, is the

fourth factor.

2.1.2. Technology Acceptance Model Theory (TAM)

The theory that guided this research was the Technology Acceptance Model Theory (TAM) to determine the extent to which the students of University of Professional Studies Accra(UPSA) embraced and used information system (IS) tools during the COVID–19 period. According to Davis (1985), the three components of the Technology Acceptance Model Theory – perceived usability, perceived usefulness, and attitude toward utilizing the system – are what account for users' motivation. He underlined that a user's attitude toward a system will play a significant role in determining whether they will utilize or reject the system. According to Fishbein and Ajzen (1975), a person's actual behaviour can be predicted by taking into account both his or her prior intentions and the beliefs that person would hold for the particular behaviour in question. The intention a person has before engaging in a behaviour is referred to as that person's behavioural intention, and it is described as a gauge of that person's intent to engage in a behaviour. They defined the attitude towards a given behaviour as a person's positive or negative feelings towards the actual behaviour. This suggests that the attitude of a person towards behaviour can be measured by considering the sum of the product of all salient beliefs about the consequences of performing that behaviour and an evaluation of those consequences. In a 1975 study, Schultz and Slevin discovered that perceived usefulness offered a trustworthy indicator of how a decision would be used as projected by the decision maker. Later research by Robey (1979) reproduced and verified the strong association between perceived usefulness and system use. Bandura (1982) went on to demonstrate the significance of taking into account both perceived usefulness and perceived simplicity of use when predicting behaviour.

2.2. Theories of Academic Work

2.2.1. Connectivism Learning Theory

A theoretical framework for comprehending learning is connectivism. According to connectivism, learning begins when a learner connects to and shares information with a learning community, which activates knowledge. According to connectivism, knowledge can be saved in several digital formats and is dispersed across an information network. According to Siemens (2008), knowledge and learning "rest in diversity of opinions". Both the cognitive and affective domains are used in learning, and both of these domains play a significant role in the learning process.

The learning process is cyclical, with learners connecting to the network to share and discover new information, changing beliefs based on new insights, then connecting to the network to share those insights, and learning new information again. Learning is viewed as a process of knowledge creation, not just knowledge consumption . Your own learning network is formed based on how learners organize their connections with the learning community. Learners can traverse networks across multiple knowledge domains. The peripheries of areas of knowledge are pervasive and enable the building of interdisciplinary connections. This means that you can always exchange the latest information to learn more about a topic or matter, thereby broadening your intellectual horizons. Shared information and existing connections make it easier to discover and understand new things.

2.3 Empirical Literature Review

2.3.1. Internet and Academic Work

Rashid and Asghar (2016) examined technology use, self-directed learning, student participation, and academic achievement. A total of 761 female students enrolled in private universities participated in the

study. Results showed that technology use was directly related to independent learning, engagement and academic performance.

Cheng and Samuel (2008) investigated college students' Internet use and their associations with academic performance, interpersonal relationships, psychosocial adjustment, and evaluation. The study was based on a national survey of 156 universities in Taiwan with a total sample of 49,609 students. Finally, the study found that most online learning activities take place from the comfort of their home computers. Participants averaged 17 total hours per week spent online, of which an average of 4.1 hours were spent chatting and making friends online, 3.59 hours online searching for academic articles, and 3.21 hours searching for non-academic information.The online game took him 2.57 hours and checking his email took him 1.35 hours. The study ultimately concluded that college students primarily use the Internet for social communication. Louis and Paul (2008) conducted a study of internet activity on symptoms of internet addiction and academic performance. Data were collected from a sample of 718 adolescents. Studies have revealed several factors. One factor is online preferences. Students felt more comfortable working with computers than with people. They were safer socializing online than offline. They ultimately felt better treated online than in person.

2.4. Benefits of Learning from home using Technology

Students may have several reasons for wanting to stay in the comfort of their own home and concentrate on their studies. There are also disadvantages when students and teachers meet via the Internet. Eslamian et al. (2019) considered the theme "New models for evaluating the impact of new IT-based services on student productivity". The study included 240 non-state university students, with a 90% response rate. Finally, it was recognized that the use of IT-based services had significantly improved teaching and learning. Students also demonstrated that they were prepared to access a wide variety of information and educational resources beyond traditional learning methods.

The use of IT is undeniable as it has dominated and strengthened the corporate and educational sectors. Liaw (2008) believes that the use of technology in learning has enabled unlimited access to educational resources and increased flexibility. Li (2022) also identified the benefits of online studies to include creating a digital learning community, improving students' digital learning skills, and staying connected during tough times. In today's information society, the need to acquire knowledge that utilizes IT in order to respond to rapid development must be extremely high. Furthermore, Salam et al. (2017) investigated the effects of ICT use on student performance. Their model was tested on 150 students from public and private schools in Peshawar, Pakistan. The results show that the use of ICT improves the quality of education and the academic performance of students. Many studies demonstrate the benefits of using technology in the classroom. Technology can be used as a tool to launch meaningful projects that encourage critical thinking and problem-solving in students. Technology can be used to reshape and redesign classrooms to create environments conducive to the development of higher order thinking skills (Kurt, 2010). The pervasiveness of technology in people's daily lives makes technology very important to students and creates connections that greatly benefit their learning. A study by Baytak et al. (2011) found that most students believed that incorporating technology into the curriculum would improve learning. Students who participated in the study reported that using technology at school made learning more fun and helped them learn more. They believe technology can make learning interesting, fun and interactive. Children today love to learn through action, interaction and discovery (Baytak, Tarman & Ayas, 2011).

2.5. Drawbacks to Learning from home using Technology

The use of the Internet for learning has received a great deal of attention. Learning online has some distinct advantages over in-person classes with faculty, but the impact on students will vary based on individual experience and level of support. One of the most persistent issues with online studies is the technical problems of internet connectivity (Abriata, 2022). Another disadvantage of learning from home is the time factor. Professors express dissatisfaction with the fact that their time is not over-exploited. Using the `Internet takes many professors out of their comfort zone. Internet education runs counter to traditional teaching methods. To take advantage of the Internet, professors must first organize their materials to fit the layout of the Internet. This process does not happen overnight and takes time, dedication and some patience. Curriculum should be adjusted to meet standard requirements for providing appropriate resources to users (students).

According to Robert Tinker, many teachers who tried online classes failed to enroll 10 to 12 students. Each student had to set up her email account, which was ultimately the professor's responsibility. One teacher said, "It's like having unlimited work hours" (Tinker 1998). Another time-related issue deals with training. Training is a must, especially for professors who are new to computers and the Internet. In order for a university to be professionally represented, professors must complete a training course. The more familiar a professor is with her services online, the more effective and efficient the curriculum will be.

Adapting a non-online course to an online course can be difficult. Many classes did well with online courses, but some did not. An example would be the experimental portion of a science class. Laboratory courses require a fair amount of hands-on work. Online courses cannot provide the hands-on experience of a classroom lab. This is not to say that some of the lab exercises cannot be done on your computer. You can run it on your computer. However, the Internet cannot replicate the hands-on approach students experience in the lab classroom (Brown 2001).

A lack of face-to-face interaction with other students and faculty can be detrimental to students and professors. For example, some students want direct feedback from professors that they can't get online. During class, simple homework problems can be easily resolved through one-on-one conversations with professors. However, this option is not available online. Emails and bulletin boards can also confuse Internet learners. Some students often cause problems by not reading emails or class notices. A large amount of e-mail can delay a student's academic performance. An example of this problem occurred at Casper University. There, many geography classes required an e-mail account and a training session before class began (Nelson, 1997).

3.0. METHODOLOGY

The research approach used is the quantitative approach. The study employed inferential statistics to identify the correlation between the use of information systems and the academic performance of students. The population used undergraduate students at the University of Professional Studies, Accra (UPSA). Purposive and convenience sampling techniques were used to collect data from 185 students. Convenience sampling helped to accelerate data collection (Smith and Johnson, 2021), while purposive sampling ensured that the sample aligned precisely with the study's objectives, increasing the research's relevance and depth (Johnson et al., 2022).

A structured questionnaire was issued to the respondents to fill and IBM SPSS was used to analyze the findings. A structured questionnaire was used since it can generate objective, quantifiable data, enhancing the reliability and validity of research outcomes. This helps to minimize ambiguity, reduce researcher bias,

and allow for efficient data processing, making them a vital tool for evidence-based decision-making and policy development (Brown and Davis, 2020). The questionnaire was adapted to ensure its relevance and appropriateness for the study. It enabled the collection of more specific data related to the research question while retaining the benefits of the questionnaire's original structure (Johnson et al., 2022). The study centred on voluntary participation, informed consent, and confidentiality.

4.1. ANALYSIS AND INTERPRETATION

Table 1. Demographic Characteristics of the Respondents

DEMOGRAPHIC CHARACTERISTIC	FREQUENCY	PERCENTAGE (%)
Gender		
Males	105	56.8
Females	80	43.2
Current Level		
Level 200	36	19.5
Level 300	71	38.4
Level 400	78	42.2

From the data extracted from the respondents, 56.8% of the sample respondents are male and 43.2% are female. Also, 19.5% of the respondents were level 200, 38.4% were level 300 and the rest 42.2% were level 400.

Table 2. The adoption of an Information System (IS)

		Frequency	Percent (%)
I am comfortable with the use of information systems from the comfort of my home.			
	Strongly disagree	10	5.4
	Disagree	19	10.3
	Neutral	11	5.9
	Agree	64	34.6
	Strongly Agree	81	43.8
Total		**185**	**100**
I have adapted to the use of information system tools during the Covid-19 period.			
	Strongly disagree	3	1.6
	Disagree	8	4.3
	Neutral	13	7.0
	Agree	60	32.4
	Strongly Agree	101	54.6
Total		**185**	**100**

I prefer online studies with the use of information

systems to face-to-face learning.

Strongly disagree	22	11.9
Disagree	28	15.1
Neutral	25	13.5
Agree	59	31.9
Strongly Agree	51	27.6
Total	**185**	**100**

	Mean	Std. Deviation
I am comfortable with the use of information systems from the comfort of my home.	**4.01**	**1.18**
I have adapted to the use of information system tools during the Covid-19 period.	**4.34**	**0.91**
I prefer online studies with the use of information systems to face-to-face learning.	**3.48**	**1.35**

According to the findings, 34.6% of the students agreed and 43.8% of the students strongly agreed that they are more comfortable with the use of Information Systems (IS) from the comfort of their homes. This greater rate of 78.4% depicts that, UPSA students comfortably use Information systems for learning from their respective homes. A greater mean of 4.01 confirmed that the students use Information Systems (IS) for learning with or without any constraint. A standard deviation of 1.18 can be explained that there is less variation concerning students' comfortability with the use of information systems from the comfort of their homes. The greater similarity among the respondents indicates that the students are indeed at ease with the use of Information Systems.

Also, 32.4% agreed and 54.6% strongly agreed that they have vehemently adapted to the usage of Information systems (IS) during the Covid-19 Period. This overwhelming acceptance rate of 87% by the students shows that they have embraced the use of Information systems during the Covid-19 period. This confirms that the students are responsive to the dynamics and changing ways of life. The average acceptance of 4.32 affirms that the use of Information Systems (IS) for learning by students during the pandemic has been adapted. The standard deviation value of 0.91 connotes that the data is closely spread around the mean. This is a very reliable number that shows that almost all the students have adapted to the use of information systems during the covid-19 pandemic.

When the students were asked to choose their preference between face-to-face learning and online, they preferred online to face-to-face because 31.9% agreed and 27.6% strongly agreed that, online learning is preferable despite the challenges. This was supported by the mean of 3.48 confirming a major acceptance by the students. The standard deviation of 1.35 means that there is less variation in students' preference between online studies and face-to-face lectures. That is, most students prefer online studies to in-person lectures.

Table 3.The Influence of the Use of Information Systems (IS) on Students' Academic Performance
The use of information systems for online studies
has positively affected my learning habit.

Strongly disagree	31	16.8

Disagree	29	15.7
Neutral	19	10.3
Agree	72	38.9
Strongly agree	34	18.4
Total	**185**	**100**

The use of information systems has improved my group participation.

Strongly disagree	19	10.3
Disagree	46	24.9
Neutral	37	20.0
Agree	57	30.8
Strongly agree	26	14.1
Total	**185**	**100**

The use of information systems has increased my CGPA.

Strongly disagree	28	15.1
Disagree	29	15.7
Neutral	19	10.3
Agree	56	30.3
Strongly agree	53	28.6
Total	**185**	**100**

The findings revealed that the learning habits of 57.3% of the students have increased. This comprised 38.9% who agreed and 18.4% who strongly agreed to the fact that the use of Information Systems for online studies has positively affected their learning habits. A mean of 3.26 indicated that more than half of the student population has increased their learning habits with the help of information systems. A standard deviation of 1.38 can be interpreted that the data is crowded around the mean. In other words, most of the students believe that their learning habits have improved after the introduction of online learning.

Concerning group participation, 30.8% agreed and 14.1% strongly agreed that the information systems have improved their participation in groups. A mean of 3.14 showed that the students are neutral concerning the influence of Information Systems on group Participation. This means that most students neither agree nor disagree that information systems have influenced their group participation. The standard deviation of 1.23 shows that the responses were clustered around the neutral value. That is, more than half of the students neither agree nor disagree that the use of information systems has improved their group participation.

In the quest to find how the use of information systems has influenced the CGPA of students, 30.3% agreed and 28.6% strongly agreed that their CGPA has increased as a result of the use of Information Systems for their studies. This was supported by a mean of 3.42 which means that more than half of the students' CGPA has increased as a result of using Information Systems for online Studies. This confirms the students' preference for online studies over face-to-face learning. A standard deviation of 1.43 shows that more than half of the responses by the students were between agree and strongly agree with the increase in CGPA as a result of the use of information systems.

To identify whether the CGPA of students has decreased as a result of using Information Systems for their studies, it was revealed that the CGPA of 33.5% of the student population has decreased. A denomination of this figure includes 16.2% of students who agreed and 17.3% who strongly agreed that their CGPA has

decreased. A mean of 2.69 showed that less than half of the students' CGPA decreased after the introduction of information systems for virtual studies. A standard deviation of 1.45 indicates the data is a bit close to the mean. Therefore, a relatively more number of students have accepted that the use of Information systems has decreased their CGPAs.

Table 4 Challenges encountered by students from the use of information systems

CHALLENGE	FREQUENCY	PERCENTAGE (%)
High cost of data		
Yes	120	64.9
No	65	35.1
Network problems		
Yes	134	72.4
No	51	27.6
Issues with the use of Information System devices		
Yes	39	21.1
No	146	78.9
Difficulty in accessing information		
Yes	30	16.2
No	155	83.8

From the above data, it is revealed that the major challenges encountered by students in using Information Systems for learning are Network problems and the High cost of data. These findings aligns with the findings of Abriata (2022) that the most persistent issues with online studies is the technical problems of internet connectivity.

Table 5.**Relationship between Information System Usage and Academic Performance**
A correlation analysis was conducted to identify the relationship between Information System Usage and Academic Performance of the students. This analysis was tested since it is useful in exploring the association between independent and dependent variables (Senthilnathan, 2019).

Correlations		
		Academic Performance
Information System Usage	Pearson Correlation	.397
	Sig. (2-tailed)	.000
	N	185
Correlation is significant at the 0.01 level (2-tailed).		

From the table, it can be said that there is a weak positive correlation between the use of information systems and overall academic performance. A Pearson's correlation coefficient of 0.397 shows that the introduction of information systems has positively affected academic performance by a weak margin. That is, even though the academic performance of students has improved, the change is not great. This result confirms the findings of Rashid and Asghar (2016) which revealed that technology usage was directly correlated to academic performance.

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. Summary of Findings

The study aimed at identifying the influence of information systems on academic performance at the University of Professional Studies, Accra (UPSA) during the period of covid-19.

The study uncovered that students have vehemently adapted to the use of information systems for their virtual studies. The transition from face-to-face to online studies did not impose major problems on the students since most students found it easy to use information systems for their studies. Above all, the use of information systems improved the academic performance of most students. The learning habit, group participation, and cumulative grade point average of most students were also enhanced as a result of embracing the use of information systems in their academics. The major challenges that emanated from the use of information systems were the cost associated and the issues with networks.

Finally, the study revealed that there is a weak positive relationship between the use of information systems and the academic performance of students. This means that the introduction of information systems has positively affected academic performance by a small margin. This confirmed the findings of Rashid and Asghar (2016) that there is a direct correlation between technology usage and academic performance.

5.2. Conclusion

The findings of this study revealed the introduction of Information Systems for learning has improved the academic performance of students. Therefore, we conclude that, if students use the Information System tools correctly and participate in all class activities as required, they will be able to improve their academic performance tremendously.

5.3. Recommendations

The study revealed that network problems and the high cost of data were the main challenges of Information System usage. It is therefore recommended that management ensures the availability and accessibility of good internet on campus.

5.4. Limitations of the study

The findings of the study may not apply to students in other institutions. Also, a relatively smaller sample size was used because of time and budget constraints.

5.5. Future Research

The study focused on undergraduate students at the University of Professional Studies, Accra (UPSA). Future researchers could consider investigating why the use of information systems improved the CGPA of some students whiles that of others decreased.

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Conflict of Interest Statement

The researchers had no competing interests to declare that are relevant to the content of this study.

REFERENCES

1. Abriata, L. A. (2022). How technologies assisted science learning at home during the COVID-19 pandemic. *DNA and Cell Biology*, *41*(1), 19-24.

2. Ajjzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ: Prentice-Hall.

3. Akinade, E.A., & Owolabi, T. (2009). Research Methods: A Pragmatic Approach for Social Sciences, Behavioural Sciences and Education. Lagos: Connel Publications.

4. Arkorful, V., Barfi, K. A., & Aboagye, I. K. (2021). Integration of information and communication echnology in teaching: Initial perspectives of senior high school teachers in Ghana. *Education and Information Technologies*, *26*, 3771-3787.

5. Asghar, H. M. & Rashid, T. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. Computers in Human Behaviour 63, 604-612 Avwokeni, J. A. (2006). Research Methods: Process, Evaluation & Critique. Portharcourt: Unicampus Tutorial Services.

6. Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

7. Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, *1986* (23-28).

8. Baytak, A., Tarman, B., & Ayas, C. (2011). Experiencing technology integration in education: children's perceptions. *International Electronic Journal of Elementary Education*, *3*(2), 139-151.

9. Blanche, M. T. (2006). *Research in Practice 2nd ed.* Cape Town, S. A: University of Cape Town Press.

10. Bless, C. H.-S. (2006). *Fundamentals of Social Research Methods: An African Perspective, 4th ed.* Cape Town, S. A: Juta & Co. Ltd.

11. Brown, A., & Davis, R. (2020). The role of structured questionnaires in healthcare research. Journal of Health Research, 10(4), 213-228.

12. Brown, J. S., & Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science*, *12*(2), 198-213.

13. Bryman, A. (2004). Social Research Methods (2nd ed.). Oxford: Oxford University Press.

14. Buckingham, R.A., Hirschheim, R. L., and F.F. and Tully C.J. (1987). "Information Systems Curriculum: A Basis for Course Design" in Buckingham, RA. R Hirschheim F.F. Land and C.J. Tully, *Information Systems Education: Recommendations and Implementation,* Cambridge University Press, 1987.

15. Bughin, J., Byers, A. H., & Chui, M. (2011). How social technologies are extending the organization. *McKinsey Quarterly*, 20(11), 1-10.

16. *Business Dictionary.* (2018). Retrieved from www.businessdictionary.com: http://www.businessdictionary.com/defintion/management.html

17. Cecez-Kecmanovic, D. (2005). Basic assumptions of the critical research perspectives in information systems. Handbook of critical information systems research: Theory and application, 19-46.

18. Checkland, P. and S. Holwell, *Information, Systems and Information Systems: Making Sensem of the Field,* John Wiley & Sons, 1998.

19. Chen, Y. F. & Peng, S.S. (2008). University Students' Internet use and its Relationships with Academic Performance, Interpersonal Relationships, Psychosocial Adjustment, and Self-Evaluation. *Cyber psychology & Behaviour,11 (4), 467-469*

20. Chetty, P. (2016). Importance of research approach in a research. *Research design strategy*.

21. DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information systems research*, *3*(1), 60-95. Retrieved December 18,2020, from http:www.jstor.org/stable/23010781

22. Downes, S (2007b, February 3). Msg 1, Re: *What Connectivism Is*. Online Connectivism Conference: University of Manitoba. http://ltc.umanitoba.ca/moodle/mod/forum/discuss.php?d=12

23. Duane R. Monette, Thomas J. Sullivan & Cornell R. DeJong. (2009). *Applied Social Research: Tool for the Human Service* (5th ed.). Thompson Learning Inc.

24. Duke, B., Harper, G., & Johnston, M. (2013). Connectivism as a digital age learning theory. *The International HETL Review*, *2013*(Special Issue), 4-13.

25. Eslamian, A., Rajabion, L., Tofighi, B., & Khalili, A. H. (2019). A New Model for Assessing the Impact of New IT-Based Services on Students' Productivity. *International Journal of Education and Development using Information and Communication Technology*, *15*(3), 4-21.

26. Johnson, L., Smith, P., & Jones, R. (2022). Sampling techniques for social research (3rd ed.). Sage Publications.

27. Johnson, L., Smith, P., & Jones, R. (2022). Survey research methods: A practical guide (2nd ed.). Sage Publications.

28. Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past?.*The International Review of Research in Open and Distributed Learning*, *9*(3).

29. Kothari, C. R. (2004). Research Methodology: Methods and Techniques (2nd ed.). New Delhi: New Age International limited.

30. Kurt, S. (2010). Technology use in elementary education in Turkey: A case study. *New Horizons in Education*, *58*(1), 65-76

31. Liaw, S.-S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. *Computers & Education*, vol. 51, no. 2, pp. 864-873.

32. Li, D. (2022). The Shift to Online Classes during the COVID-19 Pandemic: Benefits, Challenges, and Required Improvements from the Students' Perspective. *Electronic Journal of E-Learning*, *20*(1), 1-18.

33. Nelson, G. E. (1997). Expectations of Internet Education: Casper College's Experience.

34. O'Leary, D. E. (2020). Evolving information systems and technology research issues for COVID-19 and other pandemics. *Journal of Organizational Computing and Electronic Commerce*. https://doi.org/10.1080/10919392.2020.1755790.

35. Posey, G., Burgess, T., Eason, M., & Jones, Y. (2010). The Advantages and Disadvantages of the Virtual Classroom and the Role of the Teacher. In *Southwest Decision Sciences Institute Conference* (pp. 2-6).

36. RLG, The Growth of Ghana Dependent on the Application of Information Systems and Technologies: What can RLG do? Management Report 2013, pp. 3-15.

37. Robey, D. (1979). User attitudes and management information system use. Academy of Management Journal 22(3), 527-538.

38. Salam, S., Yang, M., Shaheen, A., Movahedipour, M., & Zeng, J. (2017). ICT and students' performance in Pakistan. *Human Systems Management,* vol. 36, no. 4, pp. 277-284.

39. Senthilnathan, S. (2019). Usefulness of correlation analysis. *Available at SSRN 3416918*.

40. Schultz, R. L.& Slevin, D. P. (1975). Implementation and organizational Validity: An Empirical Investigation. In implementing operations Research management science, R.L. Schultz and D.P Slevin (eds.), American Elsevier, New York, NY, PP.153-182.

41. Siemens, G. (2008a). About: Description of connectivism. *Connectivism: A learning theory for today's learner, website*. http://www.connectivism.ca/about.html.

42. Smith, A., & Johnson, B. (2021). Sampling strategies in research: Convenience, purposive, and beyond. Research Methods Journal, 15(4), 205-219.

43. Tinker, R. (1998). Netcourses Reform Education Using the Power of the Internet. *Book Report*, *17*(3), 44-45.

44. Thornhill, A. & Saunder, R. (2000). *Research Methods for Business Students, 2nd edition.* London, UK:Pearson Education Ltd.

45. UKEssays. (November 2018). Information Systems Development. Retrieved from https://www.ukessays.com/essays/business/information-systems-development.php?=1