Impact of ICT Utilization on Academic Performance: A Case Study of University of Hargeisa Students in Somaliland

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***Abstract*—The main focus of this study was to assess the impact of Information and Communication Technology (ICT) usage on student's academic performance. This study took the University of Hargeisa (UOH) case to determine the impact between ICT on Student academic performance, particularly the availability, accessibility, and usability of ICT resources in the University. This study is conducted because it is known that from time-to-time reports indicate students in UOH have difficulties in their studies because they have limited access to ICT resources. Some may not be capable of using ICT. The study was conducted with one determining factor which is cross-sectional survey design. The data were collected through the means of questionnaires from a sample of 108 out of 150 sophomore students from the department of IT at the college of computing and IT. During the confirmation of principles, the researcher used simple regression analysis to analyse whether students' academic performance was linear regression with ICT or not. The researcher found out that the availability, accessibility, and user-ability of ICT resources significantly affect students' academics at UOH. The researcher recommends that there is a need for the University to invest more in computers and related technology. Access to ICT tools should not be limited to labs and libraries but expanded through establishing the ICT resource centre. ICT training should not be limited to Microsoft Office suites but rather aim at training students with the contextual skills to use ICT for their academics.**

***Keywords*—Information and Communication Technology (ICT) usage, student's academic performance, University of Hargeisa, Hargeisa Somaliland**

I. Introduction

Teaching is becoming one of the most challenging professions in our society today. This is because knowledge is expanding so rapidly that modern technology demands the use of Information and Communication Technology (ICT). ICT has become within a short time one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering its basic concepts as part of the core of education (UNESCO, 2002b). Computer competencies are essential for success in education in the recent era. These competencies are a useful tool for students to utilize to integrate them into curricula for all levels of students' education [1]. Some believe that information technology literacy involves the preparation of persons to serve as worthy citizens in their communities and understand how society operates in an information age [2, 3]. Recently, Computer Literacy (CL) has been an issue in educational research at the university. Technological advances necessitate learning, maintaining, and upgrading computer-related knowledge [3].

Academic performance reflects the knowledge and skills that students have mastered in a subject or a course. It's a measure of how well students have performed in the various assessment items set for them based on some education criteria determined by professional educators [4]. Through students' performance in assessment items such as essays, tests, viva, and examinations, students' performance is determined by ranking as to the education standards that they have reached pass, credit, distinction, high distinction, and so on. These educational standards may be recognized as satisfying the standard for admission for further studies in institutions domestically and internationally [5].

The issue of low achievement among learners has been disturbing the instructive framework right from the elementary classes to the university level. This challenge wastes human potential and facilities for education. The findings of the study will confirm the effectiveness of ICTs in the teaching-learning process and their effect on the student's academic performance [6].

In Somaliland, there is a limitation in using ICT in education, but some areas have access to technology. So, no research is based on ICT usage on students' performance.

II. Literature Review

The research was based on the theory of cognitive flexibility emphasized by Kirkpatrick's four levels of evaluation [7]. Kirkpatrick emphasized reactions, learning, transfer, and results. Level one is reactions and just as the word implies, learning at this level measures how participants in a training program react to it. In addition, the participants' reactions have important consequences for learning (level two), although a positive reaction does not guarantee learning, a negative reaction almost certainly reduces its possibility [8, 9].

A. ICT Utilization on Students' Performance

From the assessment of ICT resources inclusive of computers, internet, and other digital resources learning tools are found to be an essential requirement for enhancing the learning outcomes of students. Recent studies state that the availability of ICT resources in learning institutions can greatly contribute to the improvement of students' achievements through the wealth of information and creativity in learning. [10] have expressed that, schools that have modern ICT equipment help students to be more interested in what they are studying and thus improve their results [11].

Further, there is a challenge with the levels of ICT resource availability, especially in the developing world. In many parts

of Africa including Somaliland shortage of ICT resources which limits the actualization of the potential of ICT [2]. For example, inadequate computer and unreliable interconnectivity in learning facilities inhibits the student's access to e-learning [12]. This relative unavailability also threatens the quality of education and at the same time, widens existing disparities in education [13, 14].

B. ICT Accessibility and Student Learning

However, the question of access to these ICT resources is also vital since the analyzed ICT assets cannot indirectly improve the learners' academic performance. However, the use of ICT resources does depend on the student and teacher's individual or collective ability to access those resources or means to advance student learning. Another piece of research conducted by [6] has revealed that physical access to ICT improves the level of educational effectiveness because students, who can use information and communication technologies regularly, become more independent learners and achieve better academic results [15, 16].

Somewhat related to the debate on Somaliland's ICT development, a lack of access to the technology continues to be a concern. Students own few computers, and limited internet connection as a result they cannot learn on their own besides the planned lab sessions [5, 10]. Also, due to inadequate ICT facilities in the students' resident areas, these accesses are further constrained making it difficult for the students to study and prepare assignments after school time. The research done gives emphasis on the importance of access; students who have better access to the ICT resources get higher scores in the national exams, and therefore, calling for enhanced availability of facilities and equipment in schools and colleges [11].

C. User-Ability of ICT Resources

In the same way, the level of utilization of the ICT resources is equally an important factor in the academic performance that is boosted by the ICT resources. The concept of usability, in this case, defines how handy ICT tools are to facilitate education to the students and the teachers. From the study conducted by it is evident that the integration of ICT is efficient only when users are provided with the necessary skills in the use of these tools [17]. This is especially critical in areas where use of internet is still limited such as among the youths who are otherwise digitally illiterate [14, 17].

In Somaliland as it is in many developing countries, the use of ICT is constrained by the lack of adequate training facilities for the students and teachers. But computers and internet usage cannot be overemphasized, yet the users should be able to utilize the provisions made for computers and internet to the optimum. This is also evident in another study by [18] in which it was noted that students who master the usage of ICT perform better in their studies and this further places emphasis on the development of this proficiency in equal proportion with accessing of the technologies [19].

III. Research Methodology

The study adopted quantitative methods of data collection and analysis. The researchers used structured questionnaires to collect primary data from target respondents [20]. The primary data was collected from all the undergraduate students at the University of Hargeisa (UOH). Secondary data was obtained from records on academic performance. This was done through reviewing the existing documentation in order to extract information that is related to this study [16]. Academic performance was measured by students' Grade Point Average (GPA) and obtained from the registrar's office of the University of Hargeisa. The study was analysed using descriptive statistics. Simple random sampling was selected to selected from the faculty of ICT in undergraduate students at UOH, especially sophomore students. It recommended a sample of 108 for a population of 150 at a level of confidence of 95% and 5% margin error which was also the same as the limits set in this study. Data from questionnaires were compiled, sorted, edited, coded, tabulated, and interpreted category-wise by principals, teachers, and students. To analyze the data, the Statistical Package for the Social Science (SPSS) data analysis package was used and the relationship between the variables was computed and presented systematically.

IV. Results and Analysis

This study aimed at analyzing the impact of ICT management on students' academic performance: a case of the University of Hargeisa. The focus was on three independent variables, namely: availability, accessibility, and user-ability of ICT resources and how these affect students' academic performance. To accomplish the above, three hypotheses were formulated and the results are presented in this section. This section is divided into two sections one deals with the demographic characteristics of respondents, and section two presents the simple Regression statistics of the items relating to particular objectives according to the hypotheses.

The sample size of this study was 108 students selected from the faculty of ICT. Out of these (108), 94 were returned. This rates 87% (Response. According to (Babbie, 2010) and (Best & Khan, 2011), a response rate of 50% is considered adequate, 60% good and above 70% very good. Therefore, the response rate from these respondents was considered to be very good and as such the researcher proceeded to analyze the data as planned, then data was analyzed using a regression model and reported in the following tables. This gave a response rate of 87%as illustrated in Table 1 below:

Table 1. Questionnaire return rate

Respondent category	Number issued out	Number returned	Percentage
Students	94	108	87

Information obtained was analysed in terms of tables of frequencies, percentages, and graphs. Responses from interviews and discussions with administrative staff were used to supplement responses from the closed-ended questionnaires. The response rate was considered reasonable because at least more than 50% of the targeted respondents participated in the study. The researcher felt that the views expressed in the report are, therefore, representative of the target population.

A. Demographics

Table 2 describes an overview of the demographic data of the respondents involved in the study on the topic of the Impact of ICT utilization on the academic performance of students of the University of Hargeisa. The survey shows that of the 94 respondents a whopping 54 percent. 3% or 51 participants were male while 45%. Out of the total number of participants, 7% of total participants were females that is 43 students, so the study included both male and female students though male students dominated the study. It is important because it helps gain views from a range of participants on ICT applications and the impact it has on performance.

Table 2. Gender and age respondents

Demographics		Number of Respondents	Percentage (%)
Gender	Male	51	54.3
14.387	Female	43	45.7
Age	19-23 years	87	92.6
	30 and above	7	7.4

In as much as the age was concerned the findings revealed that the sample population was comprised of majority of them (92. Of these 4% are aged 30 years and above. This implies that majority of the participants are of the most appropriate age group of university students and this is relevant when establishing the context of ICT use among this population. It may well be that the preponderance of younger students in the sample mirrors the typical university students in University of Hargeisa most of whom maybe described as traditional aged students as they are most likely to use ICT resources. The above demographic data therefore offer a useful background to understanding the research concerns about the ways ICT availability, accessibility and usability influence academic achievements among students in the university.

Fig. 1 shows the interaction of respondents by years of study on the study conducted on the impact of ICT usage at the University of Hargeisa. The chart shows the percentage of respondents in three categories: Sophomore Morning, Sophomore Afternoon, and Sophomore Noon Shifts.

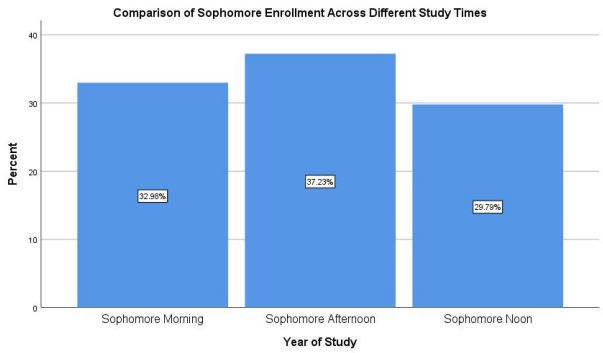

Fig. 1. Study year and grade point average.

From the chart, it is obvious that most of the respondents are Sophomore Afternoon shifts with 37% of the total population. When self-identified participants were computed by multiplying the percentage of participation of each of the participants' gender by the corresponding of respondents' average percentage for each gender, then the total number of those who self-identified was 23% of the total participants. The second largest category is the Sophomore's Morning shift which comprises of 32 percent. 98% of the respondents of Sophomores Noon are the least represented in the course constituting only 29%. 79% of the sample. This distribution also shows that many of the study participants are at middle stages of study, and are fairly distributed across the different academic years to include all students in various levels of study.

To test the hypothesis, composite indices for the independent and dependent variables were computed by summing up all valid responses intended to obtain respondents‟ opinions per each of the four variables (i.e. Availability, Accessibility, Usability of ICT resources, and student's academic performance). The reason for aggregating these responses was that the method of analysis (i.e., simple regression) necessitated data that was continuous. In verifying the hypotheses, the researcher used a simple regression analysis method to find out whether students‟ learning was linear regression with each of the three independent variables. Thus, the categorical data were transformed into quantitative forms. Because of this, extremely positive responses (i.e., Strongly Agree, very good) were assigned a value of 5, and the extreme negative responses (i.e., strongly disagree, very poor) were assigned a value of 1. Composite scores were computed for the independent and the dependent variables for statements of the questionnaire dealing with each of the four independent variables and the dependent variable. Consequently, the analysis entailed the verification of the null hypotheses at a 0.05 level of significance.

H1: Availability of ICT resources does not affect student's academic performance

The first null hypothesis was stated as: "availability of ICT resources is not regression with students learning in the University of Hargeisa". The null hypothesis was tested using a Pearson product-moment regression index to find out whether there is a relationship between the two variables. The result of the finding is presented in Table 3:

Table 3. Regression between the availability of ICT resources and student's academic performance

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.860	1	5.860	37.470	0.000b
Residual	14.387	92	0.156		
Total	20.247	93			

The results of this analysis show a positive linear regression between the accessibility of ICT resources and student's academic performance as given by the positive value of the computed regression index (0.289). The *p*-value (0.000) being less than the level of significance alpha 0.05 implies that the results were statistically significant regression (F (1, 93) = 37.470, p = 0.000), and R2 of 0.289. This suggests that accessibility of ICT resources plays a significantly positive role in student's academic performance at the University of Hargeisa, hence the null hypothesis that "accessibility of ICT

resources is not regression with student's academic performance in the University of Hargeisa" was rejected and the alternative hypothesis upheld which means that the accessibility of ICT resources influences student's academic performance in the University of Hargeisa.

H2: Accessibility of ICT resources has not affected student's academic performance

The second null hypothesis was stated as: "Accessibility of ICT resources is not regression with student's academic performance". A Pearson product regression coefficient was used to test this hypothesis and the results are summarized in Table 4 below:

Table 4. Regression between the accessibility of ICT resources and student's academic performance

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.383	1	10.383	96.843	0.000b
Residual	9.864	92	0.107		
Total	20.247	93			

The results show that simple linear regression between the availability of ICT resources and students' academic performance is given by the positive value of the computed regression index (0.513). The *p*-value (0.000) is less than the level of significance alpha 0.05. There is significant regression (F (1, 93) =96.843, p = 0.000), and R2 of 0.508 indicates that only 50.8% of the variance in the determinant availability factor affected the student's academic performance. This suggests that the availability of ICT resources plays a significantly positive role in students' academic performance at the University of Hargeisa, hence the null hypothesis that "availability of ICT resources is not regression with student's academic performance in the University of Hargeisa" was rejected and the alternative hypothesis upheld which means that the availability of ICT resources influences student's academic performance in the University of Hargeisa.

H3: User-ability of ICT resources has not affected student's academic performance

Null hypothesis three stated that: "User-ability of ICT resources is not regression with students learning". A Pearson product regression coefficient was used to test this hypothesis and the results are summarized in Table 5.

Table 5. Regression between user-ability of ICT and student's academic performance

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.740	1	1.740	8.647	0.004b
Residual	18.507	92	0.201		
Total	20.247	93			

The results show that simple linear regression between the user-ability of ICT resources and student's academic performance as given by the positive value of the computed regression index (0.286). The p-value (0.004) being less than the level of significance alpha 0.05. There is significant regression (F (1, 93) =8.647, p = 0.004), and R2 of 0.286 indicates that only 8.6% of the variance in determinant user-ability factor effected of the students' academic performance. This suggests that user-ability of ICT resources plays a significantly positive role towards student's academic performance in University of Hargeisa, hence the null hypothesis that "user-ability of ICT resources is not regression with student's academic performance in the University of Hargeisa" was rejected and the alternative hypothesis upheld which means that the user-ability of ICT resources influence student's academic performance in the University of Hargeisa.

V. Discussion

A. The Effect of the Availability of ICT Resources on Students' Academic Performance

In the study, the researcher affirmed that ICT resources at the University of Hargeisa are still lacking enough quantity. The public held a relatively neutral attitude on the use of computers in learning facilities such as the lecture rooms, Internet usage, and the sufficiency of computerized laboratories. According to (Ben Youssef *et al*., 2022) the access to ICT resources serves to improve performance less dependent on variable teacher quality and with better reliability in terms of provided educational content. (Baluku & Kasujja, 2020) also support this argument about the importance of the availability of ICT resources in enhancing the students' performance. This research supports the view that computers and other technologies enhance students' performance than conventional systems do.

B. The Effect of the Accessibility of ICT Resources on Students' Academic Performance

Concerning the availability of ICT resources, it may be concluded that the number of functional computers is insufficient and the time available for the usage of these resources is rather limited. The study further reveals that the students rarely have access to the ICT facilities from their residence halls; and there is a concern that there are few resources Centre and public libraries that have ICT facilities. In line with this, (Ben Youssef *et al*., 2022) adds that when access to the ICT resources is limited, learning is affected. In the same vein (Baluku & Kasujja, 2020) also argue that the spread of ICT resources in students' learning also remains very important because lack of access might doom the students from accessing the resources.

C. The Effect of the Accessibility of ICT Resources on Students' Academic Performance

According to this study, it was observed that students possessed a high level of ICT user-ability however this yielded poor usage. According to (Ben Youssef *et al*., 2022) digital skills can be high at the self-report level, but a digital gender gap may hinder student outcomes. This divergence provides evidence that the perceived skills of the students do not always correlate with their real skill or with utilization of ICT resources efficiently. (Baluku & Kasujja, 2020) highlight the need for functional and skillful knowledge in ICT, and the significance of proper ICT knowledge to provision so as to prepare a student for the practical ability to use ICT effectively as a tool in learning.

VI. Conclusion

Based on the findings of this study, the following conclusions have been drawn from the study of this research; the most important of which is that there is significant room for enhancement in the delivery and management of I.C.T resources of the University of Hargeisa. In response to the emerging issues, the university needs to embark on intensive investment towards the improvement of the quantity and quality of the ICT facilities. This involves expansion of the number of computers and related technology, improvement of access to these resources in class and computer laboratories, and incorporation of other needful accessories like printers and projectors.

In addition, the problem of constant and stable access to the Internet is solved, the availability of which is essential for a successful and productive study option. The intention of the university should therefore be to extend the number of computers connected to the Internet and therefore guarantee wider access to the resources found therein. This could be achieved by creating separate centers in the form of ICT resource centers that will avail to the student required software, technology tools as well as internet services.

Moreover, ICT training programs should not be restricted to application training. The university should expand its numerous of programs and packages offered into its curriculum. However, the approach should change and seek to incorporate ICT into learning more properly so as to ensure that the students can use ICT as a tool for learning (Ben Youssef *et al*., 2022); (Baluku & Kasujja, 2020).

Through improvement in these areas, the university can improve students' academic performance and effectively prepare them for a world full of technology.

Conflict of Interest

The authors declare the following potential conflicts of interest: Mr. Awil Ahmed Mohamed is an ICT Development Director for the University of Hargeisa, which provided partial funding for this study. Mr. Mohamed Ahmed Ali is a senior lecturer at the University of Hargeisa, especially the College of Computing could benefit from the study's findings.

Author Contributions

Awil Ahmed Mohamed conceptualized the research, developed the methodology, and conducted data collection. Provided critical revisions and approved the final version. Mohamed Ahmed Ali performed data analysis, contributed to the interpretation of results, assisted with manuscript preparation, and led the revision process. All authors had approved the final version.

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