

**Developing digital literacy skills of English majors at Aswan
Faculty of Education through a cloud-computing based on
the self-regulated learning approach program**

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for the Ph.D. Degree in Curriculum and Instruction
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Developing digital literacy skills of English majors at Aswan Faculty of Education through a cloud-computing based on the self-Regulated learning approach program

The present study aimed at developing digital literacy skills of English majors at Aswan Faculty of Education through a cloud-computing based on the self-regulated learning approach program. The present study followed a pre-post quasi-experimental research design. The participants of the study were thirty-seven third year English Department Faculty of Education students, Aswan University. The experiment was administered to one pre-, post-group of students. The participants were taught digital literacy skills by using a Cloud-Computing based program. The instruments of the present study included a digital literacy skills scale for assessing the participants' digital literacy. The scale was administered to the participants before and after implementing the Cloud-Computing based program. The statistical analysis of the obtained data confirmed a large effect size of using the Cloud-Computing based program on the participants' digital literacy skills. The results of the study revealed that the participants' digital literacy skills were developed after the implementation of the Cloud-Computing based program using the self-regulated learning approach. Accordingly, the Cloud-Computing based program was found to be effective in developing digital literacy skills of English Department Faculty of Education students.

Key words: Cloud-Computing, Self-Regulated Learning Approach, Digital Literacy, Faculty of Education Students

المستخلص

تنمية مهارات المعرفة الرقمية لدى طلاب شعبة اللغة الانجليزية بكلية التربية
بأسوان من خلال برنامج قائم على الحوسبة السحابية باستخدام مدخل التعلم
المنظم ذاتيا

هدفت الدراسة الحالية إلى تنمية مهارات المعرفة الرقمية لدى طلاب قسم اللغة الانجليزية بكلية التربية بأسوان من خلال برنامج قائم على الحوسبة السحابية باستخدام مدخل التعلم المنظم ذاتيا. وتكونت مجموعة الدراسة من طلاب شعبة اللغة الإنجليزية الفرقة الثالثة بلغ عددهم سبعة وثلاثين طالبًا يدرسون بالعام الجامعي ٢٠٢١-٢٠٢٢ م. وقد تم استخدام المنهج شبه التجريبي ذي المجموعة الواحدة، كما تم تدريس المعرفة الرقمية باستخدام برنامج قائم على الحوسبة السحابية باستخدام مدخل التعلم المنظم ذاتيا لمجموعة الدراسة. واشتملت أدوات الدراسة على مقياس مهارات المعرفة الرقمية وذلك لتقييم مهارات المعرفة الرقمية لدى مجموعة الدراسة قبل وبعد التجربة. وتمت معالجة البيانات إحصائيا باستخدام برنامج (SPSS). وقد أشارت النتائج إلى التحسن الملحوظ في مهارات المعرفة الرقمية لدى مجموعة الدراسة بعد دراسة البرنامج القائم على الحوسبة السحابية باستخدام مدخل التعلم المنظم ذاتيا. وبالتالي أثبتت الدراسة فاعلية استخدام البرنامج القائم على الحوسبة السحابية باستخدام مدخل التعلم المنظم ذاتيا في تنمية مهارات المعرفة الرقمية لدى طلاب كلية التربية.

الكلمات المفتاحية: الحوسبة السحابية ، مدخل التعلم المنظم ذاتيا ، المعرفة الرقمية ،
طلاب كلية التربية شعبة اللغة الإنجليزية

Introduction

Nowadays, technology has a great effect in individual's life and education. Technology is very important; it has also made life easier, faster, and better. The current era's requirements of using modern technology in learning and teaching of students, remote learning is essential in the present-day, as well as using the Internet and digital tools are important for university students to help them develop their digital literacy skills.

This century is distinguished by its rapid technological advancement. As a result, individuals' lifestyles and their ways of interacting with others have changed notably as digital technologies turn in the life (Lotherington & Jenson, 2011; Chu, Reynolds, Notari, Taveres & Lee, 2016). People are surrounded by digital technologies, starting from surfing the Web and using digital apps and services, to communicating via social networks and interacting with digital content. Using digital technology forms an important part of daily lives, learning and business. In education, the digital world is having a great effect. The purpose of bringing the digital world into the classroom is for improving traditional learning, developing teaching process, and engaging students and aiding them to acquire new skills. Through innovating with classroom technologies, instructors are enhancing their students' learning with the use of a wide range of digital devices, software, apps and other tools (White, 2015).

Digital literacy is widely recognized as a fundamental skill for all students of higher education. It helps them cope with the increasing competitiveness in the borderless world and it is one of the elements essential for students' life-long learning success (Komlayut & Srivatanakul, 2017). Furthermore, Brown (2009) and Lankshear and Knobel (2015) agreed that digital literacy is regarded as a fundamental educational goal because it provides learners with opportunities to link with others through shared

interests and goals. Spires, Paul and Kerkhoff, (2017) also asserted that digital literacy has an effective impact on contemporary education. This is because it makes information available to learners and instructors to teach them how to employ this information effectively, ethically, and responsibility.

Due to the technological developments and distance education, learning has become more learner-centered with less instructor interaction, and learners need to find new ways of regulating and handling their learning (Winkler, 2011). Actually, self-regulatory learning requires learners select and regulate information and manage what they think about, how they process and organize information, and how they change their minds about issues, with new information and make a specified way of analyzing information based on a logical and reasonable procedure (Baird, 2018). Therefore, self-regulatory approaches are considered as powerful tools to help learners direct their learning activities and performance

Technologies in educational environments can provide richness in the teaching-learning processes, and can help develop students' digital literacy skills, and media and technology skills. Integrating technology in learning and teaching processes represents a source of motivation for both educators and learners (Cığerci & Gultekin, 2017). As a result of the rapid development of science and technology, and compared with the traditional teaching model, multimedia computer-assisted teaching presents a huge number of modern educational technologies to support learners' creative thinking and innovative ability. One of these modern educational technologies is Cloud Computing which has been offered as a novel computational model which provides reliable and secure data storage, suitable Internet services and computing power (Jin, Ibrahim, Bell, Gao, Huang & Wu, 2010).

Cloud Computing is one of the most popular modern technologies that has become an integral portion of the computing world nowadays (Chandrasekaran, 2014). The benefits of using Cloud Computing applications include reducing run time and response time, minimizing the risk of deploying physical infrastructure, decreasing the cost of entry, and raising the pace of innovation (Sun Microsystems, 2009). Cloud-Computing also opens up the world of computing to a broader domain of uses and increases the facility of use by giving access via any Internet connection (Huth & Cebula, 2011). In fact, using the latest technologies in education can encourage learners to improve their skills and knowledge necessary for achieving the academic and professional goals. Thus, Cloud Computing can enhance learning opportunities and academic achievement of learners (Nofan & Sakran, 2015).

Considering the usefulness of using Cloud Computing in learning, the present study investigated the effectiveness of a Cloud-Computing based program using the self-regulated learning approach on developing students' digital literacy skills.

Context of the Problem

To document the problem, the researcher conducted an interview on 50 third year English Department Faculty of Education students. The interview was about the weaknesses that they face during using digital tools and modern technology. Regarding the weaknesses which they suffer from while using modern technology, the interviewed students pointed out that these weaknesses could be traced back to the inappropriate methods of teaching them digital literacy skills.

The researcher also conducted a pilot study to document the problem. The pilot study contained a digital literacy scale adopted from Komlayut and Srivatanakul (2017) which is reliable and validate. It contained six main skills of digital

literacy and measurement objectives posed to understand the state of digital literacy skills of students. The items of this scale measured the following skills: photo-visual digital skill, reproduction digital skill, branching digital skill, information digital skill, socio-emotional digital skill, and real-time digital skill. Based on the results of the scale application, students' digital literacy skills need to be improved. The researcher found through the application of the scale that the pilot study' students had a clear weakness in digital literacy skills. Thus, there was a need to develop English Department Faculty of Education students' digital literacy skills.

Statement of the Problem

College students need to master specific skills while using digital tools and modern technology. In addition, online learning may contain embedded resources such as hyperlinks, audio clips, etc., and students are being asked to create, collaborate, and share digital content during their learning process. Thus, students need to be trained on using some technologies to help them develop their digital literacy skills. Thus, the present study aimed at investigating the effectiveness of using a Cloud-Computing based program using the self-regulated learning approach in developing digital literacy skills of Aswan English Department Faculty of Education students.

Questions of the Study

As an attempt to solve the problem of the current study, the researcher answered the following questions:

1. What are the digital literacy skills necessary for third year English Department Faculty of Education students to develop?
2. What is the form of the Cloud-Computing based program using the self-regulated learning approach for developing digital literacy skills of the study group?

3. What is the effectiveness of the Cloud Computing-based program using the self-regulated learning approach in developing digital literacy skills of the study group?

Hypothesis of the Study

There is a statistically significant difference between the mean scores of the study group in the pre-, post-administration of Digital Literacy Scale (DLS) in favor of the post-administration.

Aim of the Study

The aim of the study is to develop digital literacy skills of third year English Department Faculty of Education students by using the Cloud-Computing based program using the self-regulated learning approach.

Delimitations of the Study

- 1- Aswan Faculty of Education, where the researcher works.
- 2- A group of third year English Department Faculty of Education at Aswan University.
- 3- Second semester of the academic year 2021/2022.

Variables of the Study

- **Independent variable:**
 - Cloud-Computing based program.
- **Dependent variable:**
 - Digital literacy skills.

Definitions of Terms

1- Cloud Computing

The researcher operationally defined a Cloud -Computing as a new technology based on using the Internet that can help 3rd year English department students improve listening comprehension and digital literacy skills by using listening data, content, information, images, videos and audio materials stored in the cloud at any time and place.

2- Self-Regulated Learning Approach

The researcher operationally defined the Self-regulated learning approach as an approach that college students can use to monitor and manage their learning process. It can lead them to better comprehension of listening texts and develop their digital literacy skills through using program based on cloud- computing.

3- Digital Literacy

Digital literacy is operationally defined in the present study as one of 21st Century skills which college students need to master to be able to listen effectively to online texts and access to information through digital technologies like Google sites, Google chats and Google forms.

Theoretical Framework

Section One: Digital Literacy

Origins of Digital Literacy

Since the emergence of the Internet and computer technology, the educational processes have changed. Technologies become an important tool in individuals' life. Technology plays a vital role in learning process in general and in language acquisition in particular. So, it is essential to consider the developing of digital literacy of students in the educational environment.

Digital technology has an important effect on society. Over the last few years, the way people work, communicate, socialize, entertain, relax and live has changed due to technological advancements. Accordingly, the concept of literacy has also changed. The term literacy has usually referred to one's ability to read and write. However, recently, other types of literacies have appeared such as media literacy, information literacy, and digital literacy that is also known as information and communication technology (ICT). In the case of digital literacy,

the primary role of technology has increased its importance. Currently, it is important to know how to properly use digital devices such as mobiles phones and computers. Thus, the concepts of digital literacy and digital skills have increasingly been introduced (Rodríguez-de-Dios, Igartua & González, 2016).

Over the past twenty years, there has been a renewed interest in digital adoption. Particularly, in the field of education, there was an increasing interest in digital pedagogy and digital literacy by incorporating ICT and digital use into learning and teaching. The aim of digital learning is to prepare learners to become digital citizens (Chen, Liu, Hung & Chung, 2020).

Over the 21st century, an individual has become a creator and consumer of mediated communication. The digitally connected knowledge communities and the collaborative world are new basics that educational infrastructures must accommodate (Lotherington & Jenson, 2011). The rapid development in science and technology resulted in accumulating knowledge, which urged instructors to initiate new curricula to meet the challenges of new innovation. Challenges include how to use technology effectively and deal with its limitations (Ahmed, 2015).

There are three key components of digital literacy which are: Information Literacy (IL), Media Literacy (ML), and (ICT) skills. IL means the ability to recognize when information is needed, and ability to locate, evaluate and use the information effectively and ethically. ICT refers to the ability to use digital technology, communication tools and networks, to access, manage, integrate, evaluate and create information. Finally, ML means the ability to decode, evaluate, analyze, and produce print and electronic media (Chu et al., 2016).

Simply, digital literacy refers to how to use a wide range of digital tools fluently. These digital tools include searching the

web, YouTube, and social networks, and how to use modern technologies effectively like Cloud Computing applications. Digital literacy means how to make use of these digital tools and applications and how to be aware of possible problems and dangers that students may face while using digital tools.

Digital Literacy Skills

Digital literacy includes the more complex skills of understanding and analysis that lead to deciding and choosing the suitable digital tools, software or hardware, and to create a variety of content (Department of eLearning, 2015). ICT literacy involves many skills such as basic skills; the ability to open software, save information, and other simple skills in using the computer, the ability to download various information from the Internet, the ability to search for information, the ability to navigate and use the Internet, the ability to classify and evaluate information, the ability to communicate information and express oneself through different mediational means, the ability to cooperate and take part in net-based interactions of learning, and finally be able to produce and create different forms of information as multimodal texts, make web pages, and so forth (Binkley et al., 2010).

Rodríguez-de-Dios et al. (2016) pointed out that there are six dimensions of digital literacy. These dimensions are as follows:

- **Technological or Instrumental Skill:** It refers to the ability to use digital technologies effectively.
- **Communication Skill:** It involves the ability to communicate via digital technologies.
- **Information Skill:** It means the ability to get information and evaluate its relevance in the digital environment.
- **Critical Skill:** It refers to the ability to analyze the information found critically.

- **Personal Security Skill:** It means the ability to use interactive communication without taking risks and dangers that could affect the personal safety of individuals.
- **Devices Security Skill:** It refers to the ability to take precautions to keep digital devices safe and avoid potential problems, like viruses and spyware.

Importance of Developing Digital Literacy Skills

Currently, digital literacy is regarded as an important factor in education. Learners should develop their technological skills to be digitally literate. Developing digital literacy skills can help students understand how to access online information and interact cooperatively and safely on social networks.

ICT literacy and IL are the future and are regarded as a major shift in our life. Using ICT literacy skills is one of the ways that will manage information explosion. The use of ICT is growing today; it has been reported that there are 31 billion searches on Google every month, up from 2.7 billion in 2006. In order to use Google one must use the Internet effectively. And, in order to accommodate the use of the Internet, it has seen an explosion in the number of Internet devices. In 1984, the number was 1,000, by 1992 it was 1,000,000, and in 2008 it had reached 1,000,000,000 (Binkely et al., 2010).

Instructors must realize that digital literacy is important to participate in today's modern world. Students also need to acquire digital literacy skills, in order to be critical users of ICT. If individuals lack digital competences, they risk being disenfranchised when it comes to democratic participation, employment opportunities, and social interaction (Department of eLearning, 2015). Its importance is that some scholars submit that digital literacy skills are a prevention tool against the digital technologies' risks. These risks are especially essential due to their psychological results on learners. Hence, digital literacy

could be actually a health prevention tool (Rodríguez-de-Dios et al., 2016).

In sum, digital literacy skills are important for anyone who hopes to keep up with 21st century digital society. Developing digital literacy skills may help learners interact more safely online. Thus, it is important for students to acquire digital literacy skills. This can help them send and receive email messages, share, access websites, use cloud applications, download, revise, and upload documents and videos.

Section Two: Self-Regulated Learning Approach

Origins of the Self-Regulated learning (SRL) Approach

Learners usually use different kinds of listening techniques and approaches while they are listening to oral texts. One of these approaches is the Self-Regulated Learning (SRL) approach in which a student is the center of the learning process and can regulate learning process.

The SRL approach emerged in the mid-1980s exploring how learners can regulate and control their own learning processes (Li, 2017). Using the SRL has become increasingly significant at various educational levels. Students with high self-regulation skills have a more smooth transition than students without these self-regulation skills (Meusen-Beekman, Joosten-ten Brinke & Boshuizen, 2015).

Self-regulation provides learners with the necessary means to achieve goals which can either come from their own interests or societal demands. In both cases, achieving goals will enable learners to attain self-fulfillment and success. Self-regulatory systems also maintain individuals' actions within the limits of acceptable and restrain from unwanted behaviors. The SRL helps students achieve higher academic goals because they can control over their learning. It is significant to recognize the essential components of the SRL to successfully self-regulate

one's learning, which helps select learning strategies and methods (Matric, 2018).

Importance of Using the Self-Regulated Learning Approach

In spite of the importance of self-regulatory processes in students' success, few educators currently prepare learners to learn on their own. Thus, self-regulation researchers tried to help learners develop key processes that they lack, such as goal setting, learning strategies, time management, learning strategies, self-attributions, self-evaluation, and help-seeking (Zimmerman, 2002).

Many previous studies have revealed that using the SRL approach can improve academic success and lifelong learning of university students. Examples of such studies are those carried out by (Mareschal, 2007; Rowden, 2013; Latifi, Tavakoli & Dabaghi, 2014; Ahmed, 2015; and Jeong, 2019). Because of the unsupervised nature of undergraduate education, learners are required to manage their own learning. They need to use the SRL approach to achieve academic success. College students often have insufficient regulatory skills and strategies; therefore, they need substantive and practical support (Jeong, 2019). The SRL approach empowers sustainable education for lifelong learning and improvement (Taranto & Buchanan, 2020).

Self-regulated students are proactive in their efforts to learn because they are aware of their strengths and weaknesses and because they set their own goals and determine task-related strategies. Those students monitor their behavior in terms of their goals and self-reflect on their effectiveness. Consequently, this reinforces their self-satisfaction and motivation to continue to enhance their methods of learning. Self-regulated learners are not only more likely to succeed academically, but they also view their futures optimistically. Additionally, the SRL approach is

important because the major function of education is the development of life- long learning skills (Zimmerman, 2002).

Using the Self-Regulated Learning Approach in Online Learning Contexts

In e-learning, there are new challenges to be overcome. One of these challenges is to allow learners self-regulate their learning. Within this self-regulation process, learners and educators use technological tools to do their tasks (Romero, Saucedo, Caliusco & Gutiérrez, 2019). Online learning offers flexibility and opportunities for learners to learn anytime and anywhere. Effective methods to enhance learner success in online courses remain under-researched. The SRL approach has been shown to promote learners' success in online learning by supporting their engagement, learning strategy use, and consistent evaluation of academic performance through instructional interventions and practice adopting the SRL process (Rowden, 2013).

The SRL approach is suitable for the college context. This is because college students are expected to control their own learning and time management. It is also supposed that college students will be more exposed to distance learning which requires more skills in time management (Park, 2000).

Considering the importance of using the SRL approach in the educational process, especially in distance learning, it is necessary to adopt the SRL approach in the e-learning of university students, because they are required to self-regulate their learning.

Section Three: Cloud Computing

The Vision of Cloud Computing

Nowadays, technology has an important role in our life. It changed the way we think and live. It also affected all aspects of life and many areas of society. Therefore, it is significant to

implement digital technologies in teaching and learning processes. One of the latest technologies is Cloud Computing which is an important technology that can be used in the educational process.

Cloud Computing is a new model of providing IT services which involves rental of resources located somewhere in the "Cloud" and is considered the future development of the IT sector. Usually, individuals are increasingly online and doing their work online, from checking e-mails and using other forms of communication, writing and editing documents, through listening to music and watching movies, up to storing the personal documents and images on the web. Notably, there is no necessity for installation, licensing and updating of program, and there are no maintenance costs as all services and programs are available through a web browser (Kurelović, Rako & Tomljanović, 2013).

There are various companies that support Cloud Computing by providing tools and technologies to adapt to the cloud environment such as EMC, Google, Amazon, Microsoft, Manjrasoft, SAP LABS, VMware, IBM, Red Hat, Salesforce, and Gigaspaces. Few of the services like Google Docs and Google Cloud Print are free, whereas that of AWS, Microsoft, etc., are proprietary. Based on the specific requirements, the user has to make a trade-off between open source and closed source services (Chandrasekaran, 2014).

Cloud Computing is a computing model based on networks, especially the Internet. This model's function is to ensure that users can simply use the computing resources on demand (Appiahene, Kesse & Bombie, 2016). Cloud Computing is defined as a model for enabling ubiquitous on-demand network access to a joint pool of configurable computing resources such as networks, storage, servers, applications, and services that can

be rapidly provisioned and released with least management effort or service provider interaction (Chandrasekaran, 2014).

Advantages of Cloud Computing

Cloud Computing is a recent technology that has several advantages. The main advantage of Cloud Computing is that it decreases the cost effectiveness for implementing the Software, Hardware, and License for all. Nowadays, it is better to adopt Cloud Computing and use it for the development of the quality and reducing the cost of education for all countries all over the world (Rao et al., 2012). They also added that the Cloud's main advantage is that it gives the low cost implementation for infrastructure and some higher business units like Google, Microsoft, and IBM introduce the Cloud for free of cost for the Education system. Thus, it can be used in the right way which will provide high quality education.

By using Cloud Computing technology in social service information area, educational institutions can save money, server equipment, and manpower, as well as they can reduce the cost of fixed assets investment and trainings for teachers to facilitate information management education in schools and to develop information and data security. Instructors can easily construct their individual online teaching environment to teach effectively and also learners can study collaboratively (Jin et al., 2010).

Cloud Computing Relationship with Digital Literacy

Technologies in the educational environment have the power to enrich learning and teaching process and also help develop digital literacy skills, and media and technology skills. Today, accessing information technology is easy and low-cost accords high importance to involving technology in education policies, and bringing it into classroom settings (Ciğerci & Gultekin, 2017). Thus, technology will soon become widely used enough for every student to be issued a device across all subjects

(Cho, Baek & Choe, 2019). Amornkitpinyo and Piriyaawong (2017) recommended that it is essential for the educational environments to make the infrastructure preparation that concerns to the network system for the Internet and learning material access to develop the 21st century skills in the form of mobile cloud learning.

Appiahene et al. (2016) indicated that the ICT is basically making use of digital tools to store and retrieves information. In changing learning environment, it is essential to think of the latest technologies to incorporate in the teaching and learning of ICT. One of the latest technologies prevailing nowadays is Cloud Computing. Moreover, IT education would be one of the most affected as it is purely practically oriented. Cloud Computing can provide solutions to these challenges and reduce it to some extent. It can also ensure that quality IT education is provided to every learner and also his attendance, class performance and others attributes can be effectively monitored and maintained without worrying for the infrastructure issues. Both public and private institutions that introduce IT education can use Cloud Computing to deliver better services, even with limited resources.

From the literature reviewed above, it can be concluded that Cloud Computing is an essential technology that could help students acquire digital literacy skills while using the Cloud Computing based program. Thus, the researcher tried to investigate the effectiveness of a Cloud Computing based program using the self-regulated learning approach for developing digital literacy skills of Faculty of Education students in Aswan University.

Method

Design of the Study

This study adopted the quasi-experimental design research of one group pre-, post-test that is used to investigate the effectiveness of the independent variable which is the Cloud-Computing based program using the self-regulated learning approach on the dependent variable which is digital literacy skills of third year English Department Faculty of Education students.

Participants of the Study

The participants of the present study represented one section from third year English Department Faculty of Education students at Aswan University. They were randomly selected from the sections of third year English Department studying at Aswan Faculty of Education. They were 37 students in the academic year 2021/2022. The present study followed the one group pre-, post-test quasi-experimental research design. The researcher taught the study group throughout the stages of the present study experiment.

Instrument and Material

The researcher prepared and used the following instrument and material to fulfill the aim of the present study:

- A digital literacy skills scale.
- A framework of a Cloud- Computing based Program which will be used to develop digital literacy skills among the study group. (Available upon request from the researcher)

Procedures of the Study

The following procedures were followed to carry out the present study:

1. Reviewing literature and previous studies related to digital literacy skills, self-regulated learning approach and Cloud-Computing.

2. Selecting the participants from third year English Department students at Faculty of Education, Aswan University.
3. Designing the pre-, post-DLS to be used to assess the participants' digital literacy skills before and after the experiment.
4. Verifying the validity and reliability of the DLS by submitting it to a group of jury members.
5. Designing a Cloud-Computing based program using the selected cloud applications (Google Sites, Google Forms, Google Chat) considering the various program dimensions in terms of objectives, content, activities, tasks and evaluation methods of the program.
6. Assessing the validity of the form of the Cloud-Computing based program and its suitability for the present study participants by submitting it to a group of jury members.
7. Submitting the DLS to the participants to assess their digital literacy skills before implementing the Cloud-Computing based program.
8. Teaching the participants by using the Cloud-Computing based program using the self-regulated learning approach.
9. Submitting the DLS to the participants to assess their digital literacy skills after implementing the Cloud-Computing based program.
10. Collecting data and treating it statistically.
11. Analyzing and interpreting the results of the study.
12. Providing recommendations, conclusions and suggestions for further research.

Results of the Study

The hypothesis of the study stated that “there is a statistically significant difference between the mean scores of the participants on the pre-, and post-DLS in favor of the post-DLS”. The following table presents participants’ mean scores, standard deviation, t-value and level of significance in the pre-, and post-DLS.

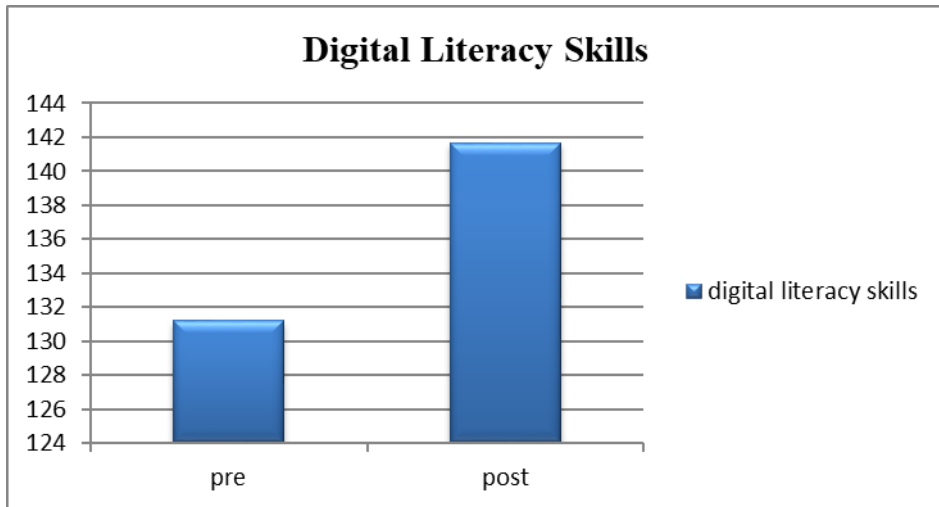
Table (1): t-value of the Difference between the Mean Scores of the Participants on the Pre-, and Post-DLS

Scale	Scale	N	Mean	S.D	T-value	D.F	Sig.
The Digital Literacy Skills Scale	Pre	37	131.19	16.05	7.51	36	0.01
	Post	37	141.68	16.17			

The results of table (1) revealed that the mean score of the participants on the pre-DLS was 131.19 with a standard deviation of 16.05 while the mean score of the participants on the post-DLS was 141.68 with a standard deviation of 16.17. This result indicated that the difference between the mean scores of the participants on the pre-, and post-DLS was statistically significant ($t = 7.51$, $p < 0.01$). Consequently, the hypothesis was confirmed.

The results of the hypothesis revealed that there was a statistically significant difference between the mean scores of the study participants in the pre- and post-DLS in favor of the post-DLS. As indicated in Table (1), the study participants showed a notable development in their digital literacy skills in the post-DLS. This is related to the use of the Cloud-Computing based program that helped students improve their digital literacy skills. Figure (1) showed the mean difference between the study participants’ digital literacy skills on the pre- and post-DLS.

Figure (1): The Mean Score of the Study Participants in the Pre- and Post-DLS



The present study focused on developing the participants' digital literacy skills by using the Cloud-Computing based program. Using the Cloud-Computing applications helped the participants use web pages correctly, learn new technologies easily, know how to complete online forms, know how to upload files online, be able to conduct video meetings online, be confident about writing a comment on Google chat, and use various media tools to access the information, audio, image or other data effectively. As a result, the post-DLS revealed that the participants' digital literacy skills were developed due to the influence of using the cloud-computing based program. Table (2) shows the effect size of the Cloud-Computing based program on the study participants' digital literacy skills.

Table (2): The Effect Size of Using the Cloud-Computing Based Program on the DLS of the Participants

Scale	t-Value	μ^2 Value	d-Value	Effect Size
The Digital Literacy Skills Scale	7.51	0.61	1.24	Large

These results were consistent with the results of Pegrum (2010); Appiahene, Kesse and Bombie (2016); Cote and Milliner (2017); Dewa, Merwe, and Matope (2018); Harati, Rahmatizadeh, and Haghi (2018). Based on the results of the effect size analysis, it is revealed that the Cloud-Computing based program using the self-regulated learning approach has a notable effect on developing the participants' digital literacy skills.

Discussion of the Results

The main aim of the present study is to develop digital literacy skills of English Department Faculty of Education students through the implementation of the Cloud-Computing based program using the self-regulated learning approach. The Cloud-Computing based program included various authentic listening materials such as audios, activities and tasks that were introduced to the study participants. The results of the present study showed that the Cloud-Computing based program has improved the study participants' digital literacy skills. This means that the participants achieved progress in their performance on the DLS. They achieved higher mean scores on the post- DLS than that on the pre-DLS.

Challenges

There were some hindrances encountered by the participants during the study such as:

- The students' fear of participating in the program.

- Students' weaknesses in digital literacy skills.
- Weak Internet connectivity.
- Students' Initial unfamiliarity with Cloud Computing applications.
- Initial lack of Internet access.
- Time consumption.

Conclusions

The Cloud-Computing based program using the self-regulated approach had a remarkable effectiveness on developing the study participants' listening comprehension and digital literacy skills. Based on the results of the present study, the following conclusions were drawn:

- The Cloud-Computing based program was effective in developing the study participants' digital literacy skills. It helped them improve their ability to deal effectively with the information found on the digital tools, effectively use various media tools to access the information, audio, image or other data that is needed, and develop other ICT literacy skills.
- The Cloud-Computing based program using the self-regulated approach helped the participants interact actively and collaboratively while using the Cloud-Computing applications.

Recommendations of the Study

- 1- Digital literacy skills should be given more attention when designing EL programs.
- 2- Training EL instructors on the use of the Cloud-Computing based program in teaching digital literacy to their students.
- 3- Using the Cloud-Computing applications in teaching digital literacy skills to students at Faculties of Education.

- 4- Using the Cloud-Computing applications in training students how to use digital information, ICT, and media literacy while learning.
- 5- University instructors should clarify the importance of developing the digital literacy skills to their students.
- 6- Developers of EL curriculum should benefit from the Cloud-Computing based program in e-learning education.

Suggestions for Further Future Research

Within the results of the present study, the following points are suggested for further research:

1. The effect of the Cloud-Computing based program on digital literacy skills of General secondary stage students.
2. The effect of using other new technologies on developing Faculty of Education students' digital literacy skills.
3. The effect of other Cloud-Computing applications and tools on developing digital literacy skills among college students.
4. The effect of a Cloud-Computing based program on developing other 21st century skills of University students.

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