

THE ROLE OF TECHNOLOGY INTEGRATION IN DEVELOPING DIGITAL LITERACY EDUCATION AND STUDENT INFORMATION

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Abstract

Digital literacy is an essential mean of lifelong learning and serves to link people and participation in governance. The academic world is not ignorant about the significance of digital literacy as it encourages library professionals to train students effectively. This involves using digital technology to improve the student's level of knowledge and digital literacy skills. This study specifically examines the role of technology integration in developing digital literacy education and student knowledge. The study used an online questionnaire to collect the primary data, which was further analyzed using SPSS. A total of 123 responses were statistically analyzed, and the study findings were derived on the basis of descriptive statistics and chi-square. The results show that an association between the variables varies is based on gender, major, and GPA. The results further indicates that there is a significant association between technology integration and digital literacy education. The relationship between how to use digital tools to find information is strictly significant as compared with the student information of GPA. Moreover, the relationship between students who are showing digital literacy and developing competence in digital literacy is significantly based on the student's major. However, the association between exposure to digital literacy and the encouragement of the student to continue learning digital skills and information literacy is not significant across the information of the students. Based on these findings, this study, therefore, recommends that policymakers should further concentrate on making progress towards technology into the process of digital literacy education. Furthermore, the library management should work on providing a long-term strategy for improving digital literacy training for students.

Keywords: Digital Literacy, Information, Library Management, Technology Integration

1. Introduction

Technology advancement and usage has brought changes in every activity and has become part of humans' life. This means that technology has to be integrated with almost every sector of life [1, 2]. Many advantages have been recognized whenever technology is integrated into the given field. This means that technology, especially information and communication technology (ICT), is a compelling force behind all transformations ranging from the economy, politics, social life, and even education. Bearing this in mind, every country is working towards the adoption and integration of technology to strive and compete in the global economy [3]. Regardless of any country's development, its economic prosperity depends substantially on the quality of education provided to its citizens [4]. Therefore, technology integration is required to reform the education sector.

Technology integration in education includes the usage of technological tools in different areas of education in creating an opportunity for the application of students' computer and technological skills while learning and solving problems [5]. Digital literacy, on the other hand, includes a wide range of skills that one requires to flourish in this technologically advancing digital world [6]. These skills involve searching,

finding, evaluating, utilizing, creating, and sharing content via the internet and information technologies [7, 8]. In this paper, the opinion of other authors and researchers concerning the role played by technology integration in developing digital literacy by reviewing existing literature related to the research hypotheses.

1.1. Objectives of the study

The following are the key objectives of the study; “Role of Technology Integration in Developing Digital Literacy Education and Student Information”:

1. To examine student technological skill and the use of digital tools
2. To access regular instructors and training on digital literacy education
3. To obtain student digital exposure, developing digital competence and students learning encouragement
4. To access training contents and ICT base substance alongside with library technological involvement and student learning skills.

1.2. Research Hypotheses

H₁: Students technological skill has a strong association with using digital tools.

H₂: Students technological skill has a strong association with searching databases and web information.

H₃: Regular instructors and training on digital literacy education have a positive association.

H₄: Training contents on digital literacy has a strong association with ICT based substances.

H₅: Library management and regular training program on digital literacy has strong associations

H₆: Students' digital exposure and developing digital competency have strong associations.

H₇: Exposure to digital literacy and students' learning encouragement has a strong association

H₈: Library technological involvement and student learning skills has positive association.

2. Literature Review

2.1. Students' technological skills and Usage of Digital Tools

According to [9], the digital tool is a collective term that is frequently used for electronic devices, systems, and resources that make use of technology to generate, process, and store information. A typical example of digital tools includes social media, mobile phones, online media, and multimedia, among others. However, in the educational context, [10] argues that digital tools are different since they are usually not used by the teacher to teach or reinforce an idea but rather assist the teacher in delivering instructions, classroom organization, and management or in students' assessment. When technology is integrated into education, students are introduced into digital tools that they learn how to use as part of the learning process.

In schools where digital tools are used, students can interact with the technology through computers, where they make use of different applications as part of the learning process [11]. For example, the students would be required to submit their assignments as a soft copy, meaning that they would have to interact with the word processing application. In the same way, while making presentations on a particular subject, the student may be required to make use of presentation making software as well as photo editing software if the presentation requires the insertion of pictures. This means that the student, regardless of what he is majoring in, will acquire the technological skills for evaluating the software to use, creating the presentation, and sharing the presentation with fellow students through information technology [12].

Therefore, most of the students acquire their digital literacy and technological skills through the usage of digital tools that are used in education.

2.2. Students' technological skills and Web information and database searching

Nowadays, with the integration of technology in education, most institutions are offering online classes and programs. All the learning materials which the student requires are uploaded into the institution's website for the students to access them whenever needed [13]. The student, therefore, must learn how to navigate through the institution's webpages and search for the material which he/she requires from the institution's database. For the online classes, the interactions between the student and the instructor take place via the web. The student must be able to search and navigate through the internet to interact with the instructor so that they do not miss any details. While the students surf through their respective institution's websites searching for materials meant for them, they can acquire technological skills such as using the internet to find, access, evaluate and utilize the materials required [14].

In the same way, most institutions offer their students research tasks which they are required to conduct on their own. The students, therefore, make use of the internet to surf through the web while searching for the content which would help them to conduct their research or study in the most thorough way possible [15]. While doing this research, the student has to make use of the internet to search, critically evaluate the content for relevance, download the required materials, and then sharing the final copy with the instructor. According to [14], searching the web and databases helps many students to increase their digital literacy and acquire more technological skills.

2.3. Regular instructors and training on digital literacy education

The main aim of integrating technology into education is to develop and increase the digital literacy of the students by offering them technological skills [16]. Schools and institutions of learning have made provisions for training students on how to interact and make use of technology to bring impact to society. Schools are ensuring that they have the facilities required to train students on how to develop their digital literacy and acquire more technological skills. Besides this, digital literacy trainers have been provided by institutions to ensure that students are trained on how to make use of technology since they would require those skills in the school's learning process. Additionally, according to [10], in countries where technology has been integrated into education, it is part of the curriculum for the students to be trained on how to make use of digital tools.

According to [17], continuous training and exposure to a particular activity increase one's ability to master and acquire more knowledge on that activity. When students are regularly exposed to digital literacy education and regularly trained by qualified instructors, their technical skills are certainly expected to increase. The exposure of students to digital tools while in class also increases their ability to acquire skills to find, evaluate, utilize, create, and share content via information technologies. Moreover, when a student is regularly directed on how to about performing a particular task that requires the use of technological skills, they can learn by doing and will be able to perform a similar task without being guided [18].

2.4. Digital literacy training and ICT

Digital literacy goes much far beyond the ability to handle a computer as it comprises having a set of skills for production and usage of digital media, processing, and retrieval of information, professional expertise in computing and participation in knowledge creation and participation via the social media [17]. ICT literacy, on the other hand, includes the skills set possessed by a particular person which enables him/her to take an active role in the society where cultural offerings and services are supported by the

computer and distributed all over the internet [15]. [13] argue that acquisition of ICT skills is used as the most relevant indicator of progress towards digital literacy.

When students are trained in digital literacy, they can acquire skills to use technology to keep track of studies while they are at home of that of their peers who are far away from other institutions by continuing in touch with them via social media [19]. Moreover, students who have undergone digital literacy training can make use of the e-learning platform of their respective institutions to gather more ideas and to interact with their trainers and instructors. Additionally, the economy of the 21st century relies on knowledge and information while conducting any activity [20]. Digital literacy and ICT literacy are therefore required to make use of the computer to acquire information and perform non-routine tasks to come with solutions to problems facing society. Digital literacy training, thus, proves to be essential while ICT substances are required.

2.5. Library management and digital literacy training

For digital literacy training to take place regularly, there needs to be a significant relationship between the management of the library and the students. Besides having the ability and skills to use information technologies to search, create, evaluate, and share digital content, digital literacy also requires the possession of cognitive and technical skills [21]. Students undertaking digital literacy training should, therefore, make arrangements with the library management so that they spend most of the time in the library helping anyone who would be needing any help in a task related to technology [17].

By having initiatives on digital literacy with the library management, the students will be able to acquire more skills by spending most of their time exposed to technology-related task as they help in the library such as in creation and uploading of professional resumes, creating and using email to interact with other people, creating movies for use in school projects, and communicating with the technicians whenever they have an issue with the computer, among other activities [20]. According to [17], almost 90% of libraries offer training on digital literacy, which includes safe practices while online, usage of new technology devices, and usage of social media. Therefore, there exists a significant association between regular training of digital literacy and library management.

Libraries are the ideal places where one can be able to learn and meditate well on an idea due to the conducive learning environment which they offer [20]. When libraries become involved in technology adoption and advancement by providing a technologically ideal environment with all the facilities required for learning and developing technological skills, more students will be attracted to wanting to learn more skills and develop their digital literacy [17]. With the right technology in the libraries, more students will have the opportunity to assess the digital tools more quickly and affordably, which will, in turn, improve their learning skills and develop their digital literacy. The learning skills of students will increase when libraries become more involved technology since most students are used to the digital content and will rarely get bored of reading articles on a screen rather than on a book [14].

2.6. Students' digital exposure and digital competency development

As earlier mentioned, the more one gets exposed to something. The more one can gather enough knowledge about that thing and can master and understand how to go about it [18]. When students become more exposed to digital literacy, e.g., through mobile phones and social media, they will be able to understand how digital devices work and will, therefore, become competent in using any digital tool. For instance, if a student is used to do their assignment using the word processor, they will be able to understand how more advanced tools of the word processor are applied, and this will make him competent when it comes writing a professional resume as he will have understood and mastered how to use word processing tools to create an impressive resume.

2.7. Digital literacy exposure and students' learning encouragement

With the current advancement and adoption of technology in the world, children are brought up knowing how to use and operate a mobile phone [19]. This means that they have been exposed to digital literacy since they were little. Similarly, most of the students have a mobile phone which they use to communicate with their friends and relatives as well as having access to social media. When such a student finds out that mobile phone usage or preferably digital literacy has been integrated into the school, they feel demoralized and usually long going home so that they can have access to their phone or generally the digital resources. On the other hand, when a student finds that the learning process is making use of the digital tools, they will associate with the learning process and will be motivated and encouraged to learn [22].

From the above-reviewed literature, it is evident that the integration of technology in education has brought significant reforms in the education sector. Some of the advantages include facilitating distant learning through online classes, and proper follow up of the course and increased interactions between the student and the instructor through the e-learning platform, adequate understanding of concepts through diagrammatic explanations using the digital tools, and usage of digital tools in education has made learning process more fun thus encouraging many students, among other advantages. The study further proved the existence of strong associations between; students' technological skills and usage of digital tools, students' technological skills and web information and database searching, regular instructors and training on digital literacy education, digital literacy training and ICT, library management and digital literacy training, students' digital exposure and digital competency development, and digital literacy exposure and students' learning encouragement.

3. Research Methodology

The study employed quantitative methods to have an in-depth insight into the research topic. The population for this study consisted of the undergraduate students. The number of participants in this study was 123 students, and these form the sample for the study. The data collection was made through the questionnaires, which were circulated online to target respondents. The questionnaire consisted of two sections where the first section was addressing the background information of the respondents, such as gender and their major, and the second section consists of questions directly related to study in order to get their perception of the topic. The data collection tool was designed by the researcher under the supervision of two research experts. The analysis of the data was done using SPSS, starting with the descriptive and then Chi-square to test the relationships.

4. Results

4.1. Demographic Information

In providing empirical evidence for this study, a total of 123 respondents have answered the questionnaire. All the questionnaires administered were fully recovered.

Table 1. Demographic Information of Respondents

	Frequency	Percentage
Gender		
Male	70	56.9
Female	53	43.1
Total	123	100

GPA		
2.0 to 2.99	9	7.3
3.0 to 3.99	36	29.3
4.0 to 5.0	78	63.4
Total	123	100
Major		
Physical education and sport science	99	80.5
Islamic study	11	8.9
Linguistic	6	4.9
Special need	7	5.7
Total	123	100

Table 1 shows the background of the students that are respondents of the study in which 70 (56.9%) were male, and the remaining 53 (46.1%) are females. A glance at the respondent's academic performance as shown by their cumulative grade point, 63.4 percent of the respondents have a GPA that falls within 4.0 to 5.0, some of the respondents of about 29.3 percent of the population sample have a GPA with 3.0 and 3.99 while the remaining 7.3 percent of the respondents have a GPA in between 2.0 and 2.99. In the area in which they major, 99 of the respondents who form 80.5 percent of the sample majored in physical education and sport science, 11 of the respondents majored in Islamic study, 6 of the respondents majored in linguistic while 7 of the respondents majored on the particular need.

4.2. Research Questions

Table 2. Students' perception of the role of Technology Integration in Developing Digital Literacy Education and Student Information

S/N	Statement	SDA f (%)	DA f (%)	N f (%)	A f (%)	SA f (%)	Mean
1	I know how to use digital tools to find information.	1 (0.8)	5 (4.1)	12 (9.8)	47 (38.2)	58 (47.2)	4.268
2	I am competent in utilized technology to work with others to create and share my work.	1 (0.8)	1 (0.8)	15 (12.2)	38 (30.9)	68 (55.3)	4.390
3	Regular instructors offer training on DL to student university.	4 (3.3)	15 (12.2)	47 (38.2)	31 (25.2)	26 (21.1)	3.488

4	The training contents ICT based covering digital database accesses and resource utilization to students.	1 (0.8)	7 (5.7)	40 (32.5)	45 (36.6)	30 (24.4)	3.780
5	Students who exposed to digital literacy began to developed D & IL competence.	1 (0.8)	5 (4.1)	11 (8.9)	47 (38.2)	59 (48.0)	4.285
6	Exposed to digital literacy in university encourage student continues learning of digital skills and information literacy.	4 (3.3)	4 (3.3)	19 (15.4)	49 (39.8)	47 (38.2)	4.065
7	Gaps in digital skills set arise when the library does not teak an applied approach to student learning with technology.	1 (0.8)	5 (4.1)	34 (27.6)	45 (36.6)	38 (30.9)	3.927
8	The library administration is working on maintaining a regular training program on D & IL for students.	11 (8.9)	17 (13.8)	38 (30.9)	37 (30.1)	20 (16.3)	3.309

Table 2 shows the response of students, which captures their perception on the Role of Technology Integration in Developing Digital Literacy Education and Student Information. The first question addresses their understanding of knowing how to use digital tools to find information. Of the 123 respondents, 58 strongly agreed that they know how to use digital tools to find information, 47 respondents who are 38.2 % of the sample reveal that they know how to use digital tools to fetch information while 12 of the respondents were indifferent. Five respondents disagree, while 1 of the respondents strongly disagree about their capacity in knowing how to use digital tools to find information. In assessing competency, 68 of the students strongly agree, while 47 of them agree that they are competent in utilizing technology to work with others to create and share their work. Fifteen respondents who make 12.2% of the sample are of neutral perspective about their competency. In disagreeing and strongly disagreeing the skill in utilizing technology to work and share with others, one respondent each settle for that option. In answering the instructors offering training on digital literacy to the student in the university, 26 respondents strongly agree that the instructors do, 31 respondents also agree that the instructors do provide training while the large part of the response to the question which makes up 47 of the respondents was neutral about instructor offering training. 0.8% and 5.7% of the respondents strongly disagree and disagree, respectively, that regular instructors provide training on digital literacy to the student of the university. The level of coverage of the ICT based contents was also assessed. Thirty of the respondents strongly agree, while 45 of the respondents agree that the training contents cover digital database accesses and resource utilization to students. Forty of the respondents are neutral, while 8 of the student were not in support that the training contents of ICT based cover digital database accesses and resource utilization to students.

The perception of exposure to digital literacy as a drive to develop digital and literacy competency was strongly agreed by 59 of respondents strongly agree, while 47 of the respondents also agree to it. This shows that a more significant percentage of the students support that exposure matters to digital and literacy learning competence. Only 11 of the respondents gave a neutral to the question, while 6 of the respondents are of the contrary view. Similarly, exposure to digital literacy encouraging students to continue learning

digital skills and information literacy is strongly agreed and agree by 47 and 49 of the students respectively while 19 of the students were neutral about their response. 4 of the respondents each disagree and strongly disagree that exposure to digital literacy in university can encourage student continue learning of digital skills and information literacy. The perception that gap in digital skill set is as a result of the library not tweaking an applied approach to student learning with technology is generally accepted with 47 and 49 of the students strongly agreeing and agreeing, respectively. However, 34 of the respondents were neutral, while 5 of the students disagreed, and 1 strongly disagreed. In answering the last question which addresses the administration of the library working on maintaining a regular training program on digital and literacy for students has 20 of the students strongly agreeing, 37 of the respondents agree while 38 of the respondents were neutral about it. 17 disagree, and 11 of the students strongly disagree with the view.

Hypothesis 1: Students' technological skill has a strong association with using digital tools.

Table 3. I know how to use digital tools to find information

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
I know how to use digital tools to find information.	Gender	7.866	0.097
	Major	28.831	0.004
	GPA	22.801	0.004

The significance of the hypothesis is considered by chi-square, and the results show that students' technological skills do not have a strong association with using digital tools from the gender side as its p-value is higher than the 5% level of significance. However, based on Major and GPA, students' technological skills have a strong association with using digital tools from the gender side as the p-values of both are lesser than 5%.

Hypothesis 2: Students' technological skill has a strong association with searching databases and web information.

Table 4. I am competent in utilized technology to work with others to create and share my work.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
I am competent in utilized technology to work with others to create and share my work.	Gender	8.071	0.089
	Major	31.942	0.001
	GPA	19.408	0.013

The hypothesis of an association between the student technological skill and searching databases and web information shows that from the gender perspective, there is no association as shown the p-value of the chi-square. Based on major and GPA, the association is keen that students are competent in utilizing technology to work with others and also to share their work.

Hypothesis 3: Regular instructors and training in digital literacy education have a positive association.

Table 5. Regular instructors offer training on DL to student university.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
Regular instructors offer training on DL to student university.	Gender	17.051	0.002
	Major	17.380	0.136
	GPA	6.614	0.579

The third hypothesis which addresses the regular instructors and training of digital literacy is positive shows that association is positive and significant based on gender, but when considered based on major and GPA, the association is not significant as their p-value exceeds the specified level of significance.

Hypothesis 4: Training contents on digital literacy has a strong association with ICT based substances.

Table 6. The training contents ICT based covering digital database accesses and resource utilization to students.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
The training contents ICT based covering digital database accesses and resource utilization to students.	Gender	3.867	0.424
	Major	27.166	0.007
	GPA	8.597	0.377

The fourth hypothesis considers the training contents on digital literacy and ICT based substances. The result obtained shows that based on gender, and GPA, the null hypothesis can be accepted that training contents on digital literacy have a strong association with ICT based substances. Based on major, the p-value is 0.007, and this is less than the 5% we will, therefore, accept the alternate hypothesis that training contents on digital literacy have a strong association with ICT based substances.

Hypothesis 5: Library management and regular training program on digital literacy has strong associations

Table 7. Students who exposed to digital literacy began to developed D & IL competence.

Statement		Chi-Square Test
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	Demographic Information	Pearson Chi-Square	P-Value
Students who exposed to digital literacy began to developed D & IL competence.	Gender	4.550	0.337
	Major	29.749	0.003
	GPA	33.688	0.000

Based on gender, the hypothesis of library management and regular training program on digital literacy has strong associations is not statistically significant and therefore the null hypothesis has been accepted while based on major and GPA their p-values shows that each is significant and we will, therefore, reject the null hypothesis and conclude that library management and regular training program on digital literacy has strong associations.

Hypothesis 6: Students' digital exposure and developing digital competency have strong associations.

Table 8. Exposed to digital literacy in university encourage student continues learning of digital skills and information literacy.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
The training contents ICT based covering digital database accesses and resource utilization to students.	Gender	1.743	0.783
	Major	13.534	0.331
	GPA	14.377	0.072

The hypothesis of exposing students to digital literacy in university will encourage to continue in learning and mastering of digital skills subsequently, and information literacy shows that based on gender, major and GPA the p-values indicate that the null hypothesis cannot be rejected and we will, therefore, conclude that students digital exposure and developing digital competency does not have strong associations.

Hypothesis 7: Exposure to digital literacy and students' learning encouragement has a strong association

Table 9: Gaps in digital skills set arise when the library does not teak an applied approach to student learning with technology.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
Gaps in digital skills set arise when the library	Gender	1.736	0.784
	Major	26.498	0.009

does not teak an applied approach to student learning with technology.	GPA	5.737	0.677
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The hypothesis considering the relationship between students' learning encouragement and digital learning shows that the null hypothesis based on gender and GPA does not have a significant p-value, and we will, therefore, conclude that exposure to digital literacy and students' learning encouragement does not have a strong association. Based on major which has a p-value of 0.009, the null hypothesis will be rejected, and we will go for the alternate hypothesis that exposure to digital literacy and students' learning encouragement have a strong association.

Hypothesis 8: Library technological involvement and student learning skills has positive associations

Table 10: The library administration is working on maintaining a regular training program on D & IL for students.

Statement	Demographic Information	Chi-Square Test	
		Pearson Chi-Square	P-Value
The library administration is working on maintaining a regular training program on D & IL, for students.	Gender	16.353	0.003
	Major	24.637	0.017
	GPA	16.327	0.038

The last hypothesis considered in this study address library administration and students learning skills. The exciting thing is that based on gender, major and GPA having the p-value of 0.03, 0.017, and 0.038 respectively are statistically significant, and we can unanimously reject the null hypothesis and conclude that library technological involvement and student learning skills have positive associations.

5. Conclusion

This study has examined the role of technology integration in developing digital literacy education and student information. Technology has affected so many parts of human life and make the process so easy. The academic area has been transformed through the medium of digital literacy education, and it has been revealed why more should be attributed to technology to get the optimal result from the academic sector. Students in the university been provided training on ICT, and having regular instructors training them on digital literacy education has to bring set back to reaping the full benefit of technology integration. This finding is in agreement with the work of [23] and also with the work of [24]. The lack of academic interaction between the library administration and student as regarding new educational and technological development in libraries do not allow students that are exposed to digital literacy to develop their technical shortcomings significantly. Therefore, there is a need for the library administration to team up with the university leaders to put in position personnel that will enhance student's digital literacy activities. The curriculum should also have digital literacy courses that will give solutions to any challenges the student

might be having relating to digital literacy. Factors such as user information, level of usage, and other relevant information must be gathered to be able to understand the ability of the students to cope with the training content that is ICT based. Besides, to have a balance scale in the approach of technology integration in developing digital literacy, the needed technology and as well as human resources should be provided as the use of electronic resources and digital literacy saves time for both the instructor and students.

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