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# Journal of Applied Technical and Educational Sciences jATES

ISSN 2560-5429



## The improvement of students' academic performance by using the computer and using the e-mail

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### Abstract

The study aimed to investigate the effect of using the computer and using the e-mail on students' academic performance. Correlational research design and a structured questionnaire were used in the study. A random cluster sample of students from the bachelor's degree program was taken. The study demonstrated that a positive correlation exists between using computer and academic performance. It can be concluded that using computer impacts academic performance. It is found that there is a negligible negative correlation between using the e-mail and academic performance. The findings of this study enhanced theoretical and practical understanding as information and communication technology skills is an important variable that impacts effective teaching and learning. It can be also concluded that using the e-mail does not influence academic performance.

*Keywords:* using the computer; using the e-mail; academic performance

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### 1. Introduction

Information and communication technologies are a diverse set of technological tools and resources used for creating, storing, managing, and communicating information. The steady growth of information and communication technologies is impacting higher education resulting in a departure from traditional education systems to more technologically driven forms of pedagogy. For educational purposes, information and communication technologies can be used to support teaching and learning as well as research activities. One of the main applications of information and communication technologies in higher education is teaching and learning based on these new technologies. The provision of information and communication technology to university students is critical to offer them more effective learning environments. The teaching profession of today has demanded to acquire certain

computer skills as a way of exploring, discovering, and accessing information besides applying such knowledge for teaching purposes in the classroom (Ahmad et al., 2016). Using the computer at schools brings a significant role among students and lecturers. Without the computer, and especially the internet, students have to rely on books given in the classroom or the libraries. And if they don't understand the material, they only have limited resources in studying. Using computers provided many resources for learning and made education more flexible and easy to access. The university lecturers as well as students are knowledgeable about the importance of common tools such as computers at university, as well as at home (Gumbo, 2018). Using computers students can gain knowledge and information not only from classroom assignments and libraries but also from available online resources. Many features, such as video tutorials, free or paid e-books, and different forums can contribute to the resources that are needed by the students. On the other side, a huge and organized storage of information is another characteristic of a computer. So, students can download and store large amounts of lecture notes, presentations, and other materials.

Planning for motivation and provision of computer capacity-building strategies is a key to effective technology integration in teaching and learning not only at university but also as a home-based technology tool (Byungura, Hansson, Masengesho & Karunaratne, 2016). As educational institutions search for more economical ways to deliver education and training, the Internet has become the main mode of choice for its reach is farther and wider than any major educational marketing initiative. Students should also learn and practice access to the Internet because, with the internet, the whole world opened an infinite amount of useful and relevant information. The status of information and communication technology-integrated pedagogy in higher education is at an early stage and is affected by low-speed Internet connectivity and a lack of adequate resources as well as training in information and communication technology-integrated pedagogy (Choeda, Dupka & Zander, 2016). Through computers and the internet, students can interact with people having the same issues and can learn from each other. Email, from the other side, is a vital part of most people's lives. Using the e-mail in the classroom can be beneficial to all of the students. Students are often required to use e-mail to communicate with instructors, staff, advisors, and peers. Email is also a great way for students to communicate with each other. If they have questions about assignments, they can email their peers for a quick answer, as well as they can help each other with projects. Using e-mail has grown rapidly in education in recent years reflecting the proliferation of computer and internet features (Updegrove, 1991). The purpose of the study is

to investigate the effect of using the computer and using the e-mail and students' academic performance. Research questions include: Is using the computer a predictor of students' academic performance at university? Is using the e-mail a predictor of students' academic performance at university?

## 2. Literature review and hypothesis development

### 2.1. Conceptual framework

There are some obstacles to using computers at the university level by both lecturers and students (Vajargah, Jahani & Azadmanesh, 2010); meanwhile, the majority of faculty use specific compatible technologies relevant to their teaching experiences (Dintoe, 2018). The more lecturers use computers and other technological tools to teach, the more students learn to use them in their learning at university-based and at home-based as well (Manyuk & Kuchumova, 2018; Jita, 2016). The conceptual framework for this paper was built based on research about existing evidence of the relationships between using the computer, using the e-mail, and students' academic performance. Research focusing on using the computer, using the e-mail, and students' academic performance key words was made through Sage, EBSCO, and ERIC databases. The diagram built based on these constructs was used as a conceptual framework for this study.

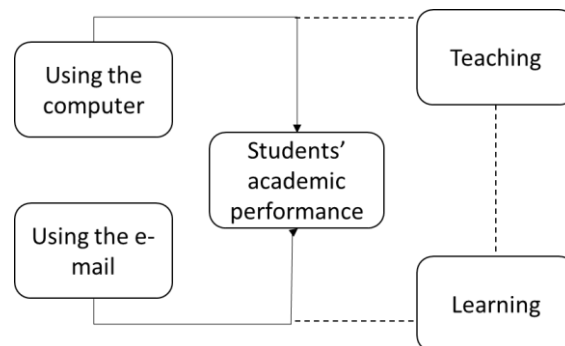


Figure 1. Conceptual framework

### 2.2. Relationships using the computer and academic performance

The lecturers or students resistance in using computers as part of teaching and learning emanated from technology viewed as a fad with little impact on actual learning, and challenges concerning institutional technology support (Chinyamurindi & Dlaza, 2018), meanwhile factors that have prevented them from using computers in teaching and learning are lack of proper access to resources, overcrowded-classrooms, lack of pedagogical support

(Alemu, 2015). Computer-based learning practices had positive effects on students' self-efficacy perceptions as well as students and lecturers are conversant with a plethora of computers that can be adopted and customized to create a digital university (Pilten, Pilten & Sahinkaya, 2017; Zozie & Chawinga, 2018). Babni (2019) revealed that the use of internet-based and computer-mediated tools have a positive impact on students' skills and performance; and Gubbels, Swart, & Groen (2020) indicated that students with moderate access, moderate use, and moderate interest in using the computer had the highest digitally assessed reading performance. At the majority, a few lecturers (32%) and students (35%) used e-learning and few courses (10%) were offered online, and the most of online uploaded modules (87%) were simply lecture notes and not interactive (Makokha & Mutisya, 2016). The adaptation of students to the challenges of digitization and new training practices requires the determination of more effective ways to attract, encourage and motivate students towards the utilization of quality theoretical and applied knowledge and skills in computer using (Apostolov & Milenkova, 2018).

The most of students have difficulty in downloading and uploading course materials using the Learning Management Systems platforms, and students prefer Google Drive, online file storage and synchronization service, for data analysis and elaboration (Umunnakwe & Sello, 2016; Chan, Lau, Li, Pow, Lai & Wong, 2017). Bakare & Orji (2019) pointed out that students learn faster and master skills better when they are allowed to participate actively by interacting freely with the lecturers and their peers, work in groups and perform practical projects together, and the adoption of the reciprocal peer tutoring generally improves the academic achievement of students in electronic and computer fundamentals. There is a moderate positive relationship between lecturers' attitudes towards using the computer integration into the curriculum and their computer use in the classroom (Hue & Jalil, 2013); but Barbosa, Sergio, Amariles, and Marilly (2019) revealed no significant differences among the learning styles and computer use in students with competency-based training. Student experience with online education variables had significant and positive relationships with teaching, comfort, and interdependence with computers, and learning collaboration impacts in teaching (Alzahrani, 2017; Adedokun-Shittu & Shittu, 2014). The use of computers and development of lecturers' competences has an impact in teaching and problem solving by students at the University (Masino, 2013; Fuglestad, 2009), meanwhile, there is a positive significant relationship between computer utilization and self-regulated learning (Onivehu, Adegunju, Ohawuiro & Oyeniran, 2018). Gurer, Cetin, Top (2019) found out that students'

attitudes towards computer programming had significant correlations with their achievement in computer programming courses, computer programming self-efficacy, and perceived learning; meanwhile, Sakibayev, Sakibayev, Sakibayeva (2019) revealed that in the context of the college-level database course mobile devices can successfully substitute traditional desktop computers and positively affect students' academic activity. Yao (2020) indicated that there was a statistical difference between test-takers' performance on a computer-based test compared to a paper-based test, and Benitez et al. (2020) revealed that the Nota Bene is an effective software to enhance students' academic performance. Therefore, based on previous research it is hypothesized that:

*H # 1: Academic performance of students at university has been explained by using the computer.*

### *2.3. Relationships using the e-mail and academic performance*

The interdependence with using the computer and the internet tools and learning collaboration impacts students' learning (Adedokun-Shittu & Shittu, 2014); and from the similar point of view, Verhoeven, Heerwegh, and De Wit (2016) revealed that there is a relationship between the learning experience and the frequency of use of computers, other technology instruments, and internet features. The learning value of an online approach was more beneficial than traditional teaching methods (Meerza, & Beauchamp, 2017; Beukes, Kirstein, Kunz & Nagel, 2018). E-learning supports independent learning and promotes participatory and collaborative learning (Eligi, & Mwantimwa, 2017); and accessibility to internet features has significant impacts on e-readiness indicators (Chipembele & Bwalya, 2016). Dickinson (2017) found out a linear positive correlation between using the e-mail and student performance in an online class; and Rostami Khodabandeh (2019) revealed a significant difference between texts written and sent by "telegram" application and e-mails, and also indicated that informality and formality markers potentially function as distinctive factors, capable of differentiating between the texts sent by "telegram" and e-mails.

The use of different internet features has an impact in teaching and e-learning at the University (Masino, 2013; Zaranis & Exarchakos, 2018), and there is a significant relationship between computer and internet utilization, critical thinking, metacognition, and academic performance of students (Onivehu, Adegunju, Ohawuiro & Oyeniran, 2018). Muianga, Klomsri, Tedre, and Mutimuciuo (2018) revealed that collaborative E-learning supported the development of students' information management and problem-solving skills

as well as their metacognitive strategies for self-regulated learning, and Apeanti (2016) found that technological pedagogical knowledge and the effectiveness of computer and internet using in teaching and learning contributes to the variances in the e-readiness of students. Kilgore (2010) suggested that teachers and parents can better understand the ways e-mail can be used to effectively communicate about student issues that can result in improved student performance and academic success; meanwhile, White Coetzee (2014) indicate the satisfaction of the students with e-mail supervision which enabled them to complete their studies in the prescribed time, and the use of e-mail in supervision was found to create opportunities for further study even on postgraduate level. Al-Jaberi (2018) indicated a positive correlation between the level of applications of E-mails and computer programs use and motivation toward e-learning and Price (2018) argues that academic libraries should be more intentional about monitoring emerging information ecosystems such as Yik Yak to share their knowledge with users and to identify potential issues with library services. Therefore, based on previous research it is hypothesized that:

*H # 2: Academic performance of students at university has been explained by using the e-mail.*

### **3. Methodology**

#### *3.1. Method*

A quantitative approach was the method used in the research. The correlational research design was used. The first-year students of a large university were selected to be used in the study.

#### *3.2. Sample and data collection*

A structured questionnaire to sample of students selected was used to gather primary data in the research. Structured questionnaires are designed, piloted, and applied by the researcher. Alfa Cronbach's values of questionnaire scales vary from .84 to .92 confirming a very good value of reliability. A random cluster sample of the students (N=235) was used in the study. A breakdown of the cluster random sample of students included 138 females (58.7 percent) and 97 males (41.3 percent). 68 students or 29% were selected in the economic faculty of the university; 85 or 36% were selected in law faculty; meanwhile, 82 students or 35% were selected in the information technology and innovation faculty of the university.

### 3.3. Analysis

Pearson product-moment correlation coefficient was used to assess the relationship between using the computer and academic performance, as well as between using the e-mail and academic performance. Linear multivariate regression was used to assess the ability of one control measure to predict academic performance by using the computer and using the e-mail. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity.

## 4. Results and discussion

### 4.1. Descriptive statistics

Table 1. Frequencies of *Using the computer* variable

		Using the computer			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	43	18.3	18.3	18.3
	Rarely	22	9.4	9.4	27.7
	Regularly	86	36.6	36.6	64.3
	Often	16	6.8	6.8	71.1
	Daily	68	28.9	28.9	100.0
	Total	235	100.0	100.0	

As shown in table 1, 27.7% of students claim that they never or rarely have used a computer at home, 36.6% of them regularly, and 35.7 % of them claim they have used often or daily a computer at home. Referring to descriptive statistics ( $M= 3.1872$ ,  $SD= 1.422$ ), 235 respondents ranging in levels from 1 to 5. This result means that most of the respondents (72.3%) have used regularly, often or daily a computer at home.

Table 2. Frequencies of *Using the e-mail* variable

		Using the e-mail			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	14	6.0	6.0	6.0
	Rarely	60	25.5	25.5	31.5
	Regularly	60	25.5	25.5	57.0
	Often	91	38.7	38.7	95.7
	Daily	10	4.3	4.3	100.0
	Total	235	100.0	100.0	

As shown in table 2, 31.5% of students claim that they never or rarely have used an e-mail at home, 25.5% of them regularly, and 43 % of them claim they have used often or daily an e-mail at home. Referring to descriptive statistics ( $M= 3.0979$ ,  $SD= 1.022$ ), 235 respondents ranging in levels from 1 to 5. This result means that most of the respondents (68.5%) have used regularly, often or daily a computer at home.

Table 3. Frequencies of *Academic performance* variable

		<b>Academic performance</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lowest level	23	9.8	9.8	9.8
	Low level	59	25.1	25.1	34.9
	Median level	40	17.0	17.0	51.9
	High level	39	16.6	16.6	68.5
	Highest level	74	31.5	31.5	100.0
	Total	235	100.0	100.0	

As shown in table 3, 34.9% of students claim that they have reached the lowest or low level of academic performance, 17.0% median level, meanwhile 48.1 % of them claim that they have reached the high or highest level of academic performance. Referring to descriptive statistics ( $M= 3.3489$ ,  $SD= 1.398$ ), 235 respondents ranging in levels from 1 to 5. This result means that most of the respondents (65.1%) have reached the median, high, or highest level of academic performance.

#### 4.2. Inferential statistics: Test of hypothesis

Table 4. Pearson correlation outputs of the relationships between using the computer and academic performance variables

		<b>Correlations</b>	
		Academic performance	Using the computer
Pearson Correlation	Academic performance	1.000	.605
	Using the computer	.605	1.000
Sig. (1-tailed)	Academic performance	.	.000
	Using the computer	.000	.
N	Academic performance	235	235
	Using the computer	235	235



As indicated by Pearson correlation outputs, there is a high positive correlation between using the computer and academic performance variables,  $r = .605$ ,  $n = 235$ ,  $p < .005$ , where increases in using the computer values were associated with increases in academic performance values.

Table 5. Bivariate regression outputs of the relationships between using the computer and academic performance variables

Model Summary <sup>b</sup>									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.605 <sup>a</sup>	.366	.363	1.11554	.366	134.549	1	233	.000

a. Predictors: (Constant), Using the computer  
 b. Dependent Variable: Academic performance

As shown in Table 5, the total variance of academic performance levels explained using the computer (the model) is 36.6%,  $F(3, 134.549)$ ,  $p < .005$ , the other variance may be explained by other variables. This indicates that using computer influence strongly academic performance. The result was consistent with previously reported works, who argued that using the computer predict academic performance (Babni, 2019; Gubbels, Swart, & Groen, 2020; Gurer, Cetin, & Top, 2019; Sakibayev, Sakibayev, & Sakibayeva, 2019; Bakare & Orji, 2019; Yao, 2020; Benitez et al., 2020) In conclusion *hypothesis # 1: Academic performance of students at university has been explained by using the computer*, is been supported.

Table 6. Pearson correlation outputs of the relationships between using the e-mail and academic performance variables

Correlations			
		Academic performance	Using the e-mail
Pearson Correlation	Academic performance	1.000	-.099
	Using the e-mail	-.099	1.000
Sig. (1-tailed)	Academic performance	.	.045
	Using the e-mail	.045	.
N	Academic performance	235	235
	Using the e-mail	235	235

As indicated by Pearson correlation outputs, there is a negligible negative correlation between using the e-mail and academic performance variables,  $r = -.099$ ,  $n = 235$ ,  $p < .005$ , where

increases in using the e-mail values were associated with increases in academic performance values.

Table 7. Bivariate regression outputs of the relationships between using the computer and academic performance variables

Model Summary <sup>b</sup>									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.099 <sup>a</sup>	.010	.005	1.39424	.010	2.292	1	233	.045

a. Predictors: (Constant), Using the e-mail

b. Dependent Variable: Academic performance

As shown in Table 7, the total variance of academic performance levels explained using the e-mail (the model) is 1.0%,  $F(3, 2.292)$ ,  $p < .005$ , the other variance may be explained by other variables. This indicates that using the e-mail does not influence academic performance. The result was not consistent with previously reported works, who argued that using the e-mail predicts academic performance (Dickinson, 2017; Rostami & Khodabandeh, 2019; Kilgore, 2010; White & Coetzee, 2014; Al-Jaberi, 2018). In conclusion *hypothesis # 2: Academic performance of students at university has been explained by using the e-mail*, is not been supported.

## 5. Conclusions and implications

One main limitation of the study should be acknowledged as part of the conclusions. The measurement of using the computer, using the e-mail, and academic performance is made based on self-reported instruments. The purpose of the study is to investigate the effect of using the computer and using the e-mail on students' academic performance. The prior assumption was that using the computer and using the e-mail impacts students' academic performance at university. The results showed that most of the students (72.3%) have used regularly, often or daily a computer at home. It is found that most of the respondents (68.5%) have used regularly, often or daily a computer at home. The study found that most of the respondents (65.1%) have reached the median, high, or highest level of academic performance.

It is found that there is a high positive correlation ( $r = .605$ ) between using the computer and academic performance of students at university. It is found that the total variance of academic performance levels explained using the computer (the model) is 36.6%, the other variance may be explained by other variables. This indicates that using computer influence strongly academic performance.

It is found that there is a negligible negative correlation ( $r = -.099$ ) between using the e-mail and academic performance of students at university. The study found that the total variance of academic performance levels explained using the e-mail (the model) is 1.0%, the other variance may be explained by other variables. This indicates that using the e-mail does not influence academic performance.

The results of the study supported by other researchers about the influence of using the computer and using the e-mail on academic performance have important implications for future research. Such research should investigate the relationships between academic performance and other variables. The results of this study also have important implications for practice. The important programs and other interventions should be designed to develop and to support students because it is confirmed by this study that using the computer influences academic performance. Overall the findings of this study enhanced theoretical and practical understanding as information and communication using the computer is an important variable that impacts academic performance.

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