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Editorial

AI: Artificial Intelligence

Donald G. Perrin

Half a century ago ,United States education had a "facelift" with substantial funding from the National Defense and Education Act of 1958 (NDEA).

> "It followed a growing national sense that U.S. scientists were falling behind scientists in the Soviet Union. The early Soviet success in the space race catalyzed a national sense of unease with Soviet technological advances, especially after the Soviet Union launched the first-ever satellite, Sputnik, the previous year. (Wikipedia – NDEA).

NDEA had a strong emphasis on science, technology, engineering and mathematics (STEMs) to support the growing demand of the space, aerospace and computer industries. This led to substantive changes at all levels of education and an updated STEMs curriculum. Research into new methods of instruction and new theories of learning led to innovations that were not strictly audio or visual. This gave birth to the concept of instructional technology which included language laboratories, programmed instruction, computer assisted learning and performance aids in a multitude of formats. It also began the transition from large group technologies (one-to-many) to small group, individualized and interactive technologies such as computers, interactive multimedia (including video), and simulators.

Each decade brought technologies that were more powerful and more affordable. In the sixties education experimented with mainframe computers. In the seventies it added graphics; in the eighties, PC and Macintosh personal computers; in the 90s; the Internet with hyperlinks and user-friendly interfaces.

In the new millennium, networks became global, computers merged with video, and the digital revolution launched the information age. In the second decade, ubiquitous smart phones and tablet computers added the internet and became a force for education. Even in economically disadvantaged countries, an increasing number of learners at all levels have acquired their own smart phones. With microminiaturization, the storage and processing capabilities of smart phones now rival the performance of many desktop computers. Digital access is personal and portable and is a great tool for research and collaborative learning.

Extensions of computer technology make computers and smart phones easier to program and use. For example, we can talk and share digital resources with persons anywhere on the globe; we can scan, save, store, process and send text, images, voice and video and interpret text to voice and voice to text so computers can talk, listen, interpret and implement voice commands. Robotics emulate human skills and replace human labor. The R2D2 character in Star Wars is becoming a reality with artificial intelligence and mastering complex skills as in self-driving automobiles.

The United States is under-producing persons with STEM skills, creating a pool of unfilled jobs and an even larger pool of unemployable workers. An educational solution is needed for the United States to maintain economic strength and leadership. Historically, education has lagged behind social and technological changes. The digital calculator, a byproduct of the Space program in the 1960s, was forbidden to be used in classrooms. Educators shunned the Wikipedia, and students were forbidden to use cut and paste and other products of computer automation – tools they will use extensively after they graduate.

Our assessment, curriculum and evaluation tools should point to the future – the world for which our students are being prepared. And our teachers and administrators, parents and politicians should be leaders in implementing innovations that will revolutionize education as we know it.

Editor' Note: Schools of Education must get buy-in and training for faculty and administration to successfully implement Information and Communication Technologies in their programs. Technology adds a technical layer with hardware and software and networks to setup and maintain. These open the opportunity for interactive learning and searches using Internet 2.0; and Learning Management Systems to support 24/7 learning. This study monitors and guides the transition to ICTs.

The University of Jordan education students' perceptions of ICT functions, applications, challenges and future expectations in the university's instructional process with multiple implications for improving their education

Ahmad Alkhawaldeh
Jordan

Abstract

This is a quantitative qualitative inquiry which used two instruments: a close questionnaire and semi-structured interview instruments to gather data about several ICT usage and challenges as perceived by 140 Faculty of Education students from the University of Jordan in the summer semester, 2017. The most important utility of the ICT is for searching the electronic sites to find essential learning information, to store and retrieve information, to download information from the Internet and to make use of ICT to give presentations in the courses students take at university and finally to complete learning tasks. The most recurrent perceptions among the University of Jordan education students were the perception that ICT is both creating joy and gets learning to be interesting for the students, makes their learning fun, reduces their anxiety and encourages them to learn more. Other highly received interests were that this technology is effective if teachers and the students receive training on the use of it. Frequent obstacles in ICT centered around unavailability of internet access, lack of sufficient training offered to professors on the use of the ICT applications, variation of the resources of knowledge and the overlapping of them, lack of availability of computer devices, isolation from the external environment by the students and the resulting lack of contact with those in the surrounding, teacher resistance to change old methods and replace them by recent ones, high cost of recent technology and the resulting unfairness in accessing the internet. Most important, future expectations regarding ICT applications, according to them, embody future wide spread application and contribution of ICT to the development of the instructional process, and increased attention by companies specialized in electronic instruction. Also, it is expected that more attention to the training of parents and teachers will improve electronic instruction applications at the university level instruction.

Keywords: ICT based learning, educational technology, perceptions, University education, ICT based teacher training.

Introduction

The acceleration of the implementation of the various applications of ICT to the improvement and development of university instruction has become a reality in university education both nationally and globally for the various merits achieved via this new and emerging type of instruction. This is constantly gaining an increasing momentum in a country like the Hashemite Kingdom of Jordan as it receives the attention of university decision makers, professors, students and parents at a high scale. This has become a daily practice both at schools and universities and the business world, at large. At university level, as the case of the current study, students now have a high tendency to give presentations using a wide range of computer applications and submit their instructional tasks to their instructors. Their independence, for example, has been prioritized due to the extensive ICT spread and applications where now professors encourage their students to use recent social media in their university study. They can use, for example, the Facebook in their

overall learning and recently the social media has penetrated the educational scene being used as a tool to enhance and mediate between the instructor and the curriculum and university learners. Likewise, students now browse the internet to download relevant material and articles to serve and consolidate their learning.

Theoretical background

The ICT environment and application to the educational process is in its beginning phases in a country like Jordan as a developing country with limited natural resources, a country that cares about uplifting the skills to create an educated society. The Jordanian educational system clearly adopts ICT to raise the skills of Jordanian university students and ensure sustainable university learning among them. The recent technological ICT integration into university education with all its various applications in the instructional process represents a paradigm shift towards the application of ICT. Average people in Jordan are highly motivated towards social media uses for personal and social and economic development of the country. Smart phones are widely used and the level of computer literacy tends to be high. At homes many computer devices are used and many Jordanians can either have Internet Access via their smart phones, computers and related devices.. Many can afford Internet Access charges. Graduate and undergraduate students in the present study are also highly motivated as evidenced through courses taught by the researchers and through formal and informal contacts with them.

Crowley and Ryan (2017) looked at Information and communications technology (ICT) as representing a vast opportunity to launch significant and lasting positive changes cross developing countries. The rapid infiltration of mobile phone access has created considerable new opportunities for poor people in both rural and urban milieu. It is noticed that, as this tendency continues, accessibility enlarges and the cost of availability declines. The key challenges encountering ICT in developing countries seem to be the sustainability of the ICT supported programs, lack of knowledge, pace of change, the issue of funding and changing roles and standards.

For the purpose of the current study, ICT educational applications are embraced by recent theories of learning such as constructivism theory which has a premise that knowledge is perceived as dynamic and constantly evolving. Drawing on the role of social constructivist theory which is seen to relate with recent ICT applications such as the social media, on the other hand, Vygotsky (1978) who was the founder of the social constructivist theory, argued that social interaction plays a key role in the development of cognitive function and high order thinking, results as exemplified by the relationships among individuals and emphasizes the social contexts, learning and knowledge. At the University of Jordan, widespread adoption of ICT is underway.

Recently, e-Learning has been perceived as of paramount significance for both learners and the teachers or lecturers as in the case of this study. It has been looked at as an alternative medium for the transmission of knowledge that changes the relationship between the teacher or trainer and the learner. It requires new skills, competencies and attitudes amongst those planners, managers, teachers and trainers who are going to design and develop materials and support learners online (Gray, Ryan, Coulan 2003).

Blazquez and Diaz (2006) support the idea that ICTs are central to education in the 21st century, design for ICT learning should be based on constructivist theory where knowledge is acquired through active involvement of students where there is collaboration and negotiation of meaning.

According to Yusaf (2011), ICT in schools will not guarantee effective use because teachers must have competence and the right attitude towards ICT for the gains to be realised. In a similar vein, Jaffer, Ngami, Czerniewicz (2011) suggest that the use of ICT has to be a priority for teaching and learning in the future. Michael, Leigh and Peter (2011) likewise noted that the important

measure for success of any educational reform is the extent to which it is adopted by teachers. According to Light (2009) if ICT is integrated into a high quality learning environment, it can strengthen knowledge and consolidate thinking skills, but ICT alone cannot create this kind of teaching and learning environment if teachers do not have positive attitudes and skills.

The Diffusion of Innovations Theory developed by Rogers (1995) contends that people's attitude towards technology is a major factor for effective adoption. Similarly, the Technology Acceptance Model developed by Davis (1989) argues that before accepting technology, a positive attitude towards it is a prerequisite. The same was also asserted by Sun et al (2008) and Piccoli et. al. (2001) also affirmed that for students and teachers to be more satisfied and effective users of technology they should have a positive attitude towards it. The model below was used by John (2015) is embraced for the purpose of the present study.

The researcher reviewed several related models and selected the following model which assesses the impact of ICT in the learning and teaching process based on a study by Adedokun-Shittu 2012.
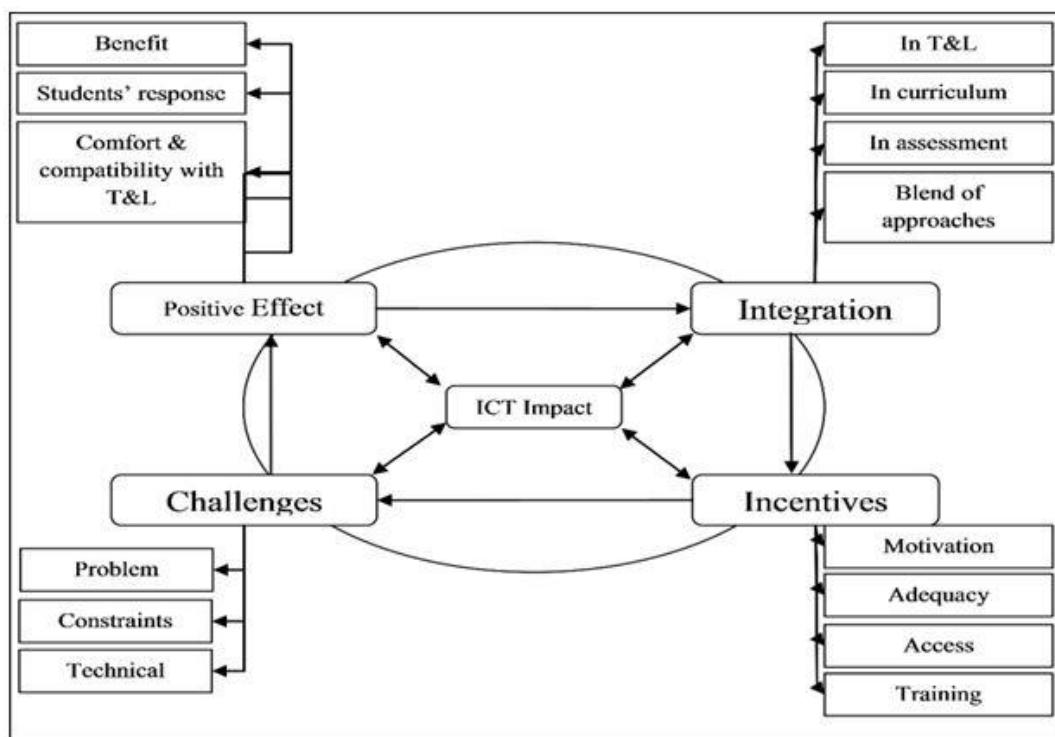
Previous studies

In the context of the present study, several research studies are referred to in order to inform the discussion and the implications derived from its results.

Perceptions and attitudes of higher education students of the importance of ICT in their education

It has been noticed that the way students perceive the new educational technology has significant effect on their learning via the ICT various applications and tools. This study is placed within a framework of the perceptions of the university students at a higher education institution in the University of Jordan.

Macura (2014) investigated students' perceptions of ICT used by university staff and students. He used a questionnaire and interview administered to a randomly selected sample of fifty students to enlist their views on the extent to which they and academic staff utilize ICT during learning and teaching. Students were satisfied with ICT use and functionality. Students also mentioned that most lecturers do not use ICT for the purpose of teaching. Students perceived ICT, particularly with the computer, as impacting positively on their academic study, academic access and other curricular issues. The researcher concluded that in spite of challenges such as an underutilisation of ICT's by other lecturers, the students perceived ICTs as useful in their learning. Students suggested that universities should sustain their ICT e-learning programs and offer training and financial support if student academic performance quality is to be enhanced.

An exploratory attitudinal study was carried out by Gay, Mahon, Devonish, Alleyne and G. Alleyne (2016) concerning attitudes and usage of ICT by undergraduate management learners in Barbados. The study sample consisted of 166 students while the majority of them indicated they had access to computers and regularly used the World Wide Web. Also, more females than males accessed a computer off campus. More than 90% used the course-based Web CT, whereas only 30% of them used the Campus Pipeline. The study showed that students had a general tendency towards using the ICT. Males were more predisposed to incorporate ICT in web-based instruction compared to other teaching activities. Also, older students were more interested in using ICT only as an add-on to teaching activities. The findings suggested a high usage and a positive attitude toward ICT among tertiary level students. University decision makers need to address both the gender and age factors in handling ICT usage as well as use strategies to sustain positive student attitudes and encouraging more ICT usage and integration.

Perceptions and attitudes of teachers towards application of ICT to the instructional process

Hashim (2010) assessed the attitudes toward ICT among distance education student who affiliated with the Institute of Education Development. He studied computer anxiety, liking and usefulness and confidence. The study findings revealed that some students are still uncomfortable with the use of ICT or educational technology for achieving e-learning. Likewise, Khalid (2009) observed that negative attitudes are because of a lack of confidence to use ICT in the classroom.

A study by Govender and Maharaj (2005) showed that successful implementation of educational technologies depends to a large degree on the attitudes of educators, who at the end of the day decide on the manner and when to use them in their teaching process. Teachers' attitudes are a main factor in the adoption of technology. Educators who have a positive attitude towards technology, feel more comfortable with using it, and usually incorporate it into teaching.

Yusuf (2011) conducted a case study on the student-teachers' competence and attitude toward information and communication technologies. Participants included 382 student-teachers who studied at the Faculty of Education at University of Ilorin in Nigeria. Using a questionnaire, the study findings suggested that the majority of the student teachers had positive attitudes towards the use of ICT and they were competent in the use of basic ICT skills. The study did not reveal significant differences between males and females in usage and attitude towards ICT's role in education.

According to Yasmin (2008) teachers that cling to traditional beliefs need gradual re-orientation and individual practical interaction with the ICTs to get concrete understanding of the potential of ICT in learning and teaching. Teachers' attitudes towards using knowledge outside their talent and desire tend to be a factor impeding ICT integration, and successful integration of ICT requires competences and skills essential for teaching.

Challenges that hinder using ICT in the classroom

Various world countries and educational systems eagerly look forward to the application and integration of ICT in the educational system. These are faced by many challenges. Nkula and Krauss (2014), Dzidonu (2010), Chigona and Chigona (2011), Ramorola (2014) and Ang'ondi (2013) reflected on the multiple challenges to integrate ICT into the teaching and learning process and the curriculum. These covered issues with teachers' attitudes and perspectives, planning and implementing ICT programs, training and qualification of teachers, lack of dedicated support from the administration and many others.

Chigona and Chigona (2011) pointed out that teachers did not have sufficient technical support for use of ICT for teaching. Teachers complained that technical support was not readily available and it negatively affecting their use of technology for teaching. The lack of technical support does not encourage teachers to effectively use ICT for their teaching. Similarly, Dzidonu (2010) said that there appears to be a resistance to creating a technological change aggravated by a lack of motivation to change concerning the introduction of ICT to facilitate education in educational institutions and the excessive subscription to a traditional chalk and talk mode of instruction.

Ramorola (2014) reported that South African teachers faced several challenges in the attempt to integrate technology with a coherent framework for schools. Findings of the study revealed difficulties in the roadmap to integrate technology into the instructional process: lack of technology policy, insufficient technology tools, lack of teachers qualified in technology integration, and maintenance and technical problems. The study concluded that effective integration of technology necessitates sufficient time, planning, dedication as well as enough resources.

Statement of the problem

The issue that university students use the various ICT applications is a recent trend among university students at several educational levels. University administration has started to give special importance to ICT applications to improve the delivery and execution of university courses. This requires students to rely on and benefit from the recent educational technologies. The University of Jordan, where students sample was randomly withdrawn, calls for training in design and implementation of courses using ICT with training for faculty and the employees to teach courses that integrate the new technologies. From our observations to the students, we notice the high stamina among them to use recent technology. Their presentations represent a new trend in learning. This study quantitatively and qualitatively investigates the perceptions of these students of the usage and challenges of the new ICT at the level of university education.

Research questions

What are the perceptions of University of Jordan education students regarding the multiple functions of ICT in their instructional process?

What are the perceptions of University of Jordan education students regarding the use of the ICT in their instructional process?

What are the obstacles that face the application of ICT technology in the instructional process from the perspective of education students at the University of Jordan?

What are the University of Jordan education student's perceptions of the future expectations about the role of ICT in their instructional process?

Study significance

The study gains its major significance from its coverage of the perceptions of the University of Jordan education students. The ICT applications in the instructional process are still in their initial phase and the university professors are beginning to learn how to apply the new technology to their university instruction. This study therefore, represents an attempt to shed light on this evolving globally and nationally paradigm and to show to what extent electronic education is achieving progress in the instructional milieu. Decision makers at universities can make profit from its results, professors at university can measure how much this field is progressing and in what direction as the compass of educational direction appears to be directing towards the right direction. Researchers also can make profit by getting new data as this study is not only a quantitative but also qualitative study.

Methodology

The study has taken use of the use of two main instruments: a close questionnaire design to solicit information from 140 University of Jordan education students. The other instrument was an interview with 25 students who were interviewed for a round 20 minutes individually to report on their perceptions regarding the role of ICT in the process of university learning, the role of educational technology in the construction of the curriculum, the multiple uses of the social media in the educational process, the future expectations for using ICT technology in the instructional process and finally the obstacles that face social media in the instructional process.

Validity of the instrument

For the purpose of this study, the questionnaire and the semi-structured interview were forwarded to seven professors specializing in ICT, English education with focus on computer mediated language learning specialists. Almost most of them assured that the instrument fits the purpose of this study and suggested few things. All comments and suggestions were meticulously handled by the researcher.

Reliability

To ensure that the results are consistent, the questionnaire was reapplied on a smaller sample of students (No= 25) from outside the original sample and from the same population of University of Jordan education students. Cronbach alpha reliability coefficient was computed and was (0.87) which was high and served this study. As for the semi-structured interview, intra-rater reliability was calculated by returning students' responses to eight students who were first interviewed to assure these responses. A high similarity and match was observed between their first responses and their endorsement of these responses.

Data analysis

Data collected via the questionnaire and the semi-structured interview were stored and analyzed using SPSS software. The questionnaire was collected from the respondents during the summer semester, 2017, from a sample of 140 students. Each questionnaire was identified by number and statistical analyses were calculated to answer the research questions.

Findings of the study

The study accumulated a massive amount of data using the close questionnaire and the semi-structured interview.

Research Question One covers the perceptions of University of Jordan students regarding the multiple functions of ICT in the instructional process

Table 1
Perception of the students of the functions of ICT in the instructional process

Item No	Student's perception of functions of ICT in the instructional process	Mean	STD	Rank
1	Downloading learning material from the internet	2.228571	0.682177	M
2	Giving presentations regarding the classroom instruction performance	2.157143	0.648977	M
3	Accomplishing learning tasks required by the instructional process	2.514286	0.55601	H
4	Screening electronic sites searching for learning stuff	2.342857	0.69708	H
5	Storing and retrieving learning data	2.214286	0.654654	M
6	Sorting out learning and personal problems	2.357143	0.612477	H

The most significant function of the use of the ICT is for searching the electronic sites as referred to by university students to find essential learning information. The second function as appearing in the above table is store and retrieve information. A third function is to download information from the Internet. A fourth function is to use ICT to give presentations in the courses students take at university and finally to accomplish certain learning tasks.

Research Question Two covers the perceptions of university of Jordan students regarding the use of ICT in the instructional process:

Table 2
Perceptions of the students of the use of ICT instructional process

No.	Student Perceptions of use of ICT in instructional process	Mean	STD	Rank
7	Learning is joyful and making instructional process as fun	2.785714	0.476584	H
8	Organizing the learning process of the students	2.728571	0.446293	H
9	Facilitating the process of retrieving information	2.771429	0.484922	H
10	Improving the learning achievement among students	2.585714	0.549502	H
11	Promoting co-operation among students	2.571429	0.601471	H
12	Promoting learner independence	2.6	0.572763	H
13	Developing communication skills	2.671429	0.555455	H
14	Encouraging motivation among students	2.6	0.572763	H
15	Improving learning process among students	2.428571	0.624936	H
16	Not costly in terms of time, resources and effort	2.442857	0.6919	H
17	Does not restrict my learning options	2.314286	0.646915	M
18	Does not increase anxiety among students	2.457143	0.692939	H
19	Useful especially when students access computers at homes	2.757143	0.521087	H
20	Useful if parent give support for their children	2.628571	0.638601	H
21	Effective when computer resources are available	2.714286	0.54026	H
22	Effective when there is a training offered for students on their use	2.771429	0.484922	H
23	Effective when there is a training for teachers on the ICT educational applications	2.8	0.467659	H

Among the high perceptions among the University of Jordan education students were the perception that ICT is joyful and interesting for the students and makes their learning as fun and reduces their anxiety and encourages them to learn more. Other highly received interest were that this technology is effective if teachers and the students receive training on the use of it.

Research Question Three covers the obstacles that face the application of ICT technology in the instructional process

A set of items in the questionnaire addressed the barriers or obstacles experienced by the sample of the study which are illustrated in Table 3 below.

Table 3
Obstacles that face the use of ICT in the instructional process

	Obstacles that face the use of ICT in the instructional process	Mean	STD	Rank
24	Lack of availability of computer devices both quantitatively and qualitatively	2.657143	0.584838	H
25	Problem of the availability of internet access	2.714286	0.484073	H
26	Applying ICT technology in a traditional environment without developing it	2.614286	0.641331	H
27	Not paying attention to varying electronic learning resources	2.471429	0.672618	H
28	Not offering sufficient training for teachers and students on application of ICT	2.542857	0.671854	H
29	Variation of the resources of knowledge and the overlapping of them	2.628571	0.591825	H
30	Misusing electronic instructional programs	2.6	0.665707	H
31	Weakness in the content of the used electronic learning programs	2.542857	0.627562	H

Highly frequent obstacles centered around the problem of the availability of internet access, lack of sufficient training offered to professors on the use of the ICT applications, variation of the resources of knowledge and the overlapping of them, misuse of electronic instructional programs and weakness of the content of the used electronic programs.

Research Question Four covers the student's future expectations regarding ICT in the instructional process

The current study sought the future expectations of the ICT and how far it can go to make learning more fun and at the same time empower the learner to achieve better and so meet the standards for learning. These are tabulated below.

Table 4
Future expectations for using ICT

No.	Future expectations for using ICT	Mean	STD	Rank
32	The need to Match the used electronic instructional programs with the educational philosophy of the country	2.585714	0.575091	H
33	More applications of ICT in the instructional process	2.885714	0.3193	H
34	Training of teachers and engaging them and taking their notes about various applications and programs	2.757143	0.492701	H
35	Training and involving parents in the electronic education of their children	2.742857	0.554529	H
36	Increasing attention by specialized educational companies interested in electronic instruction in offering specialized instructional programs for students at all levels	2.842857	0.402714	H

Table 5
Obstacles to ICT expressed by University students in semi structured interviews

No	Obstacles of ICT based instruction	Number	%**
1	Lack of availability of computer devices	8	32
2	Lack of varying of learning resources of all forms	2	8
3	Weakness in the content of the electronic programs	3	12
4	Insufficient training on computer technology	5	20
5	Wrong and insecure use of the information technology	5	20
6	Not ensuring the credibility of information on the web	4	16
7	Availability of internet Access	7	28
8	Lack of training on recent technology	9	36
9	High cost of recent technology and the resulting unfairness in accessing the internet	14	56
10	Insecurity of the various web sites	5	20
11	Difficulty of using recent technology	5	20
12	Inaccuracy of information on the web	5	20
13	Teacher dissatisfaction with recent technology	5	20
14	Teacher resistance to change old methods and replace them by recent ones	7	28
15	Electricity disconnection	2	8
16	Lack of emotional learning via ICT learning	2	8
17	That this new technology does not encourage creativity because of the availability of fixed programs and templates	2	8
18	Deterioration in the use of the standard language variety because of the use of colloquial variety	4	16
19	Privacy sometimes being threatened	4	16
20	Mismatch of some content with national culture	6	24
21	The long hours spent by children on the internet	6	24
22	The availability of some racial information on the internet	3	12

No	Obstacles of ICT based instruction	Number	%**
23	The bad effect on the relationship between the student and the teacher because the latter spends long hours on the computer	4	16
24	Weakness in the spirit of competition by the teacher	2	8
25	Computer addiction	4	16
26	Isolation from the external environment and the resulting lack of contact with those in the surrounding	9	36
27	The negative effect on the family fabric because of the disharmony or the multiplicity of input received by each individual in the family	3	12
29	Dissatisfaction among some educationists with the ICT	1	4
30	Dissatisfaction among some teachers who do not trust ICT based instruction	1	4

**Number divided by 25 as the total number of the students

Most important future expectations regarding ICT applications embody the future spread of the application and contribution of ICT to the development of the instructional process. The increase of attention by specialized companies in the electronic instruction. Also, the training of parents and teachers to improve electronic instruction applications.

Qualitative results derived from semi-structured interviews in this study

A set of interviews were conducted with a number of students in this study which were referred to support quantitative results.

Research Question Five covers the obstacles that ICT encounters in being integrated into university education,

Most serious challenges centered around the lack of availability of computer devices, isolation from the external environment and the resulting lack of contact with those in the surrounding, teacher resistance to change old methods and replace them by recent ones, high cost of recent technology and the resulting unfairness in accessing the internet, lack of training on recent technology, availability of internet access.

Regarding the role of ICT in the learning process, all 25 university students highlighted its role in their learning and reflected on the various instructional functions it plays. For instance, a freshman student stated this role by saying:

> ICT offers both the student and the teacher at university level a huge amount of information derived from encyclopedia, dictionaries, maps which can be accessed using traditional methods. (University student No.1)

The same student continued to say:

> An instructional medium such as the electronic computer and other technological media with their multiple programs and functions in the instructional process encourage the exploration of the talents of the students and develop cognitive capacities in all university courses. Information technology has challenged traditional teaching methods and have enabled the release of the students' abilities to develop their learning.
> (University student No.1)

As to the role of the social media in their learning, a university student considered the social media a unique tool which can be exploited in creating motivation among those students who adapted themselves with their use a matter which can make their learning as fun and entertain them and enable them to reveal their abilities and their ideas to achieve excellence in their

learning. This student also continued to say that these social media offer the student the opportunity for interaction with others and enhance cooperation ties with other students.

With respect to the obstacles that face ICT based instruction, the same student above mentioned the computer addiction, isolation from outside world, the web information mismatch with national values. Calling for independent university learning, another student expressed the idea that ICT related instruction promotes autonomous learning.

> The basis of any instructional process is manifested in the role of the learner. The learner is the one who is responsible for information collection then the teacher role is to assist him or her and after that the student can benefit from recent technology in the provision and the knowledge of information in an expanded form. This has led to self-learning among the students. (University student No. 2)

These quotes demonstrate how it is vital to encourage learner independence which due to the rapid applications of the ICT has become an indispensable requirement.

Discussion

The main purpose of this study was to screen and display the perceptions of the 140 education students taking the summer course who were mostly first and second year students with around a sixth were M.A students taking the prerequisite courses with undergraduate students. This was taking place during the summer semester 2017 at the University of Jordan in the capital city of Amman.

The most important utility of the use of the ICT is for searching the electronic sites as referred to by university students to find essential learning information. The second function as appearing in the above table is store and retrieve information. A third function is to download information from the Internet. A fourth function is to use ICT to give presentations in the courses students take at university and finally to complete certain learning tasks. Blazquez and Diaz (2006) support the idea that there is no doubt that ICTs are seen as central to education in 21st century. Likewise Pelgrum (2001) considered the ICT as the cornerstone for an information society

As to the highly frequent perceptions among the University of Jordan education students were that ICT is both creating joy and gets learning to be interesting for the students and makes their learning as fun. Meanwhile, it reduces their anxiety and encourages them to learn more. Other highly received interests were that this technology is effective if teachers and the students receive training on its applications to education.

Highly frequent obstacles centered around the following list of problems listed below.

- The inaccessibility of the internet
- Lack of sufficient training offered to professors on the use of the ICT applications
- Variation of the resources of knowledge and the overlapping between them
- Misuse of electronic instructional programs
- Weakness of the content of the used electronic programs.

In the semi-structured interviews conducted in this study, major emerging challenges were:

- Lack of availability of computer device
- Isolation from the external environment by the students and the resulting lack of contact with those in the surrounding
- Teacher resistance to change old methods and replace them by recent ones
- High cost of recent technology and the resulting unfairness in accessing the internet

- Lack of training on recent technology
- Availability of internet access.

Some of these results were reported in similar studies such as those by Chigona and Chigona (2011) who pointed out that teachers did not have sufficient technical support regarding the use of ICT for teaching. Likewise, Similarly, Ramorola (2014) noted that many teachers face several challenges when they integrate ICT into their classroom instruction. Bingimlas (2009) noticed that several studies indicate that teachers don't have the competence and confidence in using ICT in their classroom because they don't have enough time. Cassim and Obono (2011) pointed to the lack of training and skills as one of the barriers to the use of ICT in the classroom. Du Plesis and Webb (2012) emphasized that teachers need multiple types of training where technology and pedagogical needs are addressed.

Most important future expectations regarding ICT applications embody the expectation about the future wide spread of the application and contribution of ICT to the development of the instructional process. The increase of attention by specialized companies in the electronic instruction. Also, more attention to the training of parents and teachers to improve electronic instruction applications.

Conclusion

The present study highlights the role of ICT in the university learning and teaching such as giving presentations via recent technology, downloading relevant material and storing and retrieving data. They perceived technology based learning as joyful and interesting.

To conclude, the present study brought evidence about the spectrum of challenges facing the integration of ICT into the teaching and learning process at the level of university education which encompass the inaccessibility of the internet, lack of sufficient training offered to professors on the use of the ICT applications, variation of the resources of knowledge and the overlapping between them, misuse of electronic instructional programs, weakness of the content of the used electronic programs. Also in the semi-structured interviews conducted in this study, major emerging challenges were: lack of availability of computer device, isolation from the external environment by the students and the resulting lack of contact with those in the surrounding, teacher resistance to change old methods and replace them by recent ones, high cost of recent technology and the resulting unfairness in accessing the internet, lack of training on recent technology and availability of internet access.

Recommendations

For concerned Higher Education institutions and faculty

Modernising Higher Education and updating the teaching faculty and staff methods and strategies of teaching to line up recent ICT tools and applications has become an integral component of university education. This study recommends the integration of ICT into university curriculum and the acceleration of the training of lecturers on using them besides motivating students to accept this new trend of instruction.

For upcoming research

Studies to come can focus on several related research directions emerging from this study that encompass investigating the nature of the training projects offered to teachers and parents taking into consideration the educational environment and the cultural frames of the related societies to make these programs more responsive and successful.

For those interested in the trade of specialized ICT applications programs

These companies should consider the needs of the various populations of the students and their parents and their attitudes towards these applications.

References

Adedokun-Shittu, N. A. (2012). *The deployment of ICT facilities in teaching and learning in higher education: A mixed method study of its impact on lecturers and students at the University of Ilorin, Nigeria*. Ph.D. Thesis International Islamic University Malaysia.

Ang'ondiEnos, K. (2013). Teachers Attitudes and Perceptions on the Use of ICT in Teaching and Learning as Observed by ICT Champions. X World Conference on Computers in Education July 2-5, 2013; Toruń, Poland.

Balanskat, A., Blamire, R and Kefala, S. (2006). A review of studies of ICT impact on schools in Europe.Europeanschoolnet.

Bingimlas, K., The barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. Eurasia Journal of Mathematics, science and technology education 2009, 5 (3).

Blaquez, F.E., Diaz, L.A. 2006. A Training Proposal for E-learning. European Journal.Open Distance e-learning

Brooks, J. G., & Brooks, M. G. (1999). In search of understanding: The case for constructivist classrooms. Alexandria, VA: Association for Supervision and Curriculum Development.

Bullock, J. Evaluating the impact of using ICT upon student motivation and attainment in English, [Online], Available: HYPERLINK "http://www.educ.cam.ac.uk/research/projects/tips/bullock.pdf" http://www.educ.cam.ac.uk/research/projects/tips/bullock.pdf

Cassim, K. M. And Obono, S.D. 2011.On the factors affecting the adoption of ICT for the teaching of world problems. Proceedings of the World Congress on Engineering and Computer Science WCECS, October 19-21, 2011, San Francisco, USA

Chigona A &Chigona W 2010. An Investigation of Factors affecting the Use of ICT for Teaching in the Western Cape Schools. In T Alexander, M Turpin & JP van Deventer (eds). ECIS 2010 Proceedings. Pretoria, SA: University of Pretoria.

Crowley, J. and Ryan, M. (2017). The five key challenges in implementing ICT for development. Retrieved from https://www.devex.com/news/the-five-key-challenges-in-implementing-ict-for-development-82499 on 1-9-2017.

Cubukcouglu,B. 2013. Factors enabling the use of technology in subject teaching. International Journal of Education and Development using Information and Communication Technology, vol. 9, Issue 3, PP.50-60.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, (September), 319-340.

Du Plessis, A and Webb, P. 2008. Generative use of computers: promoting critical outcomes of the South African curriculum. Education as change, 12(1):15-27.

Dzidonu C 2010. The Role of ICTs to Achieve the MDGs in Education: An Analysis of the Case of African Countries. From (Retrieved January 7, 2011)

Gay, Mahon, Devonish, Alleyne and G. Alleyne (2016). Perceptions of information and communication technology among undergraduate management students in Barbados International Journal of Education and Development using Information and Communication Technology (IJEDICT) 2, (4), pp. 617.

Govender, D.W., Maharaj, M.S. 2005.The attitudes of educators to Information Technology Adoption in School Settings.

Gray,D.E., Ryan,M.,Coulan,A. 2003. The training of Teachers and Trainers: Innovative Practices, Skills and Competencies in the use of e-learning. European Journal. Open Distance e-learning.

Hashim, G., Ahma, G. and Abdullah, C. (2010). Antecedents of ICT attitude of distance education students. Turkish online journal of educational technology-TOJET, volume 9N.l, pp. 28-36.

Jaffer, S; Ng'ambi, D; Czerniewicz, L. 2011. The role of ICTs in higher education in South Africa: one strategy for addressing teaching and learning.

John, S. (2015). The integration of information technology in higher education: A study of faculty's attitude towards IT adoption in the teaching process, Contaduria Y Adminstration, 60, 1, 230-252.

Khalid, A. (2009). Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature

Kipsoi, E J., Chang'ach, J K., & Sang H C. 2012. Challenges Facing Adoption of Information Communication Technology (ICT) In Educational Management in Schools in Kenya. Journal of Sociological Research, 3(1), 18-28. http://dx.doi.org/10.5296/jsr.v3i1.1882

Light, D. The role of ICT in enhancing Education in Developing Countries: Findings from an Evaluation of the Intel Teach Essentials course in India, Turkey, and Chile. Journal of Education for International Development 4:2 December 2009.

Macura, A. (2014). Students' Perceptions of the Use of ICT in a Higher Education Teaching and Learning Context: The Case of a South African University, Mediterranean Journal of Social Sciences 5(11):43-47 ·

Ndawi, V.E., Thomas, K.A. &Nyaruwata, T. L., 2013.Barriers to Effective Integration of Informal and Communication Technology in Harare Secondary Schools. In: International Journal of Science and Research (IJSR), India Online ISSN2319-7064. Retrieved from http://www.ijsr.net/archive/v2i9 /MDcwOTEzMDQ%3C on 10/2/2015

Nkula, K. & Krauss, K.E.M. 2014. The integration of ICTs in marginalized schools in South Africa: Considerations for understanding the perceptions of in service teachers and the role of training. IDIA conference 03-05 November 2014. Port Elizabeth, South Africa

Oladosu, K. (2012). Basic Technology Teachers' Awareness and Attitude Towards the Use Of Information and Communication Technology for Sustainable Development in Lagos State Education Districts: I,IV and VI. Journal of Education and Practice Vol 3, No 13, 2012.

Oliver, R. (2000). Creating Meaningful Contexts for Learning in Web-based Settings. Proceedings of Open Learning 2000. (Pp; 53-62).Brisbane: Learning Network, Queensland.

Piccoli, R. Ahmad, Ives, B. (2001). Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training MIS Quarterly, 25 (4) , 401-426

Ramorola, M.Z. (2010). A study of effective technology integration into teaching and learning: A casestudy. Pretoria: University of South Africa.

Rogers (1995).The diffusion of innovations Free Press, New York NY

Sun, R.J. Tsai, G. Finger, Y.-Y. Chen, D. Yeh (2008). **What drives a successful eLearning?**

An empirical investigation of the critical factors influencing learner satisfaction. Computers & Education, 50 (4) , pp. 1183-1202

Teo, T. (2006). Attitudes towards computer: A study of post-secondary students in Singapore. Journal of Technology and Teacher Education Vol. 14, Issue 1

Vygotsky, L.S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA:Harvard University Press.

Woolfolk, A.E. (2006) Educational Psychology, 10th edition, Upper Saddle River, NJ: Allyn& Bacon

Yasmin, G. (2008). ICT Usage in Higher Institution: A Case Study on Pre-service Teachers and Institutions. Turkish online Journal of Education Technology. Vol.7 (1).ISBN1303-6521.

Yusuf, M.O. (2011). Information and communication education: Analyzing the Nigerian national policy for information technology. International Education Journal 6, (3), 316-321.

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Exploring the positive and negative impacts of using YouTube videos to enhance student's learning in an undergraduate and Master's programme

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Fiji

Abstract

This research study investigates the positive and negative impacts of utilizing YouTube videos to enhance students learning in undergraduate and Master's programmes at the University of the South Pacific. There are a number of ways in which information and computer technologies can be integrated in the learning design. The findings from this research study accentuate that there are both positive and negative effects of using the YouTube videos to boost student learning. Moreover, with the development and advancement of global information and computer technology, lecturers and instructors in many universities around the globe are utilizing online resources to augment students learning in various courses they teach. The findings from this study has policy implications for stakeholders. Moreover, this study has policy ramifications for students, as they utilize videos as a form of digital learning to comprehend concepts, theories and practices associated with the course. Using YouTube videos to enhance students learning is one way information computer technology can be used to enhance students learning in the undergraduate and masters programmes.

Keywords: YouTube, postgraduate, undergraduate, masters, technology, student learning.

Introduction

With the advancement of global information computer technology, lecturers and instructors in many universities around the world are using online applications to enhance students learning in the respective courses they are teaching (Tan and Pearce, 2011). The use of web applications to enhance students learning experience is reminiscent of the fact that there is no one best approach to learning. Learning can be enhanced in a number of ways. In some universities, face-to-face learning may be superior while in other universities, where the adoption or acceptance of technology in learning is much higher, online or blended mode of learning may be superior (Porter et al., 2016).

There are numerous ways how the information computer technology can be incorporated in the learning design (Duncan et al., 2013; Bozalek et al., 2013). Firstly, with the use of interactive Moodle technology, it is easier for students to communicate with the lecturer and other students in the course (Boling et al., 2012). Students who are enrolled in the course can interact with the instructors and other students who are enrolled in the course can see the discussions on topical issues raised by their fellow students (Limongelli et al., 2016). This has a multiplier effect not only on the students who are enrolled in the course but on every member of the class. Everyone enrolled in the course is able to see the discussion and benefit from these discussions. Secondly, the multimedia available online are frequently used by the lecturers to engage students in the

course content (Robinson and Hullinger, 2008). For instance, if a lecturer is covering a topic on the impact of supply chain management on the operations of the business, it is very easy to identify and play a video on the supply chain management practices used by the world's prominent business warehouses. Companies are using marketing tools that are available online to increase their market share. In an attempt of doing so, they are giving away information that could be used by the lecturers to improve the students learning experience.

Moreover, technology use can have both positive and negative impact on students learning experiences. There are two ways how technology use can have a negative impact on students learning experience. Firstly, instant messaging can cause disturbance and waste productive time of students while they are sending and receiving unnecessary messages when they should be focusing on revising their school work and focusing on other important aspects of the course (Lenhart et al., 2010). Secondly, students are usually seen misusing laptops in the lectures as many of them are on social networking sites while the lecturer is trying to deliver the lecture (Fried, 2008).

There are two reasons for analysing the impact of using YouTube videos in enhancing the student's learning outcome at the undergraduate and postgraduate programme at the University of the South Pacific. First, YouTube is one of the most popular web applications that is most commonly used by instructors and higher education students. Second, YouTube has refereed videos and also non referred videos and this enables us to examine both the positive and negative impacts of using YouTube videos to enhance students learning outcomes at the University of the South Pacific. Third, to date none of the existing studies have examined the impact of using the YouTube videos on the performance of students enrolled in undergraduate and postgraduate courses at the University of the South Pacific. This is one of the pioneering studies that makes an attempt to examine the impact of using YouTube videos to improve student's ability to engage in class and uplift their overall performance.

This paper is divided into nine sub-sections. The second sub section outlines the background of higher education in the 12 Pacific Island Countries followed by theoretical perspectives related to multimedia use and higher education delivery in the Pacific Island Countries, literature review, research methodology, research findings and discussions, theoretical and policy implications and finally the conclusion and limitations of this research.

Background of Higher Education in the 12 Pacific Island countries

There are a number of higher education institutions in the Pacific Island Countries. Some of these institutions are the University of the South Pacific, Fiji National University, University of Fiji, South Pacific Bible College, Solomon Islands National University, Divine Word University, Pacific Adventist University, University of Technology, University of Garoke and University of Papua New Guinea (University of the South Pacific Handbook, 2017). These higher education institutions are involved in providing a range courses from social science, science, medicine, technology, and climate change. Out of these prominent higher education institutions in the Pacific Island Countries, the University of the South Pacific is one of the leading providers of business and science courses in the twelve Pacific Island Countries. These 12 Pacific Island Countries are Vanuatu, Nauru, Samoa, Cook Islands, Kiribati, Fiji, Solomon Islands, Tonga, Tuvalu, Tokelau, Marshall Islands and Niue. The Pacific Island Countries are geographically isolated and reaching population in the isolated islands with the aim of providing high quality education has been a challenging task for the University of the South Pacific and other regional institutions in the Pacific region. The provision of distance learning courses together with hybrid blended courses at the University of the South Pacific has helped the higher education service delivery to achieve even greater milestones in trying to enhance the accessibility of education in the Pacific Island Countries.

Theoretical perspectives related to multimedia use and education delivery

The Cognitive Load Theory was developed by the education psychologist, John Sweller in 1980s (Sweller, 1988, 1989). Sweller was looking for the best ways of teaching mathematics and science courses to the students and he came up with the Cognitive Load Theory to address how audio and visual techniques could be used to enhance the learning experiences of the mathematics and science students. This theory is based on three assumptions; namely, working memory, long term memory and schemas (Sweller, 1988, 1989). According to Sweller (1988,1989) the short term memory, also known as working memory, has limited capacity to hold information for a short period of time while the long term memory has the capacity to hold information for a long period of time and it can hold unlimited amount of information. The schemas refer to the psyche of the student in responding to information overload (Sweller, 1988, 1989). According to Mayer (1989,1996,1997,1999), multimedia learning, which is a part of the Cognitive Load Theory occurs when students are able to relate to images, pictures and words to the contents of the course. The main aim of this theory is to examine how multimedia can be structured to foster excellence in students learning experience. Multimedia researchers have emphasised that multimedia learning occurs when students are able to build mental representations of the images and pictures displayed in multimedia. Multimedia can also negatively affect student's learning experiences when the right form of multimedia instructional design is not used to engage students in the learning process.

There are two reasons for using the Cognitive Load Theory in this paper. First, to date, the Cognitive Load Theory has mainly been used by the education psychologists to enhance students learning experiences for the courses taught in the primary and secondary education. However, none of the existing studies has used the Cognitive Load Theory to examine how students respond to YouTube videos in the management science studies delivered at the higher education institutions. Second, the learning style of student's vary across the geographical regions, implying that students in some regions may respond positively to YouTube videos while students in other regions may not respond likewise. Therefore, using the right YouTube videos to engage students in the learning process is essential because the main aim of using YouTube videos is to enhance students learning experience by using appropriate images and pictures presented in the multimedia.

Literature review

The use of online multimedia to deliver lessons has an overall impact on the delivery of education in the university setting (Anstine and Skidmore, 2005; Lauver et al., 2013). Application of technology in higher learning has enormously transformed classroom teaching (Girard et al., 2013; Sosin et al., 2004). This is both inside and outside the classroom (Chen and Lin, 2012). A high proportion of teachers use digital resources that are available online (Perrault, 2007; Vockley and Lang, 2011), thereby accentuating the importance of using multimedia to deliver education (Albertson and Johnston, 2016). The existing studies on the use of multimedia or YouTube videos to enhance students learning experiences can be divided into two categories. The first category includes the positive impact of the multimedia or YouTube use on student's ability to understand the course contents while the second category includes studies that examines the negative impacts of YouTube use on students learning experience. The instructor plays a crucial role in deciding the type of YouTube video to use and how the video is related to the contents of the course. Therefore, it is extremely important that the instructor has a good knowledge and understanding of the student's background and how they respond to certain issues raised in the video before deciding to demonstrate an issue in the class by using the YouTube video.

Positive and negative impacts of YouTube or Multimedia use

Khedo et al. (2013) found that social networking sites have both positive and negative impacts on youths in Mauritius. The YouTube site does not only allow videos to be uploaded but it also allows users to make comments on those videos. These comments may be distracting to students if these videos are used in the lectures. Perryman and Lesperance (2015) found that the small island commonwealth developing states are struggling with digital infrastructure problems. As a result of this, finding high quality multimedia that will enhance students learning experiences in the small island developing countries is a challenging issue. Multimedia that is used to deliver blended courses may be difficult for students to access in the isolated islands. Resultantly, students in the isolated islands are digitally excluded as they may not be able to load and view the videos that the instructor is using in the lectures. According to Gakio (2006), there are many African Universities that are constrained by lack of internet connectivity and availability of computer technology1. Therefore, it would be difficult to use YouTube videos in these countries to improve students learning. Palaigeorgiou et al. (2011) study based on 117 students based in the Greek Informatics Department found that web based learning can be enhanced by encouraging students to participate in the web learning environment design process. Jaffar (2012) found that student's learning experiences can only be enhanced if YouTube videos were linked directly to course objectives. The findings of Henrickson (2016) pointed out that videos serve as a supplement to those traditional classes on campus and are extremely useful to those individuals who strive and work with these resources, since they are in a position to replay parts of them as in-class resources, as many times as they want. The utilization of new technologies such as YouTube can assist lecturers in addressing some issues associated with workload and offers support to students by presenting additional responsibilities in their assessments (Ng et al., 2009). Frydenberg and Andone (2016) submit that short videos have sprung up as a podium for exchange of ideas, practices, skills, capabilities and life occurrences through online social networks and systems. Ng et al.'s (2009) findings accentuate that the utilization of YouTube is a beneficial device that permits the shift in students' active engagement to the advancement of learner empowerment. This involves the student in examining, administering and assessing their own learning (Nicol and Macfarlane, 2006).

Furthermore, the application of micro videos in course delivery can be extended to a number of disciplines (Frydenberg and Andone, 2016). Students are expected to use multimedia that is provided to them by the textbook writers and instructors of the respective courses that they are enrolled in (Henrickson, 2016). Frydenberg and Andone (2016) highlighted that six second restrictions on videos frequently encourages and stimulates critical thinking and creativity in learners, as the videos taps into the students thinking process without overloading them with information. The production of these types of videos presents an efficacious route to accentuate student scholarship and digital learning abilities. Research information highlights that traditional teacher focused educational systems (e.g. use of lectures) do not permit the best or the optimum learning culture and experience for variety of reasons (Biggs and Tang, 2007). Technology is viewed upon as one of the approaches that provide a worthy teaching experience (Holmes et al., 2013) and student focused learning is enabled and expedited through information and communications technology.

Furthermore, through utilization and application of the emerging social media, students can use it as a tool to motivate creativity and knowledge (Frydenberg and Andone, 2016; Ng et al., 2009). Regardless, of the practical benefits of YouTube, it is apparent that the conveyed benefits are not only the benefits that are the consequence of technology on its own but is also attained via instructional execution that emphasizes on student empowerment (Ng et al., 2009).

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[1] Most North African, Mauritius and South African universities do have access to this digital infrastructure.

Research methodology

The main aim of this paper is to examine the positive and negative impacts of using YouTube to enhance students learning experience at the undergradute and Master's level studies at the University of the South Pacific. This is a longitudinal study conducted over a period of approximately six and half years. The first three authors in this study have been involved in teaching undergraduate and Master's level courses at the University of the South Pacific and have used YouTube videos to encourage learning for undergraduate and postgraduate students. Table 1 shows the courses that are taught by each of the lecturers at the University of the South Pacific and what they have used YouTube videos for their respective classes.

Table 1
Courses taught and ways of using YouTube videos

Course	Enrollment Numbers	Semester, Year	Types of YouTube Video Used
MG305	1422	2014-2017	Video on new venture creation topics or issues.
MG321	215	2014-2017	Video highlighting internal business issues.
MG311	740	2016-2017	Highlighting quality related issues [e.g. medicine, etc.]
MG412	117	2014-2016	Highlighting quality related issues [e.g. medicine, etc.]
MG202	540	S1, 2014 & S1, 2017	Some videos that were used in the class were on Darden's restaurant, Regal Marine, Alaska Airlines.
MG315	480	2014-2017	Videos on industrial relations from ILO website.
MG316	510	2014-2016	Videos on industrial relations from ILO website.
MG401	180	2014-2017	Videos on industrial relations from ILO website.
MG402	170	2014-2017	Videos on industrial relations from ILO website.
MBA423	70	2017	Videos on industrial relations from HR website.

Source: Developed by the Authors of this study by using Enrolments Database (2017).

This study is primarily a deductive study that uses the North American approach of phenomenology and participatory action research to collect and analyse data (Denscombe, 2014). There are two approaches to phenomenology polarised in the existing literature. The first approach of phenomenology is the traditional European approach that uses phenomenology to study human experiences in their daily lives. The second approach to phenomenology is the North American approach that uses the phenomenological approach to gather information on education and business related issues (Denscombe, 2014). For this study, the researchers who were themselves the participants of the research have been teaching a number of courses, both at the undergraduate and postgraduate level for a number of years. The participants of this study have been using the YouTube videos to enhance students learning experiences for the last four years. Focus group meetings and discussions were organised with the research participants.

These focus group meetings were mainly aimed at discovering the positive and negative impacts of using the YouTube videos on students learning experience at the University of the South Pacific. This issue was also discussed in a number of informal meetings in the university setting. Furthermore, participatory action research was also used as an approach to collect data because

the researchers, who are also the participants of this study, are going to use the research findings from this study to further improve the quality of videos they are currently using to improve the delivery of the courses at the University of the South Pacific. The approach used in this study was quite unique as both participatory action research and phenomenology was integrated to collect and analyse data for this study. The step-by-step procedure used to collect data for this paper is illustrated in Figure 1.
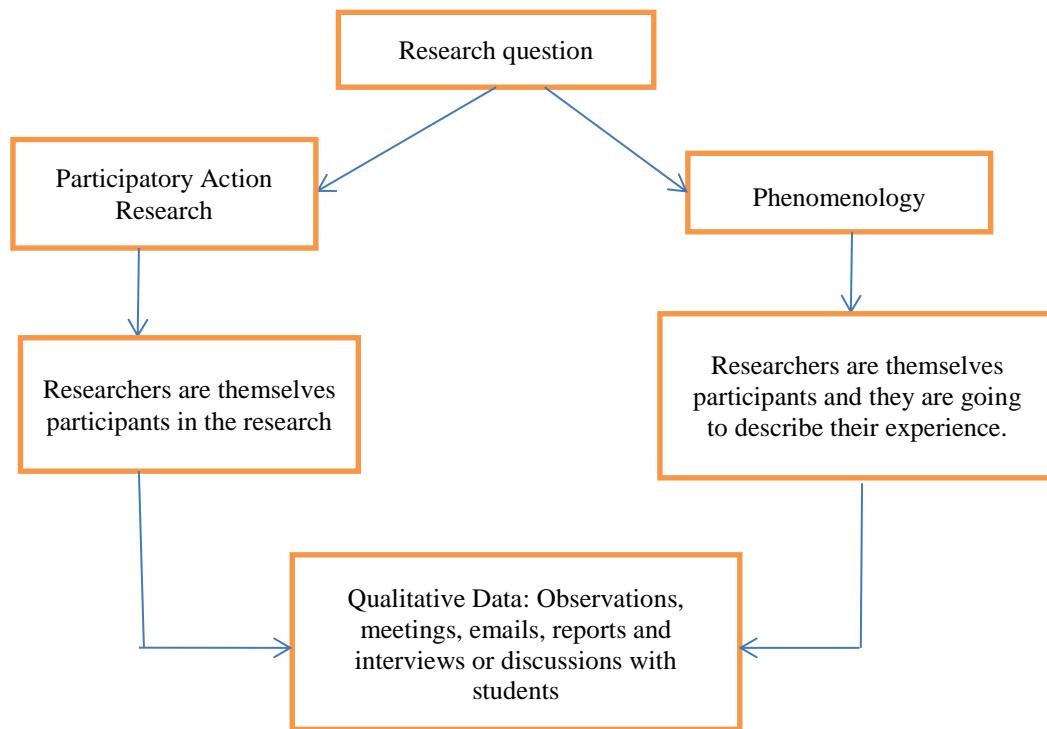

Figure 1: Approach used to collect data

Source: Developed by the authors of this Study, (2017)

Research Findings

Positive Impacts of YouTube Videos

High Quality Videos on YouTube*:* The YouTube videos allow the instructors to enrich their classes with audio and visual multimedia contents while at the same time, bringing to limelight the contemporary issues that are affecting the managers in the Pacific Island Countries. Conventionally, lecturers have always focused on face-to-face delivery of the lectures but with the introduction of the multimedia, it is much easier to integrate the course contents with multimedia that is freely available online. Students practically have limited knowledge on the new course contents that is discussed in each lecture and with the use of YouTube videos; the instructor is able to bring an entirely new perspective to the delivery of courses.

According to one of the instructors teaching postgraduate course:

> "…the use of YouTube videos in the postgraduate classes helps to introduce the practical reality of the course contents delivered in the course. Use of digital medium to teach human resource management courses, particularly, the topics on recruitment and selection helps students from the Pacific Island Countries to understand how recruitment and selection is done in the international setting. The YouTube videos are cost free and by using an effective and free medium to deliver courses at the University of the South Pacific are extremely effective…"

Similarly, another instructor who is using YouTube videos to enhance learning in the classroom environment mentioned that some YouTube videos are compiled by the prominent professors in the different fields of study. In the traditional classroom environment, students only benefitted from the experience of the lecturers who are teaching the course; however, with the use of the YouTube videos, students are benefitting not only from their lecturers or instructors but also from lectures delivered by Professors from world renowned universities, such as, Harvard and Cambridge.

Easy for students to follow: One of the advantages of the YouTube videos is that it is easy for student's to follow and understand. This digital age has greatly influenced the way students learn and understand the course contents delivered in the classroom. Fiji is a heterogeneous society and the main medium of communication is English. Most of the YouTube videos that are related to the field of management science are mainly in English and it is easy for lecturers or instructors to use YouTube videos to discuss how operations management strategies are used by prominent global organisations. Without the use of YouTube videos, it would be difficult to introduce the global operations management system in a classroom based learning environment. One of the lecturers who has been using YouTube videos to encourage learning in classroom mentioned that:

> "…I frequently use YouTube videos to discuss case studies in the lectures and tutorials. I had used the following YouTube video in the lecture to discuss the difference between the concept of mission statement and strategy https://www.youtube.com/watch?v=qpt-eeH0Yfc. This video is based on the Regal Marine, a global boat manufacturing giant that has aligned its operations strategy to achieve its goals and objectives. Students were asked to explain the concept of mission statement and strategy after watching this video and they were able to do so clearly and link these two concepts to Regal Marine. Without using this video, they would not have been able to link the concept of mission statement and strategy to the local context but linking these two concepts to the international context would have been difficult…"

The instructors using the YouTube videos stated that videos that have voice and music is able to attract greater students attention than videos that does not have voice and music playing in the background. In an operations management class, some of the important companies that you would normally discuss are Hard Rock Café, Toyota, Arnold Palmer Hospital and Regal Marine. YouTube is one of the best multimedia platforms that has short videos on these global companies. These videos are easier for students to follow as it has pictures, cartoons, graphical and verbal narrative by the presenters. Another instructor teaching MBA courses stated that:

> "…I have noticed that while students are watching YouTube videos they also take notes, a practice that is common in a traditional classroom setting… "

Helps to deliver online and blended courses: Blended students enrolled at the University of the South Pacific usually do not have the privilege to meet their instructors face-to-face to discuss the course contents. Most of the students enrolled in the blended courses are not from the Laucala campus. There students are mainly enrolled in the regional centres and the blended courses are

mainly delivered by using the information computer technology. One of the lecturers teaching blended course mentioned that:

> "…regional students have limited access to meet their lecturers face-to-face to discuss the problems and issues that students may be facing in the course. The textbook used in the blended courses usually have a video case exercise that also stimulates students to use videos for learning purposes. This also probes students to supplement their learning with additional videos that they could find online, particularly on YouTube. The acceptance rate or the popularity of the YouTube videos is quite high amongst the students in the Pacific Island Countries…"

Additionally, students have also learnt how to integrate YouTube videos in their seminar and case study presentations. This requires an additional skill because when students try to integrate the videos with their case study or seminar presentations, they need to be able to pick out a relevant video that is directly related to their seminar and presentation topic. Another instructor teaching MBA course stated that:

> "…integrating videos for student teaching in the Master of Business Administration (MBA) class helps students to figure out how they can use videos for their own seminar presentations. It also retains student's attention and lectures are not monotonous. In this modern decade, students prefer digital means of learning which include online and mobile learning. Students can get videos instantly and this reduces the time taken by the students to learn a concept or an idea…"

Negative impacts of YouTube videos

There are also negative impacts of using the YouTube videos on students learning experience. These YouTube videos distort the student's ability to comprehend the audio and visuals captured in the videos and transform this into a learning matter[2]. Some of the YouTube videos are of poor quality and these videos may not be able to effectively enhance students learning. One of the lecturers teaching blended course mentioned that:

> "…YouTube videos that are of poor quality distort the student's ability to comprehend information and make meaningful judgements from it. Some videos have distorted images and sometimes the language of the characters in the video is not clear. This affects the student's ability to relate the contents of the video to the course contents…"

Secondly, some of the YouTube videos are from unreliable sources and since it is not moderated we cannot really be sure whether we can trust the contents of the YouTube video or we cannot trust the contents of the YouTube video. According to one of the lecturers teaching first year students at the University of the South Pacific mentioned that:

> "…if you are teaching first year students and if you encourage students to use the YouTube videos to learn about the course, it may prove to be difficult for the students to quickly adopt the multimedia. The students may not be able to learn effectively from the YouTube videos as they really do not know whether the contents are correct or incorrect. YouTube videos are not moderated or peer reviewed so it is difficult to determine whether the contents are correct or incorrect. Some videos are also from unreliable sources and have irrelevant contents…"

Thirdly, some of the YouTube videos are quite lengthy so incorporating it in the lectures is quite difficult. Incorporating the videos in the lecture notes requires the strategic ability of the lecturer

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[2] This means how students can learn from the YouTube videos and relate it to the course content.

to think about the issues related to the course content and identifying the video that best fits with the course contents. One of the respondents teaching postgraduate level course stated that:

> "…Some videos are lengthy therefore; it cannot be included in the lectures. Also some parts of the content of the video are irrelevant. When students use these videos for their seminar presentation, they select videos that are not related to their presentation. These videos when in cooperated in the lectures disrupt the flow of lecture…"

Theoretical implications of this paper

There are two important theoretical implications of this paper. First, this study supports the Cognitive Load Theory which states that students are able to relate the images, pictures and words in the YouTube video to the course contents. Students learn in a number of unique ways. Some students learn by listening attentively to the lecturer while other students learn via videos and images. Second, this study also highlighted that multimedia can have both positive and negative impact on the students learning experience. Poor video quality can distort the student's ability to relate the content of the video to the contents of the course. Conversely, if the contents of the video are of high quality, students will be learning immensely from these videos. This finding also supports the Cognitive Load Theory.

Policy implications of this paper

The findings of this research have policy implications for various stakeholders. Firstly, policy implication for the university administration whereby the administration can encourage academics as well as students to teach and learn via YouTube videos in cooperated in lectures and seminar presentations respectively. Secondly, this study also has policy implications for students, as students can use videos as a form of digital learning to understand the various concepts and theories relating to the course. Third, government should provide reliable internet connectivity and infrastructure in this digital era particularly in the regional campuses. For example, the move from 3G network to 4G network in Fiji was initiated by the government in terms of allocating various spectrums of the 4G network to various companies.

Conclusion and directions for future research

The main aim of this study was to examine the positive and negative impacts of using the YouTube videos in enhancing the students learning experience for the postgraduate and undergraduate courses at the University of the South Pacific. The findings from this study show that there are both positive and negative impacts of using the YouTube videos to enhance students learning experience. Some of the positive impacts of using the YouTube videos are that it is easy to follow and helps to deliver both online and blended courses while the negative impacts of the YouTube videos are of poor quality, unreliable and lengthy. Future researchers can also look at the impact of YouTube videos on foundation level students in similar geographical setting.

References

Boling, E. C., Hough, M., Krinsky, H., Saleem, H., & Stevens, M. (2012). Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *The Internet and Higher Education*, *15*(2), 118-126.

Bozalek, V., Gachago, D., Alexander, L., Watters, K., Wood, D., Ivala, E., & Herrington, J. (2013). The use of emerging technologies for authentic learning: A South African study in higher education. *British Journal of Educational Technology*, *44*(4), 629-638.

Bozalek, V., Gachago, D., Alexander, L., Watters, K., Wood, D., Ivala, E., & Herrington, J. (2013). The use of emerging technologies for authentic learning: A South African study in higher education. *British Journal of Educational Technology*, *44*(4), 629-638.

Denscombe, M. (2014). *The Good Research Guide: For Small-Scale Social Research Projects*. 5th Ed. Open University Press: McGraw Hill Education.

Duncan, I., Yarwood-Ross, L., & Haigh, C. (2013). YouTube as a source of clinical skills education. *Nurse education today*, *33*(12), 1576-1580.

Fried, C. B. (2008). In-class laptop use and its effects on student learning. *Computers & Education*, *50*(3), 906-914.

Gakio, K. (2006) "African Tertiary Institutions Connectivity Survey (ATICS) 2006 Report." Available at URL: http://www.gesci.org/files/Connectivity%20in%20African%20tertiary%20institutions.pdf.

Jaffar, A. A. (2012). *YouTube: An emerging tool in anatomy education. Anatomical sciences education*, 5(3), 158-164.

Khedo, K. K., Suntoo, R., Elaheebocus, S. M. R. A., & Mocktoolah, A. (2013). Impact of online social networking on youth: case study of Mauritius. *The Electronic Journal of Information Systems in Developing Countries*, *56*.

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010). Teens and mobile phones: Text messaging explodes as teens embrace it as the centerpiece of their communication strategies with friends. *Pew Internet & American Life Project*.

Limongelli, C., Lombardi, M., Marani, A., Sciarrone, F., & Temperini, M. (2016). A recommendation module to help teachers build courses through the Moodle learning management system. *New Review of Hypermedia and Multimedia*, *22*(1-2), 58-82.

Mayer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review*, 8, 357-71.

Mayer, R. E. (1999). Research-based principles for the design of instructional messages: The case of multimedia explanations. *Document Design*, 1, 7-20.

Mayer, R.E. (1989). Systematic thinking fostered by illustrations in scientific text. *Journal of Educational Psychology*, 81, 240-246.

Mayer, R.E. (1997). Multimedia learning: Are we asking the right questions? *Educational Psychologist*, 32, 1-19.

Palaigeorgiou, G., Triantafyllakos, G., & Tsinakos, A. (2011). What if undergraduate students designed their own web learning environment? Exploring students' web 2.0 mentality through participatory design. *Journal of Computer Assisted Learning*, *27*(2), 146-159.

Perryman, L. A., & Lesperance, J. (2015). Collaborating across borders: OER use and open educational practices within the Virtual University for Small States of the Commonwealth.. In: *Open Education Global Conference 2015*, 22-24 April, 2015, Banff, Alberta, Canada.

Porter, W. W., Graham, C. R., Bodily, R. G., & Sandberg, D. S. (2016). A qualitative analysis of institutional drivers and barriers to blended learning adoption in higher education. *The Internet and Higher Education*, *28*, 17-27.

Robinson, C. C., & Hullinger, H. (2008). New benchmarks in higher education: Student engagement in online learning. *Journal of Education for Business*, *84*(2), 101-109.

Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and inservice teacher preparation. *Journal of Teacher Education*, *54*(4), 297-310.

Sweller, J. (1988). "Cognitive load during problem solving: Effects on learning." *Cognitive Science*, 12(2), 257-285.

Sweller, J. (1989). "Cognitive technology: Some procedures for facilitating learning and problem solving in mathematics and science*." Journal of Educational Psychology*, 81(4), 457-466. doi:10.1037/0022-0663.81.4.457

Sweller, J. (1994). "Cognitive load theory, learning difficulty, and instructional design." *Learning and Instruction*, 4(4), 295-312.

Sweller, J., van Merriënboer, J. G., & Paas, F. C. (1998). "Cognitive Architecture and Instructional Design." *Educational Psychology Review*, 10(3), 251-296.

Tan, E., & Pearce, N. (2011). Open education videos in the classroom: exploring the opportunities and barriers to the use of YouTube in teaching introductory sociology. *Research in Learning Technology*, 19(1), 125-133.

University of the South Pacific. (2017). Pacific Islands Universities Research Network (PIURN).https://research.usp.ac.fj/?page_id=431

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Editor's Note: Foreign Language instructors have been early adopters of new technologies. Many have exemplary programs with advanced technologies that are highly effective. Read on . . . .

The effect of online learning on the German students' achievement in Arabic as a Foreign Language in the German Jordanian University

Rima Abu Omar, Thelallqab Oweis, Kawther Ali Qarrain
Jordan

Introduction:

Arabic is one of the most significantly prevalent world languages economically culturally educationally as well as politically, and has become more popular and widespread year after year as a result of a number of factors – both subjective as well as objective. Whereas the earlier include all the aspects related to the desire of those interested non-Arab to further delve into the science and indulge in the knowledge of the Arabic culture with its vast heritage, the latter is all manifested in the cultural, political and linguistic globalization in which language learning has become a distinctive characteristic of, not to mention its significance in, (1) the mutual understanding and the building of different means of communication and dialogue among various people and cultures, for the (2) aim of reaching a better understanding of today's world which is characterized by wealth, diversity and multi cultures, and as such, (3) language is the most prestigious means of communication. (Saudi Electronic University www.seu.edu.sa).

Furthermore, Arabic is one of the most widely spread Semitic languages in the world. As stated earlier, the Arabic language was learned only by researchers interested in languages but has become very important between (1883-1950) after which the United Nations issued an official resolution in (1973) making Arabic an official language along with languages including (English, French, Russian, Spanish and Chinese). In accordance with the Resolution number (3190/28/d) (United Nations General Assembly), Arabic is already considered an official language in 22 Arab countries and has spread in more than (30) Arab and non-Arab countries as a second language and is spoken by (256) million people around the world. Further, Arabic is also widespread in Europe and countries of North and South America, not to mention the (1.5) billion Muslims from around the world that use Arabic in their daily rituals in addition to it being the fourth language globally preceded by Chinese, Spanish and English and as such is considered one of the most important languages worldwide. (Albadri (www.lasportal.org)

More importantly, Arabic has had an enormous share of interest by researchers in this field due to the immense effect that this language has on learners of Arabic as a foreign language and is therefore of pressing need as it is considered the most fundamental means of communication and not only is it considered a standard for a new language acquisition, but is also closely linked to obstacles in academic achievements and can further lead to failures in all the other subject areas and can therefore influence the learner's self- competence. (Alsubaihi, 2015)

Jordan is probably one of the leading countries in drawing those interested in learning Arabic as a foreign language motivating them to choose it from among other destinations; especially since Jordan has both economic stability and security not to mention the hospitality and the welcoming nature of the Jordanian people which makes it easier for foreign learners to approach and interact with them naturally in an unprecedented way. Regardless of the motive for learning Arabic, these learners' display of interest in the Arabic language increases the value and significance of the language especially since it is the core of the Arabic and Islamic culture as well as it religious and scientific heritage and the reference for the lexicon of the history of our culture and civilization. (Al-Anati, 2009).

Furthermore, Jordan was also a pioneer in the field of teaching Arabic as a foreign language on different levels. One example would be the classrooms for teaching Arabic to foreigners that were opened in the universities' language centers where not only are the four language skills taught but also colloquial Arabic spoken by Jordanians on daily basis using cutting-edge technology based classrooms in addition to organizing orientation programs in order to introduce tourist sights, ancient places and all the modern advancements that Jordan has encountered in the different fields (Alkhawaldeh et al, 2014). The German Jordanian University is yet another shining example as it supports Jordanian German relations especially in academic collaboration found in a number of joint programs between the GJU and a 132 other universities in Germany where teaching Arabic is one of the major features of such collaboration. The GJU, represented by both the School of Applied Linguistics and the Consultation Center' established the Arabic Language and Culture Program in 2014 in collaboration with the German Committee for Academic Exchange (DAAD) and the university of (Bochum) which supervised the launching of the program in 2014.

German students from various German universities come to Jordan to learn both standard as well as spoken Arabic for different majors including: Arabic Language and Literature, Islamic Studies, Middle Eastern Studies and Eastern Studies. Standard Arabic is taught inside the classroom, i.e., using traditional methods four days a week. This same method of instruction was used when teaching spoken and standard Arabic along with a website link called (ArabiyahAlnas) comprised texts, audioscripts and a variety of individual activities.

The problem of the study

Not only does Arabic signify an Arabic/Islamic culture and ancient civilization, it is also a living contemporary language that represents a large fraction of the human society in a geographically dynamic region of interest to the rest of the world. Due to the increasing demand for learning Arabic on the part of speakers of other languages for a variety of reasons, be it political, diplomatic, economic, religious, cultural, educational, or merely for tourism and communication, there is a pressing need on the part of educators to observe the teaching of Arabic as a foreign language from another perspective where the focus is on the notion of scientific development of our curricula as well as the methods and tools used in teaching, not to mention providing a proper classroom environment beginning with computers to the internet and up to the stage with the term teaching technology which is dependent on the use of modern technology to present the content effectively and smoothly. Henceforth, the researchers took it upon themselves to offer in-depth objective research that provides learners of Arabic as a foreign language with new and valuable tips.

With the spread of modern technology and social media, communication among countries and nations has become easy making it inevitable for countries to detach themselves from this globalized world, thus governments around the world acknowledge the necessity to teach their citizens foreign languages especially the booming ones that are spoken by a large number of people and recognized internationally like the Arabic language which is one of the ten most common languages in the world. (Nicholas and Putros, 1994).

There is no doubt that technology as a whole can be vital in providing innovative solutions to a variety of problems in teaching Arabic as a foreign language, and in order to enhance education and its effectiveness for this time and age, such solutions have emerged from the information revolution and the development in education and communication sciences manifested in various theories and strategies within the framework of teaching Arabic as a foreign language.

Questions of the study:

The study sought to answer the following questions:

1. Are there any statistical differences in the students' level of learning Arabic as a result of the online and the traditional teaching methods used?

2. Are there any statistical differences at $(0.05=\alpha)$ in the students' level of learning Arabic as a result of the gender and major variables?

Purpose of the study:

This study aims to achieve the following:

1. Present the German Jordanian University's (GJU) hands on experience in online learning.

2. Promote the level of the Arabic language of speakers of Arabic as a foreign language enrolled in GJU.

3. Identify advanced and up-to-date means of teaching Arabic as a foreign language using online methods.

4. Explore the students' attitude towards online teaching which can directly impact their creative thinking and individual learning.

5. Identify particular obstacles which can limit the use of online methods for language learning and henceforth find possible solutions to overcome such barriers in the educational system.

6. Develop the field of teaching Arabic for non-speakers in light of all the successful experiences with respect to *international* vs. *Universal* accreditation.

Significance of the Study

The importance of this study is manifested in the following points:

- Presenting well-planned principles in the area of Arabic for foreign learners, as well as aiding learners to acquire the language naturally and smoothly utilizing modern methods.

- Assisting those in charge with the implementation of curricula and the organization as well designing of training courses, not to mention opening new horizons to learners using current methods.

- Developing students' tendency towards free reading- a great way to spend some leisure time and learn Arabic using a less traditional way.

Limitations of the Study

The study has the following limitations:

Temporal limitations: this study was carried out during the year 2015/2016

Spatial limitations: This study is limited to GJU's School of Humanities and Applied Languages and Consultation Center.

Population Limitations: The sample of the study carried out was limited to learners of Arabic as a foreign language enrolled in different departments at the School of Humanities and Applied Languages as well as the Consultation Center of GJU.

Terminologies of the study:

Online Learning: Carliner (1998) defines Online Learning or e-learning as learning using the computer or using resources from the computer to facilitate the teaching/learning process whereby the computer replaces both the textbook as well as the teacher in that it presents the

proper material on the screen at the request and demand of the student once they enter the required data. Although the content and supplementary material presented by the computer may be easy to follow as in the case of traditional methods, it is displayed in a computerized way and may appear in the form of a text, a drawing, an image, animation, audio, visual and or both. Online learning can also take place via scheduled videoconferencing similar to that of a traditional classroom, or a page on the internet with supplementary material including video of previous lessons, outside of class online discussions as well as online exams with the results entered electronically into students' records.

The German Jordanian University: One of the governmental universities founded by the collaboration of the Jordanian and German Governments (2005). The university was mainly established in order to offer cutting-edge education on the undergraduate level, and is financed by the Jordanian government with financial support by the German government. With a student body of almost 5000, a fairly small percentage are German exchange students, the university offers more than 20 both undergraduate and graduate programs.

The Arabic Language and Culture Program: a program introduced in GJU's School of Humanities and Applied Linguistics and the Consultation Center in 2014 in collaboration with the German Committee for Academic Exchange (DAAD) and the German University of (Bochum) which supervised the launching of the program in 2014. The primary goal of this program is to raise the language level of the students using an intensive four-day weekly program with 90 minutes per day not to mention a weekly cultural program that also aims at orienting these student with the Arabic culture by accompanying them on various visits and field trips. The program also offers a weekly discussion seminar where German students get the chance to discuss issues in Arabic with a group of students from GJU who have interest in the Arabic language and who are members of the Arabic club at the university called (ALDAAD) Club.

Learners of Arabic as a Foreign Language: They are German students enrolled in a number of programs at GJU and are learning Arabic as a foreign language.

Theoretical background and review of related literature:

There has become a pressing need for new strategies that would shift the current educational system to fit today's fast track technological and scientific advancements, which impacts education and further imposes burdens and demands on individuals to acquire the skills necessary to enhance performance and also on a national level where education becomes an unnegotiable right contributing in the ongoing of national efforts towards growth and expansion. (Altabbakh & Alhadi, 2005). As a result, a number of new teaching methods and tools appeared including (E-Learning) which involves the use of modern communication tools like computers networks; audio, visual, graphics and electronic libraries whether distance or during the semester, i.e., using all sorts of technology in order to facilitate the teaching-learning process (Almusa & Mubarak, 2005).

Further, the use of technology has helped those interested in teaching Arabic to realize the need for teaching techniques to further explain new words and sentences. This results in a more interesting and exciting atmosphere where language is no more perceived as a set of grammatical rules and random symbols, but is rather a living thing used on daily basis. These techniques are referred to visual, audio, and audiovisual depending on the senses being used (Deeb, 2012). Some examples of visual techniques are images and graphics and teaching boards like pocket board, flannel board, magnetic board, maps and slides. The audio techniques however include audio recordings like language labs, audiotapes and CDs. As for the audiovisual techniques, as the term suggests, include media that require both hearing and vision like television programs, interactive computer programs and video programs. The language teacher should be eclectic with

the methods using a solid foundation by specifying the goals of the class as well as knowing the extent as to which these tools can contribute in achieving these goals. (Alqasimi, 1991).

Some of the audio tools that can be used by language teachers include sound tracks, images, graphics, cards, boards and audio recordings; which is the most one used for the listening skill amongst others like language games, images, drawings, role play, signs and symbols. As for the speaking skill, not only are listening and language games used, but also activities like field trips, images, slides, movies are also used as they improve speaking activities which include mimicking and repeating. As for the last skill which is the writing, the teacher depends on the traditional board and the visual one both of which are major tools in acquiring the skills of writing. (Sini, 2009, 172-213).

On a different note, Alsallameen (2015) has conducted a study which aimed at finding the effect of a proposed program using social media in teaching reading comprehension to non-speakers Arabic. The sample of the study was made up of (15) students of Arabic as a foreign language enrolled in level 6 at the Language Center of the University of Jordan. The tools that were used in the study was a reading comprehension test, and a teacher's guide (using Facebook and Skype), and results showed significant differences at a <05 between the means in the students' ability to read in the pre- and posttests as a result of the proposed program which would use social media in teaching reading comprehension to non-speakers of Arabic.

Deeb (2012) conducted a study to find out the extent as to which the teaching techniques are applied in the actual teaching process using a pilot study on the students enrolled in Arabic as a foreign language M.A. program in the Language Learning Center in Damascus and the degree of its success as well as their own views on these tools as to help decide what tools are most beneficial and suitable for their academic levels. To achieve the goals of the study, a survey was done on the students enrolled in the Arabic as a foreign language M.A. program of their own view on the degree of employing such techniques in the teaching process. After testing the validity and credibility of the survey, the study was conducted on a the sample group of 14 students who represent all the students enrolled in the same program and results showed that the teaching techniques were barely used by the teachers in any of the courses due to the scarcity of the necessary equipment which means not using it effectively.

In his study conducted in (2008), Alzu'bi investigated the effectiveness of an educational program in developing both the listening as well as reading comprehension skills of the advanced level students of Arabic as a foreign language at the University of Jordan. The researcher used a semi-experimental method on a sample of 21 students using a listening and reading comprehension achievement test, and the program was done over two months at the university's Language Center. To analyze the data, ANCOVA was used and the results showed significant differences at a <05 between the means of the samples of the study in the reading comprehension test of the experimental groups.

Other studies have been done in related areas. Aljarf (2006) for example conducted an undergraduate level in Saudi Arabia using a sample of 113 female freshmen students (English majors) at King Saud's department of Languages and Translation. The students were distributed into a control group of 51 students enrolled in Writing I during the spring semester of 2001 and were taught using traditional methods, and an experimental group made up of 62 students enrolled in Writing I during the Fall Semester of 2002 who unlike the control group were taught using both online as well as traditional methods. Results showed better results on the part of the experimental group that was taught using both methods than the control group which was taught using traditional methods and thereof, the study recommended integrating online courses in Saudi Arabia's universities in order to keep with the technological developments as it has been proven

to improve students' performance and motivation for learning when used hand in hand with the traditional methods inside the classroom.

Kim Jo (1993) has also done a study titled "Teachers' qualification in Present Day use of educational technology in the Korean High School, and their attitudes well as the obstacles they face when using it. The aim of the study was to see to the degree of teachers' realization of the concept of educational technology and its actual implementation in the high school along with their attitude towards its use. Results showed that teachers have very low and/or an inability in some cases of using technology inside the classroom despite most of the teachers' positive attitude towards the crucial and significant role technology plays using the attitude scale designed by the researcher.

Methodology of the study:

This Chapter tackles a thorough description of the study' sample and methods used to test the sample and the statistical methods as well. The researchers used a semi-experimental design which is characterized by a randomized control-group post-test (Alzoba'ii et al, 1981); a design composed of two groups; control and experimental, and was conducted on German students enrolled in one semester of the Arabic Language and Culture Program the GJU. The experimental group was taught using an online book called Arabiyat Alnas (www.routledge.com/cw/vounes) which is used teach colloquial and modern Arabic whereas the control group was taught using the traditional method and the same book "ArabiyatAlnas" along with worksheets distributed among the students during their classes.

Participants of the study

The study comprised all the German students enrolled in the intermediate level of the Arabic Language and Cultural Program in the German Jordanian University in Jordan.

Sample of the study

The sample of the study was selected systematically in order to control the other variables. 2 out of the 4 intermediate classes were selected. The sample of the study was composed of (30) students, distributed equally into them control and the experimental groups. The experimental group of non-Arab students was taught using online methods whereas the control group was given the same course using the traditional method, i,e, textbook, class discussions and worksheets.

Instruments of the Study

The following tools were used in the study:

Pretest

Posttest

Procedures of the study

In the classrooms where the experiment was to be conducted, an achievement test composed of 30 multiple choice paragraphs was distributed to the sample of the study before the start of the program to see the pre knowledge equivalence between the two groups.

The study was conducted over a period of a month from 10-16-2016 till 11-13-2016 distributed into 4 weekly lectures; 45 minutes each, with various topics including (the Arab world, cities, the Arabic language, health, travel and transportation.)

Design of the study:

The study was comprised the following variables"

Independent variables

Teaching methodology: two methods of teaching were used including the traditional method using the textbook and the online method using the computer and the website of the book ArabiyatAlnas.

Dependent variables:

Students' achievement on the posttest.

Controlled variables

Academic Level of students: Intermediate

Course Content

Reliability and validity of the test:

To confirm the reliability of the test, it was presented to experts in teaching Arabic as a foreign language from Shatha Almashriq Center which already collaborates with GJU in the same field. The teachers at the center reviewed the test and modified and edited some paragraphs creating a final version composed of (30) multiple choice questions.

To ensure the validity of the test, it was done through giving the pretest to a pilot sample of (30) students from the same university and repeating the same test almost one month later (Posttest). The validity of factors were calculated using Pearson Correlation and came out to (0.80) which was considered correlative with the study.

Results and discussion of the study:

The present chapter is composed of an outline of the results of the study in order to identify the effect of online learning on the achievement of the German students learning Arabic as a foreign language in the German Jordanian University. The results are laid out according to the questions of the study:

Question One: *Are there any significant differences at (a=0.05) in the German students' degree of learning Arabic as a result of the online teaching method and the Traditional method?*

To answer this question, the means and deviations of both groups (control) and (experimental) were calculated and an (ANCOVA) was applied on each in the posttest whereof the control group used the traditional method while the experimental group used online teaching methods as illustrated in Table (1-2):

Table 1
Means and standard deviations of pre and posttest scores
for control and experimental groups.

Test		Pretest			Posttest
Teaching method	**number**	**Mean**	**Standard deviation**	**Mean**	**Standard deviation**
Traditional (control group)	15	16.333	3.539	18.333	3.309
Online method (experimental group)	15	17.000	2.803	23.800	2.678

Table 2
ANCOVA for overall scores of the posttest between
control and experimental groups

Source	Sum of squares	Df	Mean Square	F	Sig	Partial n
Pretest	185.935	1	185.935	74.047	0.00*	0.012
Method	180.073	1	180.073	71.712	0.000*	0.685
Error	67.798	27	2.511			
Total	13792.000	30	13972.000			
Fixed Total	477.867	29	477.867			

Coefficient (=2R0.848)
*statistically different at=0.05

Table 2 illustrates the value of f(71.712) which is statistically significant at (a=0.05) which shows statistically significant differences (a=0.05) in the learning level of the German learners as a result of the online as well as the traditional methods with a mean square of(23.800) for the online method while it was (18.333) for the traditional method.

To calculate the difference in the achievement of the German students on the Arabic test as a result of E-learning, the ETA square (Effect Size) was (0.685); which is relatively high and shows that E-learning method has a rather positive effect on the Arabic test scores of the experimental group. To calculate the scientific significance of the differences between the pre and posttests which show the effect of the E-learning method on the variance between the control and experimental groups on the Arabic test, the coefficient (2R) was calculated at (0.848) which is relatively high, i.e., using E-learning in teaching has contributed in (84.8%) of the improvement in the Arabic test scores of the experimental group. It is worthy to note that the results of this study correlate with those of Alsallameen(2015), Deeb(2012), Alzu'bi(2008) and Aljarf(2006) all of which have shown improvement in the students' achievement via E-learning as well as their motivation towards its use, which reaffirms the effectiveness of E-learning in enhancing students' learning of Arabic especially since it provides them with the opportunity to learn smoothly and further enables them to effectively acquire and apply new concepts. (Meloni, 1999) maintains that using the internet in the English as a foreign language classrooms increases students' motivation to learn and also provides them with a hands on experience of the language, not to mention broadening their horizons and further reduces the dependence on paper for learning. What most distinguishes E-learning is its flexibility and the opportunity it offers in language enrichment and revision as well as enabling teachers to use eclectic methods such as simulation, learning through exploring, experimental learning, and individual therapy (Carliner, 1998)

It is worth noting that the designing and developing of electronic Arabic Curricula will on the one hand provide learners with opportunities to develop their language abilities and skills and further offer an educationally independent and comfortable atmosphere outside the realm of the classroom as there is no need for the student to practice his/her language in front of other classmates and hence prevents any embarrassment that may ensue; especially weak students facing difficulties in language learning inside the classrooms with the more advanced fellow classmates. More importantly, this technique boosts student's self-confidence and enables them to use numerous lexicon and linguistic expressions and further allows instant personal feedback which can contribute in motivating individual learning in a relaxed and less complex atmosphere thereby giving more room for self-development with the freedom to choose the time and place.

Question Two: Are there any significant differences at (a=0.05) in the German students' degree of learning Arabic due to gender and field of study?

To answer this question, the means and deviations of the groups' test scores were calculated and an (ANCOVA) was applied on the posttest based on the variables of the study (Gender and Field of Study) as illustrated in Tables (3-4).

Table 3
Means and standard deviations of pre and posttest scores
for control and experimental groups.

Test			Pre		Post	
	Variable	#	Mean	StdDev	Mean	StdDev
Gender	Male	14	17.357	2.499	21.429	3.275
	Female	16	16.063	3.605	20.750	4.726
⎮Major	Middle Eastern Studies	5	16.60	3.91	19.80	6.42
	Orientalism	11	15.73	2.97	19.18	3.46
	Islamic Studies	8	17.25	2.87	23.13	3.44
	Middle Eastern Cultural Studies	2	20.00	1.41	22.50	.71
	Universal Development Studies	1	21.00	-	21.00	-
	Arabic	3	15.00	3.00	23.67	1.53

Table 4
ANCOVA for overall scores of the posttest based on gender and major variables

Source	Sum of Squares	DF	Mean Square	F	Sig
Pretest	204.349	1	204.349	33.549	*0000.
Gender	1.455	1	1.455	0.239	0.630
Field of Study	112.092	5	22.418	3.681	*0.014
Error	134.003	22	6.091		
Total	13792.000	30			
Fixed Total	477.867	29			

Coefficient (=2R0.632)
*statistically different at=0.05

Table 4 illustrates the following:

1. The value of "F" for the posttest based on the (field of study) variable is (0.630); a statistically insignificant amount at (a=0.05) which shows statistically insignificant differences (a=0.05) in the learning level of the German learners as a result of the (Gender) since both male and female students were exposed to the same learning environment and given equal learning opportunities.

2. The value of "F" for the posttest based on the (field of study) variable is (3.681); statistically significant at (a=0.05) which shows statistically significant differences (a=0.05) in the learning level of the German learners as a result of their (field of study). To identify which group the differences were in favor of, the researchers used Table (3) which illustrates the means and standard deviations for the fields of study showing differences between (Orientalism) and (Arabic) and was in favor of (Arabic) with a mean of (23.67) whereas it was (19.18) for (Orientalism) which interestingly proves that the students majoring in Arabic as a foreign language are more engrossed and immersed in their field since the content they study is the core of their majors, and as such, they are in pressing need for modern tools to help them master the Arabic language smoothly.

Recommendations:

Any development in the Arabic as a foreign language curriculum, teaching methods and learning techniques used depends on the use of technology which requires using modern techniques in order to provide learners with an effective and efficient educational content.

Moreover, online teaching mechanisms and tools play an important role in the teaching and learning processes as they are both a means to an end if selected and utilized effectively by the teacher and can result in tremendously positive outcomes in the educational system as a whole.

Based on the previous positive results of the study, the researchers have come up with the following recommendations:

1. Improving the qualifications of the teachers of Arabic as a foreign language through training them to use modern online tools and providing them with intensive courses in computers and online distance learning to be used as a primary source of teaching. Further, teachers should be trained to design and produced their own multipurpose intermediaries such as drawings and scripts.

2. Allocating a specific budget for up-to-date learning technologies for all universities and further encouraging decision makers at these institutions that offer Arabic as a foreign language to implement strategies and teach tactics as well as oversee the execution of these strategies in order to instill the culture of technology in teachers.

3. Incorporating a system of internet clubs as well as workshops and seminars into the educational due to the significant roles these tools play in increasing students' interest in the course subject as well as providing learners of Arabic as a foreign language with advanced interactive online education.

4. Sustaining communication; cultural and educational within the Arab region and also with those of other cultures to exchange knowledge in order to re-demonstrate the moderation of the Arabic language and Islam.

5. Introducing the Arabic language as a foreign language in its contextual framework including everyday language used by individuals in the society.

6. Develop the field of teaching Arabic for non-speakers in light of all the successful experiences both locally as well as internationally and also with respect to the international and universal accreditation.

7. Bringing forth the Arabic language in the Arab world through delving it deep into the scuffles of technology in order to thoroughly study and implement it in a way that would enable us to yield Arabic featured generations of technologies that support the spread of the Arabic language and regain its status in the world especially after the reports issued by UNESCO confirming that Arabic is among the languages that might be endangered in 2021.

Arabic References:

Albadri, Isam (D.T) "The History of the Arabic Language Accreditation in the United Nations." Retrieved 15 October 2016: www.lasportal.org

E-Learning University. "Arabic Language Distance Learning using Modern Techniques via an Interactive Curriculum." Retrieved 13th October 2016: https://www.seu.edu.sa/sites

Aljarf, Rima S. (2006). "The Effectiveness of E-Learning in Teaching University Level English in Saudi Arabic", Education and Psychology, Issue No. 26

Alkhawaldeh, M. A. Al Aljarrah and F. Alrabii"The Drive for Learning Arabic as a Foreign Language in Jordan, and its Connection with Certain Variables." The Jordanian Journal of Educational Science, Vol.10(2), pp191-204

Deeb, Awsaf (2012) "The Reality of Implementing Learning Techniques in the Arabic as a Foreign Language M.A. Program: a Future Vision for the Educational Techniques Terms," Damascus University Journal, Vol. 28(2)

Alzobaii, A. et el, (1981). "Research Methodology and Curriculum in Education," The Faculty of Education, Baghdad University.

Alsalameen, M.A. (2015). A Survey of the Effect of a proposed program using Social Media to teach Reading Comprehension to learners of Arabic as a Foreign Language in al-Hussein Bin Talal University. (Unpublished Master's Thesis).

Alsubaihi, Ahmad B.S. (2015). The Strategies of Reading Comprehension of Arabic as a Foreign Language Learners. Retrieved 10th October 2016, From: http://www.alukah.net.library/0/83122

Sini, M.I. (2009). A Study of the Methods of Teaching Foreign Languages. An Introduction in a Seminar entitled: Teaching of Arabic as a Foreign Language convened in AlmadinaAlmunawara from 1-7 Jamadiawal, the Arab Office of Education for the Gulf Countries.

Altabbakh, H. Alhadi, M. (20q05). The Strategy of Developing and Managing the Electronic Course Content in accordance with the Available learning standards. A Research paper presented to the 12th Annual Conference of Information and Computer Technology, alsadaatAcademy for Management Sciences, Cairo, February 15th-17th.

Alanati, Walid.(2009). "Noon waAlqalam" for Arabic as a Foreign Language: a Linguistic Study. Um Alqura Journal of Linguistics. Issue No (2), 112-152

Alqasimi, Ali and M. A. Alsayed. Educational Techniques in the Teaching of Arabic as a Foreign Language, The Brochures of the Islamic Organization of Education, Science and Culture, Isisco

Almusa, Abdullah and A. Mubarak. (2005). E-Learning, Origins and Applications. Riyad: King Fahed's National Library.

English References:

Carliner, Paul. (1998). An overview of online learning. VNU Business Media

Kim ,Joo. (1992). Instructional Technology in Korean Secondary School .Study of Current Utilization, Needs Attitudes and Problems Diss , abs ,int. http://www.it.coe.uga.edu/selfstudy. 15/3/2010

Meloni, C. (1998). The internet in the classroom. ESL Magazine, 1, 1, 10-16.

Nicholas,A & Putros, S. (1994)attitudes and motivation in second language learning (22).1-17.

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Peer mentoring program: empirical evidence and analysis from South Pacific region

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Abstract

This paper explores the advantages and disadvantages arising from the senior peer mentoring programme at the University of the South Pacific. The research findings reveal the following as the main advantages of the peer mentoring programme: increase in the number of students who are attending sessions in the programme, the number of mentees who manage to pass their courses is relatively high; and peer mentoring has assisted possible failing students to get a minimum pass grade (C grade) after attending the peer mentoring sessions. The disadvantages are: the programme is not sustainable for high achieving students (A or A+ grades); peer mentoring programme has low popularity with mentees from certain disciplines, and students undertaking courses which do not have mentors are disadvantaged. This paper, by examining the senior peer mentoring programme at the University of the South Pacific, contributes to existing literature on student learning support mechanisms.

Keywords: senior peer mentoring, student learning, advantages, disadvantages, poor performing students, pass rates, policy implications, University of the South Pacific.

Introduction

Many universities have student support programmes that assist students to complete their studies and one such programme is 'peer mentoring'. Literature over time continues to show that many students tend to face difficulties in their transition from high school to tertiary education (Tinto, 1993; Wangeri, Kimani, & Mutweleli, 2012; Sotardi, Brogt, et. al., 2016). One reason attributed to this is that the manner of learning and teaching in the two environments is quite distinct. In the South Pacific, high schools tend to be teacher centred (Taufe'ulungaki, 2003). This encourages 'spoon-feeding' of students (Landbeck & Mugler, 1994; Latu & Young, 2004) and reliance on rote learning and memorisation (Phan & Deo, 2008). Tertiary environments on the other hand expect students to demonstrate a certain level of autonomy in their learning and thus benefit those students who are able to display this characteristic. Students who do not possess such traits tend to perform poorly in their courses and may even be at risk of dropping out.

The student peer mentoring programme benefits a number of stakeholders. Firstly, it provides academic support to 'mentees' who require additional support with their studies. Secondly, it upgrades mentors' skills (Beltman & Schaeben, 2012) and thirdly, it raises the quality of education at 'tertiary institutions'. Such a programme exists at the University of the South Pacific (USP) and this paper examines the advantages and disadvantages of the programme at USP, and explores whether peer mentoring programme helps weak students to pass and average students achieve a higher grade.

Background:
Overview of thesenior peer mentoring in University of the South Pacific

The University of the South Pacific is regional university comprising twelve member countries, namely, Fiji, Tuvalu, Vanuatu, Tokelau, Cook Islands, Solomon Islands, Niue, Samoa, Kiribati, Marshall Islands, Tonga and Nauru (The University of the South Pacific Calendar, 2017). The University has three campuses (Fiji, Samoa, Vanuatu) and nine centers spread across the South Pacific. USP has three faculties namely, Faculty of Business and Economics (FBE), Faculty of Science Technology and Environment (FSTE), and Faculty of Arts, Law and Education (FALE).

The 'Senior Peer Mentoring' (SPMP) at USP was established in 2006 by the Center for Excellence in Learning and Teaching (CELT), the learning support section in USP. The section is located at USP's main campus - Laucala in Fiji Islands. The title CELT was changed to its present name Student Learning Support (SLS) around 2009 and SLS was decentralised into each of the three faculties. As such each faculty has its own student learning support centre and its own peer mentoring programme.

The Senior Peer Mentoring programme at USP relies on group collaborative activities during the facilitation of sessions. The mentors (senior students who have successfully completed the course) provide assistance to their mentees (students who are currently enrolled in the course).The mentors do not tutor or teach students but rather create awareness on academic skills relating to the subject such as assignment unpacking, problem solving strategies, argument development and the like.

Literature review

Given that the main aim of the paper is to explore the advantages and disadvantages of the peer mentoring programme, this literature review will focus predominantly on the advantages and disadvantages of the programme to mentees. This section consists of two sections. The first addresses the advantages of peer mentoring to 'mentees'. The section on disadvantages of the programme to mentees follows next.

Literature review: advantages to mentees

There are a number of advantages of the peer mentoring programme to the 'mentees'. Firstly, the peer mentoring programme enriches mentees to upgrade their 'academic knowledge', guides them on how to tackle their assignments and projects as per course expectations, learn how to make power points for seminar presentation and prepare for tests and final exams in order to pass their courses (Dearlove, et al., 2007; Darwin & Palmer, 2009). Peer mentoring is more helpful for students who are academically weak and are at risk of failing their courses (Dearlove, et al., 2007). Beltman & Schaeben (2012) suggests that such programmes are platforms for additional academic support for students. Secondly, mentees are able to learn helpful academic skills from senior students who have done the course before (Limbert & Summer, 1995; Taherian & Shekarchian 2008). Mentees feel comfortable and are at ease with senior student mentors who are at their level. This is different from formal teaching used by tutors and lecturers. Thirdly, Dearlove et al., (2007), and Darwin and Palmer (2009) argue that the peer mentoring programme enhances 'collective learning' between senior and junior students throughout the University. Mor over, peer mentoring is flexible with the time and commitment as mentees can attend the sessions when they do not have classes or other commitments. Furthermore, peer mentoring programmes help underperforming students to complete their studies in a tertiary institution within the normal period and enter the labour market (Canter et al, 2012; Andrews & Clark, 2011). This saves money (tuition fees, books, etc.) for students, their parents, or government scholarship funding. Andrews and Clark (2011) evaluate the need to retain university students in Higher Education Institutions, due to the affordiability issue and they suggest the use of peer mentoring as the

solution. Another advantage is that the peer mentoring programme provides students with skills to look for job opportunities and career development (Mavrinac, 2005; Canter, et al., 2012). The advantages of mentoring according to Mavrinac (2005) are job satisfaction, career advancement, psychological well being and professionalism for mentees. Moreover according to Smailes and Gannon-Leary (2011) the 'virtual online' peer mentoring programme (non-face-to-face) is without boundaries and it can be used at home or any place where internet is availiable and students can learn from recorded peer mentoring sessions . Finally, since 'online' peer mentoring sessions are recorded, it can be watched or used as many times as students like.

Literature review: disadvantages to mentees

As there are two sides to a coin, peer mentoring also has its disadvantages. Firstly, one of the significant challenges with peer mentoring is 'maintaining the relationship between the mentor and the mentee' (Colvin & Ashman, 2010; Ehrich & Hasford, 1999; Heirdsfield, et al., 2008). Colvin and Ashman (2010) argue that assumptions should not be made about understanding of the roles, risks and benefits involved in such relationships. The challenge of peer mentoring is to maintain the relationship between the mentor and the mentee. (Colvin & Ashman, 2010). Any disagreements between the mentor and the mentee will tarnish this relationship (Ehrich & Hasford, 1999). Conflicts can arise between the mentors and the mentoring supervisor, there can be confidentiality breaches, the mentors can practice nepotism, there could be lack of active listening, and the roles could be misunderstood (Taherian & Shekarchian 2008).When mentees tend to lose interest and disengage themselves this will also harm the relationship (Heirdsfield, et al., 2008).

The second disadvantage is that in the 'eMentoring' and 'virtual online' peer mentoring programmes there is 'no face-to-face discussion' and this makes 'mentoring difficult' (Penny & Bolton, 2009; Darwin & Palmer, 2009; Smailes & Gannon-Leary, 2011). Penny and Bolton (2009) examined eMentoring between teachers and urban high schools in USA and found that there the absence of face-to-face contact proved to be a limitation for the eMentoring project. Darwin and Palmer (2009) studied 'virtual online' peer mentoring programmes and they argue that there is no one-to-one discussion in the 'virtual online' peer mentoring programme. The disadvantage of online peer mentoring programmes could be that students do not have face-to-face contact and the programme is not participatory (Smailes & Gannon-Leary, 2011).

Mentees are also disadvantaged if 'mentors lack mentoring skills' such as communicating effectively which affect student learning (Husband & Jacobs, 2009; Terrion & Leonard, 2007; Dearlove, et al., 2007). Also, mentees may expect too much from the mentors but are disappointed when mentors do not fulfil their expectation. As a result, mentees are not able to get all the benefits of the mentoring programme or session. This can be avoided by properly recruiting and selecting mentors, training them and monitoring their performance on a regular basis (Terrion & Leonard, 2007). In addition, peer mentoring sessions are not like tutoring as they focus on mentors facilitating group discussion but more emphasis is given to collective discussion between the mentees (Dearlove, et al., 2007).

Fourth, conflicts between mentor meetings and other lectures and/or tutorials (Glaser, et al. 2006) can dissuade mentees from attending sessions regularly which in turn impacts their overall performance. Furthermore, peer mentoring programme can be a time consuming event as mentoring is time consuming for both the mentors and the mentees (Bryant & Terborg, 2008; Allen, et al., 2004). An extra hour has to be taken out to attend the sessions. Due to this mentoring be can stressful to both parties and time needs to be managed properly to avoid this (Allen, et al., 2004). Moreover, mentees might withdraw from mentoring programmes should they start receiving support from other students such as their peers in class.

Finally, the lack of face-to-face contact and group learning is another drawback (Smailes & Gannon-Leary, 2011). The lack of resources and guidance when needed serves as a disadvantage of peer mentoring programme to students (Heirdsfield, et al. 2008; Darwin & Palmer, 2009). Adequate resources are a challenge for colleges as well as finding appropriate mentors (Darwin & Palmer, 2009).

Methodology

This paper has used both quantitative and qualitative methodologies to collect data. For quantitative approach we used longitudinal set of data for the period 2014-2016, from the Student Learning Support (SLS) section of the Faculty of Business and Economics at the University of the South Pacific and these are reflected in the tables and graphs in the research findings section later in the paper. For qualitative research we interviewed key stakeholders; namely mentees, mentors and faculty teaching staff. We designed semi-structured questionnaire which we used for interviewing mentees, mentors and faculty teaching staff. This qualitative approach enabled us to gather rich quality information to supplement the quantitative data. Additionally, since one of the authors is a full time staff at the Student Learning Support (SLS) at the University of the South Pacific, she availed inside information and interpretations which provided more richness to the research findings.

Research findings: advantages and disadvantages of peer mentoring

The research findings of the Peer Mentoring Programme at USP unravel both advantages and disadvantages and these are discussed next.

Research findings: disadvantages of peer mentoring programme at USP

The peer mentoring programme conducted by the Faculty of Business and Economics (FBE) has a number of advantages. The programme provides opportunities for students to work on peer led activities. These peer leaders or mentors have already completed the course successfully and pave the way for new students in the course. As such, information on how to address the requirements of the course, how to approach problems such as calculations, and tips on answering questions, are some aspects discussed during mentoring sessions. In the following sections, three positive outcomes of the peer mentoring programme at FBE will be discussed.

Firstly, the research findings show that an overarching positive feature in the programme has been the increase in total mentee numbers. The data (graph 1) shows that the period 2014–2016 demonstrates a marked growth in total mentee numbers.

	2014	2015	2016
Semester 1	663	818	880
Semester 2	510	513	755
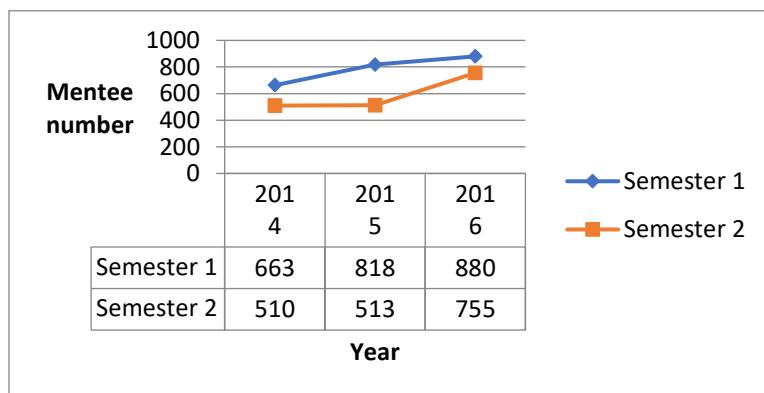
Graph 1: Growth in total number of mentees: 2014-2016
Source: Data- USP SLS Peer Mentoring Records: 2014-2016

The general increase in mentee numbers over the 3 years suggests that the programme has been effective for the students (mentees). Thus, it may be that after noticing possible impact of attending sessions on their course grades, students have returned for mentoring in subsequent courses and may even recommend the programme to other students. Interviews with mentees substantiate this whereby students recommend the programme to incoming students from same home countries and same ex-high schools. This indicates that students do look out for each other and do point out support programmes that can be useful to their friends. Student Learning Support (SLS) in FBE has, on numerous occasions, been approached by Student Association groups to inform and promote the programme to incoming students about their peer mentoring programme. It is also possible that marketing strategies used by current mentors and encouragement from lecturers have attracted students.

Secondly, the research findings show that the total number of mentees who have been successful in passing their courses is relatively high in comparison to total overall mentee numbers. This indicates again the effectiveness of the programme and marks it as a supplementary pedagogical space for students. Data in graph 2 shows total mentee passes relative to total mentees.
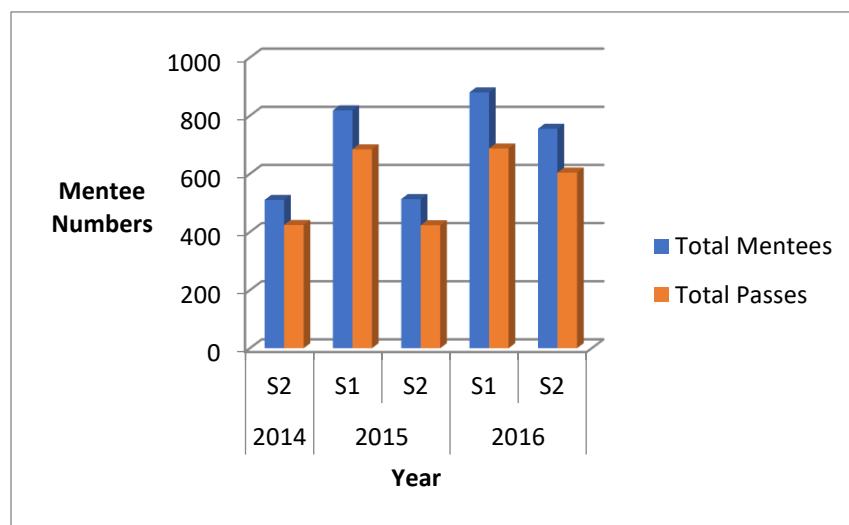
Graph 2: Total mentee passes relative to total mentees
Source: Data- USP SLS Peer Mentoring Records: 2014-2016

Thirdly, the research findings show the number of students who achieved a pass and scored a C+ or C grade after attending the peer mentoring programme. Table 1 highlights the total number of C+ and C grade pass mentees relative to the total mentees who have been successful in the programme for the respective semesters:

Table 1
Comparison of total mentee pass with total mentee passing with C+ or C grade

	Total Mentees	Total Mentees Passed	Total Mentees with C+ or C Grade
2014 semester 2	510	424	223
2015 semester 1	818	684	417
2015 semester 2	513	423	223
2016 semester 1	880	687	322
2016 semester 2	755	604	332

Source: Data- USP SLS Peer Mentoring Records: 2014-2016

While it is beyond the scope of this paper to examine the extent of impact of session attendance on course grades, the interviews with mentees highlight that attending the sessions have contributed in some way to students pass rates. Hence, students who could have failed the course had they not attended any sessions, have made it through. Mentoring numbers tend to surge around due date of assignments, mid-semester tests and exams. Also students who are unsuccessful in their mid-semester tests are advised by their course coordinators to seek assistance through the programme. These are likely justifications for students achieving low pass grades. Graph 3 below illustrates the figures listed in Table 1 above. That total number of low grade passers may be the majority in each group of total number passed is implicated.
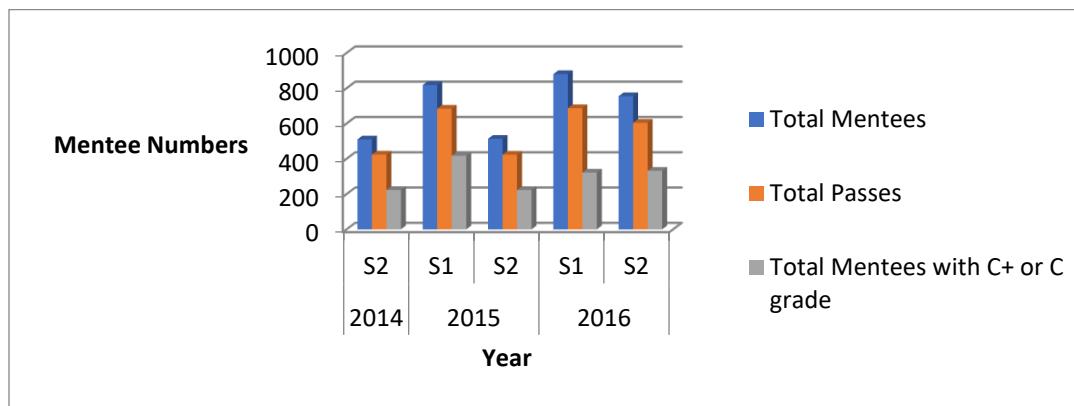
Graph 3: Comparison total mentee pass with total mentee pass with C+ or C grade
Source: Data- USP SLS Peer Mentoring Records: 2014-2016

Research findings: disadvantages of peer mentoring programme at USP

The Senior Peer Mentoring programme conducted by Faculty of Business and Economics at USP is not short of disadvantages. The research findings show that the following are the main drawbacks. Firstly, the Senior Peer Mentoring Programme does not seem to be helpful for high achieving students (i.e those getting A or A+ grades). Table 2 shows the results from 2015-2016.

Rresearch findings show that students who are 'high achievers' (who have high grades) think that 'they will not benefit' from peer mentoring sessions. This can be explained by the fact that many such students attend only one or two sessions during the course of mentoring and they are probably exploring what peer mentoring is about and assessing whether it would be of any use to them. While it is highly unlikely that a limited number of attendance may have a significant effect on a high achieving mentee's performance, it is nevertheless probable that Peer Mentors share study tips which may have contributed slightly to the high achieving students' performance. For example, Table 1 shows that for semester 2, 2015 and in semester 2, 2016 students with very low attendance in peer mentoring sessions achieved grades of A or A+. Of these students many have attended only once or twice throughout the semesters. This shows that there are high achieving students who attend either one or two sessions and then discontinue attendance. Some attend sessions very early in the semester while others attend around exam times.

Moreover, it is evident from the table 2 that while there is clear variation in the courses in which high achieving students with low attendance perform well; it is also evident that although total mentee numbers tend to increase, the total number of mentees who do well with low attendance tends to remain low. This is evident in the following courses AF102, EC202 and UU200. This result suggests that high achievers are not too likely to attend peer mentoring sessions. It must be noted however, that there are a few students who have attended sessions regularly and have scored high grades as well and this could be B+ students who by the help of peer mentoring got extra marks to change from B+ to an A.

Table 2
Mentees with an A or A+ grade but with low attendance: 2015-2016.

2015 Semester 2				2016 Semester 2			
School and course		Total number of Mentees	Low Attendance of Mentees with A or A+ grade	School & course		Total number of Mentees	Low Attendance of Mentees with A or A+ grade
SOAF	AF100	14	1 Session	SOAF	AF102	58	2 Sessions
					AF121	8	1 Session
	AF102	16	2 Session		AF201	76	3 Sessions
SOE	EC100	8	1 Sessions	SOE	EC102	19	1 Session
	EC101	31	3 Sessions		EC202	54	1 Session
	EC202	37	3 Sessions				
STHM	TS109	5	1 Session	SLMD	LM216	37	33
SLMD	LM113	15	2 Sessions	SGDIA	UU200	113	5
SGDIA	UU200	106	2 Sessions				
SOA	AG212	7	1 Session				
SMPA	MG206	23	1 Session				

Source: Data- USP SLS Peer Mentoring Records: 2015-2016

Secondly, the research finding show that peer mentoring programme has 'low popularity' with mentees from certain disciplines. While this is evident in the low number of mentees that attend sessions for specific courses, the situation varies from semester to semester. For instance, the School of Agriculture which had healthy attendance during the years 2014 and 2015, no longer attracted mentees in 2016 and 2017. One of the reasons attributed to this is that most Agriculture courses offered at the Laucala Campus are available through the print and online modes and these methods of learning provide the flexibility of studying geographically (another country or island) away from the main campus and thus cannot not attend face-to-face peer mentoring sessions. As such, it is possible that the programme is unable to generate interest for mentoring as students may not see any need for it. Poor and fluctuating numbers are also evident in School of Management, School of Economics, School of Land Management and School of Tourism. The results are shown in Table 3.

Various factors could be attributed for the low popularity of peer mentoring from different disciplines. One reason for unpopularity could be that students possibly perceive 'difficulty levels' of courses differently. For instance, it is probable that calculations and problem solving exercises are viewed as more difficult than those without them. As such, students' attendance for courses such as Politics is lower than numerical based courses such as Accounting and Economics. This situation, however, is not true for the university's generic course UU200: Ethics and Governance which is entirely theory based and has attracted large number of students for the peer mentoring programme. Another reason could be that there may be lack of support from the School staff (lecturers) in terms of guidance and making students aware of the availability of resources to peer mentoring, as well as regular marketing of the peer mentoring programme to students (Interviews with lecturers, August 2017).

Table 3
A comparison of total mentees for a period of 3 years (2014-2016)

Schools in the Faculty of Business & Economics	Years					
	2014		2015		2016	
	Sem 1	Sem 2	Sem 1	Sem 2	Sem 1	Sem 2
School of Accounting courses	239	117	372	239	391	296
School of Economics courses	161	125	171	122	136	141
School of Management courses	113	96	76	118	83	107
School of Development, Governance, and International Affairs courses	73	106	71	43	157	155
School of Agriculture courses	30	29	0	28	0	0
School of Land Management courses	32	34	68	34	64	37
School of Tourism, Hospitality and Management courses	15	15	49	35	49	19

Source: Data- USP SLS Peer Mentoring Records: 2014-2016

Some lecturers do not support nor are helpful to both mentees and mentors. The programme could be impacted by lack of faith and trust in the 'ability of mentors', unhappiness with mentors and poor mentoring skills as well.

While all peer mentors attend thorough training and are observed at least once during the course of the sessions, there is possibility that some give way to laxity in their strategies. This may not favour well with mentees and affects attendance. Mentees expect their mentors to be aware of the content and be able to deliver the content meaningfully as well. Some mentees may not consider their mentors as substitutes for their tutors and hence poor attendance. For instance, as seen in the data below, the course AF108 did not attract too many mentees. The course is offered through the face-to-face mode in semester 1 every year. It is deemed to be a difficult course yet surprisingly students do not seek assistance through mentoring. Additionally, it is difficult to identify mentors for accounting courses perceived as difficult as students are also reluctant to mentor them.

Thirdly, the research findings show that the peer mentoring programme is affected when courses do not have mentors. School of Agriculture has not had peer mentors for a period since the end of 2015. Results show that during 2014 and semester 2 of 2015 peer mentoring for selected Agriculture courses was offered. The number of attendants was reasonably good and mentee performance was also correlational. However, no mentor could be identified for agriculture courses after this time leaving students in first year agriculture course disadvantaged.

Schools at USP which have better numbers do so as lecturers have taken the initiative to provide incentives for attendance at the sessions. One such technique is applied by the School of Accounting first year course coordinators who select questions to be attended to during the mentoring sessions and inform their students about this. This prompts students into realising the significance of the mentoring sessions and participating in mentoring activities relating to the provided questions. Such is clearly evident in the course AF101 and AF102 which have increasing mentee numbers for the period of 3 years (see Table 4).

Table 4
Comparison of total first year mentee numbers
for the School of Accounting: 2014-2016.

School of Accounting and Finance (SOAF)			
	Semester 1, 2014	**Semester 1, 2015**	**Semester 1, 2016**
AF101	98	117	127
AF102 (Offered by Print mode only)	3	13	40
AF121	35	40	62
AF108	0	12	2
FM101	NA	99	76

Source: SLS data: End of Semester 1 Reports: 2014-2016.

Recommendations

The paper suggests the following recommendations for policy makers at the university:

The faculty, staff and Student Learning Support (SLS) staff which oversee the programme should ensure that each core course has a mentor and that students are using the service available to them. Some first year core courses do not have mentors to assist students. School staff (lecturers) need to make students aware of the availability of peer mentoring programme which they can attend.

Mentor recruitment and mentee attendance is at times dependent on faculty staff making students aware that peer mentoring services offered by SLS is utilised. If they work closely with SLS staff, good and dependable mentors can be identified and quality support could be provided to students.

There should be closer collaboration between the course coordinator and the peer mentors in terms of the activities that are used during sessions. Such a strategy will alert students that course coordinators and mentors are working together and for the benefit of students.

Regular marketing of the peer mentoring programme to students is needed for those students who are at risk of failing their courses. These students need to be identified by staff at the start of each semester using mechanisms such as preceding exam marks. Such students must be compelled to attend at least 50% of the peer mentoring sessions to ensure that they perform well at the end of the semester.

Peer mentors need to attend training for mentors and take their work seriously as it is observed that some mentors give way to laxity in their strategies. The peer mentoring programme tends to create pathways for independent study and even empower students to take ownership for their studies. As such, peer mentors must be offered regular training workshops on pedagogies that address learning styles of diverse groups. This would attract and sustain a larger number of students.

Finally, given that first year experience at tertiary institution is important for students it is recommended that mentoring for core courses within a school should be mandatory.

Summary and conclusion

The senior peer mentoring programme has come a long way since its inception in 2006 and decentralisation in 2009. There are obvious positives that emerge from the programme. More students are participating in the programme and benefitting through it by passing their courses. This finding no doubt suggests that such programmes are useful for students who may be grappling with learning demands of tertiary institutes. On the other hand, the programme is not without limitations. The programme definitely does not work for high achieving students who tend to attend limited sessions and then stop attending altogether. Additionally, not all courses attract high number of mentees. Also courses that do not have mentors are not able to offer the peer mentoring support to their students**.**

The paper has provided some recommendations for policy makers on how to further enhance the peer mentoring programme at the University of the South Pacific and how other tertiary educational institution globally can learn from the experiences of the South Pacific. Similar studies can be done in other regional based universities for comparion purposes.

References

Allen, T.D., Eby, L.T., Poteet, M.L., Lentz, E. & Lima, L. (2004). Career benefits associated with mentoring for protégés: A meta-analysis. *Journal of Applied Psychology*, *89*(1), 127-136

Andrews, J. & Clark, R. (2011). *Peer Mentoring Works! How Peer Mentoring Enhances Student Success in Higher Education.* Birmingham: Aston University.

Beltman, S. & Schaeben, M. (2012). Institution-wide peer mentoring: Benefits for mentors. *The International Journal of the First Year in Higher Education, 3*(2), 33-44.

Bryant, S. E. & Terborg, J. R. (2008). Impact of peer mentor training on creating and sharing organizational knowledge. *Journal of Managerial Issues*, *20*(1), 11-29.

Canter, K. S., Kessler, E. D., Odar, C., Aylward, B. S., & Roberts, M. C. (2012). Perceived Benefits of Mentoring in Pediatric Psychology:A Qualitative Approach. *Journal of Pediatric Psychology, 37*(2), 158-165.

Colvin, J. W. & Ashman, M., 2010. Roles, Risks, and Benefits of Peer Mentoring Relationships in Higher Education, Mentoring & Tutoring. *Partnership in Learning, 18*(2), 121-134.

Darwin, A & Palmer, E (2009). Mentoring circles in higher education, *Higher Education Research & Development*, *28*(2), 125-136, DOI: 10.1080/07294360902725017.

Dearlove, J. , Farrell, H., Handa, N. & Pastore, C. (2007). The Evolution of Peer Mentoring at the University of Western Sydney. *Journal of the Australia and New Zealand Student Services Association*, 29 (April), 21-35.

Ehrich, L.C. & Hansford, B. (1999). Mentoring: Pros and cons for HRM. *Asia Pacific Journal of Human Resources*, *37*(3), 92-107.

Glaser, N., Hall, R. & Halperin, S. (2006). Students supporting students: The effects of peer mentoring on the experiences of first year university students. *Journal of the Australia and New Zealand Student Services Association*, *27*, 4-19.

Heirdsfield, A.M., Walker, S., Walsh, K. & Wilss, L. (2008). Peer mentoring for first-year teacher education students: The mentors' experience. *Mentoring & Tutoring: Partnership in Learning*, 16(2), 109-124.

Husband, P.A. & Jacobs, P.A. (2009). Peer mentoring in Higher Education: a review of the current literature and recommendations for implementation of mentoring schemes. *The Plymouth Student Scientist, 2*(1), 228-241.

Kasra, T., & Mina, S. (2008) Mentoring for doctors. Do its benefits outweigh its disadvantages? *Medical Teacher*, 30(4), e95-e99, DOI:10.1080/01421590801929968.

Landbeck, R. & Mugler, F. (1994). Approaches to study and conceptions of learning of students at the University of the South Pacific. *Research and Development in Higher Education, 16*, 286 – 289.

Latu, S. & Young, A. (2004). Teaching ICT to Pacific Island Background Students. Paper presented at the Sixth Australasian Computing Education Conference. Dunedin. *Conferences in Research and Practice in Information Technology, 30*. Retrieved October 11, 2012, from http://129.96.12.107/confpapers/CRPITV30Latu.pdf

Limbert, C. A., & Summer, C (1995. Peer Mentoring Group for Faculty and Staff Women. *NWSA Journal, 7*(2), 86-99.

Mavrinac, M. A. (2005). Transformatonal Leadership: Peer Mentoring as a Value- Based Learning Process. *Liberaries and the Academy, 5*(3), 391-404.

Phan, H. P. & Deo, B. (2008). Revisiting the South Pacific approaches to learning: a confirmatory factor analysis study. *Higher Education Research and Development*, *27*, 371 – 384.

Smailes, J. & Gannon-Leary, P. (2011). Peer mentoring–is a virtual form of support a viable alternative? *Research in Learning Technology*, *19*(2), 129-142.

Sotardi, V., Brogt, E. etal. (2016). *Common student problems with assessment during the transition to university: Support staff perspective insights and recommendations*. Wellington, New Zealand: Ako Aotearoa National Centre for Tertiary Teaching Excellence.

Taufe'ulungaki, 'A. M. (2003). Language difficulties of Pacific students in tertiary institutions in Teaching and Learning with Pasifika students. In A. Kirkness & N. Fanene (Eds.), Teaching and Learning with Pasifika Students: A Colloquium for tertiary teachers. Centre for Educational and Professional Development, AUT University.

Terrion, J. L. & Leonard, D. (2007). A taxonomy of the characteristics of student peer mentors in higher education: Findings from a literature review. *Mentoring & Tutoring*, *15*(2), 149-164.

Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition*. Chicago: University of Chicago Press.

The University of the South Pacific, 2017. *USP Campuses.* [Online] Available at: http://www.usp.ac.fj/index.php?id=campuses [Accessed 7 September 2017].

Wangeri, T., Kimani, E., Mutweleli, S. M. (2012). Transitional Challenges facing University First year students in Kenyan Public Universities: A Case of Kenyatta University. *Interdisciplinary Review of Economics and Management, 2*(1), 41-50 http://www.ku.ac.ke/schools/humanities/images/stories/docs/Research/trannsitional-challenges-facing-first-year-students.pdf

(USP involves 12 Pacific Island Countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.)

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Editor's Note:

Excel for problem solving and software programming (EXCEL4PS&SP)

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Abstract

The "Computational thinking" and basic coding abilities are universally recognized today as largely desirable features, especially for early and middle age students. Their importance has somehow been enforced by the large-scale spreading of computer software for mobile devices (Apps) and, hence, by the need for new young generations with the right mindset to approach the developing of software. Despite this, teaching computer programming is yet an open-ended challenge for educators all over the world. Spreadsheets have always been a great opportunity to empower the learners in solving problems of any kind, such as the simplest ones strictly relating to school subjects and, on the opposite edge, complex situations in the Problem-Solving domain. Unfortunately, their use is often quite empirical and extemporaneous, both in textbooks and courses. The work this paper deals with, is based on a well-grounded methodical use of Excel, plainly aimed to make computer programming a less hard activity to learn for novice. At this end, an application has been built to support the learner in prototyping solutions for simple sequential problems which can be then automatically translated in the JSON file-format adopted by SCRATCH 2.0, ready to be tested and refined in the block-based graphical environment.

Keywords: Excel, coding, Scratch, json, software programming teaching.

Introduction

This paper is related with a significant teaching experience in computer programming and a continuous work-in-progress since the late 90's, inspired on one side by the great power embedded in spreadsheets and, on the other hand, by the real use of this kind of software in educational contexts and textbooks, too often quite extemporaneous and inadequate from a didactic point of view. Probably it may seem that relating Excel or similar software to the matter of introducing the novice in the field of programming be at least an old-fashioned way to reach the goal, especially true if you consider the strong emphasis we're living nowadays towards block-based coding tools, with Scratch, Snap and App Inventor environments, all by MIT, on the top of list. However, the great ease of these tools in approaching the world of programming does not seem to guarantee, on its own, the formation of a good programmer, due to several reasons:

- little attention is paid to the methodological aspects in favour of "trial and error" strategies which, although having a clear formative value, should be privileged in stages later than the initial ones, typically requiring a more robust approach to analyze the problem on hand;

- they don't solicit the modular design and abstraction attitudes, a pair of "must" for any professional in the field;

- as a counterpart to the previous points, the preferred target domain for many young users of these tools is the one of video-games and animations, surely not trivial and demanding for a solid and efficient approach to software design;

- for the reasons above, the experience acquired programming by this kind of tools can be not easily transferable to other more traditional languages and applicative domains.

Context

Technical and scientific areas are the main application fields for the project, and educational contexts are its preferred stage, mainly in second-level school grade. Since the beginning of this experience, 16 years old students approaching for the first time a course in informatics and computer programming were involved in the experimental stage for about a 3 months period. In consequence of some important changes which came into effect on the 2010/11 school-year in Italy (Gelmini's Ministerial reform), Informatics has become a subject of study for 14-15 years old students too and it is now possible to extend the project at earlier stages of educational paths. The actual trend in the institute is to introduce computer programming in Scratch for 15 years old students, after a preparatory Excel course. Being a technical-economic school, the problems the students face with are often related to the management application domain: in other words, the algorithms are generally limited in complexity, while the emphasis is on the methodological aspects. Nevertheless, very often the students encounter difficulties during the initial analysis of the problem, in identifying inputs / outputs data and in choosing a correct resolution process.

General and specific aims

The enhancement of skills in problem resolution is a first main cross objective of the project, while the use of spreadsheets to heighten Problem-Solving abilities represents a long-term one for almost all our students: indeed, less than a dozen of them participate every year at the Problem-Solving Italian Olympics, being carefully pre-selected based on school merit and their interest. Some ad-hoc Excel-based applications have already been realized, for example to solve problems requiring backtracking, but their discussion is beyond the scope of this paper. Considering it is highly desirable the need for teenagers to have a conscious relationship with electronic devices, with whom nowadays they grow and live, an additional main project's goal is to provide them a clear vision of the relationship between man and computer, highlighting the roles and tasks of each of them.

With this perspective in mind, we propose a method for using spreadsheets which is based on the use of multiple worksheets within a single document (workbook) related to the problem to be solved. Such a structure of the document is very useful to achieve the overall objectives already exposed allowing, at the same time, the shift of the focus from the software tool you are using to the problem you are solving. Incidentally, this is in sharp contrast with the method usually proposed in the ECDL (European Computer Driving Licence) courses about the use of spreadsheets where, indeed, the problems are often completely missing and replaced by the features listed in the pertinent syllabus. Although the model underlying the project is quite general, we had to make a choice on the spreadsheet to use, finalized to its description, implementation and experimentation: Microsoft Excel was so chosen, above all thanks to its widespread in schools of all levels.

Last but not least, the project aims to introduce the novice to software programming, allowing him a fast prototyping of automatic solutions to simple problems, which can be then easily coded in one or even more programming languages, both manually and automatically. In all sincerity, this wasn't a planned aim in the first years of the project: instead, it began to take shape on the field, carefully observing students using the software, originally just a template, without neither macro nor VBA code, in the first decade of the 2000s. Since then, the use of the application as a valuable tool to teach the basics of programming to the neophyte has assumed a relevance more and more meaningful and continues to be the main guideline for the evolution of the project.

Project tools

To experiment the ideas in the project the Excel software is required (2007 version or higher), which lets you manually (i.e., without the support of our automation tool) solve problems according to the basic model compliant with the project philosophy (par. 0): in the early steps of a course, it's a good idea to use the original template: this is especially true for non-computer educators who want to master the proposed methodology before promoting it among their learners. Up until now, the monitoring and testing phases of the work done by the students using the (non-automatic) template have been carried out manually, often preferring a sort of self-assessment guided by the teacher and inspired by typical rules and constraints of the model. Embedding these last ones in some kind of (semi-)automatic assessment tool could be a possible direction to investigate on the future. Once gained the ability to successfully implement a correct solution (in this context, we mean a solution which produces correct answers but, also, according to the proposed model, as it will be clear later) for some simple problems, the time is right to automate the production of prototypes using the project software tool, just a single file in .xltm format: the reader is warned that compatibility issues with other spreadsheets, such as Google Sheets, have not been verified to date. The outcome from this second stage, which automatizes the template, includes a working solution, i.e. a well-structured workbook embedding macro and VBA code (.xlsm file format) and, also, an algorithm generated in pseudo-language, which could be a good starting-point to obtain a program by the student. Other optional components specifically addressed to the use of software as a programming teaching tool are included: they allow for the automatic translation of the pseudo-language in several programming languages, among which Scratch.

Resources

From the point of view of human resources involved, the project mainly concerned the author who has played, as long as now, the roles of both teacher and software developer. A valuable contribution, however, has been offered by some of the best students of the past few years, especially for the feedback they could deliver on the field as recipients of the experiment.

The project Excel4PS&SP

The heart of the project consists of a spreadsheet model, structured on several sheets, functional for the achievement of overall objectives of the project. Revisited and improved over the years, this model is still anchored to its originally designed features (SecondName, 2001), that we quickly analyze below.

Model description

The use of multiple worksheets within a single Excel document is implemented in accordance with criteria designed to encourage the distinction of the various roles involved in software developing and execution environments:

- Executor (man or machine);
- User (man);
- Programmer (man).

To outline a conceptual framework that can guide the student, a project to solve a problem will be divided accordingly to the following worksheets:

a) "Constants" (Const) sheet, to contain immutable data in relation to the problematic situation to be addressed, or which are at least estimated to remain stable for periods long enough;
b) "Input" Sheet, to allow user data entry;

c)   "Variables" (Var) sheet, to contain all the data, except for the constant ones, which are required for the calculation process (Input / Output data and working data): hence, it will have to keep a copy of each data in the Input sheet too, as well as the results that will be addressed later to the Output sheet;

d)   "Processing" or "Program" sheet, where all the instructions needed to process the data (constants and variables, taken from their respective worksheets) should be included;

e)   "Output" sheet, to display the results expected by the user, collected from the Variables sheet. It's possible, of course, to replicate some data in output from the Input sheet but, again, taking them from the Variables sheet, where their copies are stored.
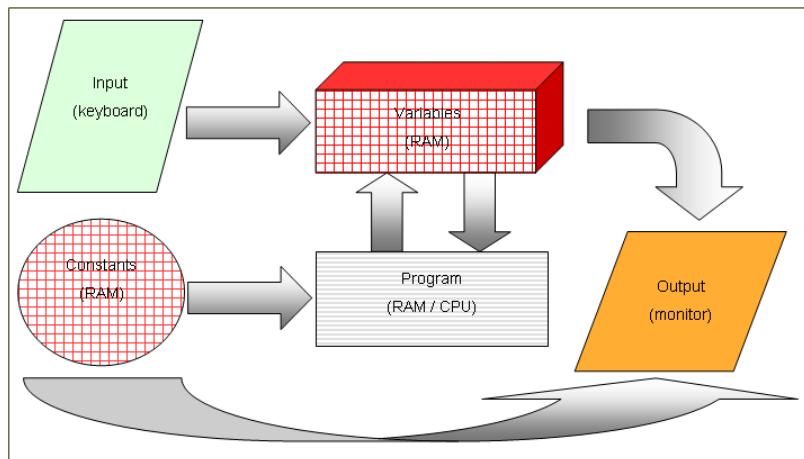

Figure 1 The flow of data between the Excel worksheets

In Figure 1 the data flow between the sheets in the model is depicted. In particular, it shows that the Input/Output sheets have exclusively the functions of allowing data entry and displaying the results, just emulating the keyboard and monitor devices of a computer. Going on with the analogy, the Constants and Variables sheets, which contain all the data used by the algorithm to solve the problem, can be functionally considered comparable to the RAM (data area). The Program sheet, containing instructions and the results produced by their execution, emulates both RAM (program area) and CPU (registers).

During the designing and testing phases, the student will be asked to think about the problematic situation on hand in order to identify and classify the involved problem data (constants, inputs and outputs) in advance, which have to be placed in the appropriate worksheets. For each of them he/she will have to:

▪   reserve a free cell (data-cell), whose content should be entered at that moment in the case of problem constant data (i.e. simple values), known from the beginning. For the input data, their typing could be deferred to the testing phase, maybe better from a conceptual point of view, when the student will be asked to assume the user role: as a counterpart, however, it should be noted that their earlier input helps somehow the student in the next steps, which are heavily based on designing and entering formulas on other worksheets, according to a typical "try-and-test" approach, clearly suited for spreadsheets. For the problem output data (the results), instead, just a formula can be entered as content for each data-cell within the Output sheet, aiming to copy a value (produced by some kind of calculus in the Program sheet) from a paired data-cell within the Variables sheet (see the upper right curved arrow in Figure 1).

▪   Assign a meaningful name to the cell chosen to contain it (data-identifier), consisting of a sequence of literals and / or numerical characters, yet in compliance with the lexical rules imposed by the software in use. As a basic design choice, this identifier should be just the only way to refer to the associated data within the formulas.

- ▪ Type into a contiguous cell (preferring the one at the left of the data-cell, or on the top of it as a second-level option) a free text description of what the data itself represents (label-cell), taking also into account the membership sheet. Despite the appearance, this kind of skill turns to be an important one, because it makes the student aware of the roles and the relationships among them. In addition, it is a useful indicator (a sort of litmus test) for smart and effective monitoring by the teacher.

The Variables worksheet will gradually embed data-cells for the I/O data, which will be followed by all the necessary working data emerging throughout the problem-solving process. The rules for allocating data-cells on this sheet are the same already seen, but each I/O data-identifier should be different from the one assigned in the I/O sheets. The naming convention adopted here is based on the use of prefixes for linking data-identifiers to the membership worksheets. As an example, the cell containing the radius of a circle may have as identifiers InRadius, Radius and OutRadius within the Input, Variables and Output sheets, respectively. With reference to the content, each data-cell on this sheet will be filled by the result of a formula: simply a copy of a paired data-cell from either the Input or the Program sheet, which implements in the order the upper left arrow and the vertical left arrow in Figure 1.

Within the Program sheet every step of the processing procedure is a formula embedded in a statement-cell: the outcome generated from its evaluation is assigned as the content for its paired data-cell in the Variable sheet, as said above. Of course, this outcome is also automatically bound by the spreadsheet software to the cell containing the formula itself: that is an important point of difference to focus on, compared to the assignment command of the imperative programming paradigm, which instead holds the target variable far away from the instruction. Once again, the model described here closely follows the logical-functional architecture of computers, where the results are generated and temporarily stored in registers within the CPU before their transfer into the main memory (RAM). A statement-cell, as well as data-cells, should be contiguous to a label-cell containing a short description, with the aim to clarify its function (in analogy with the programming languages remarks). It should have an own unique name (statement-identifier) too, which could be built for example by prefixing the base name of the matching data on the Variables sheet with the prefix "WK" (Work).

The testing phase should be carried out by the student entering the data in the appropriate cells on the Input sheet and, then, observing and interpreting the results reported by the Output sheet. If the implementation of the project has been done according to the directives proposed in the model, it will not be necessary, neither appropriate, to make changes within the other sheets, except for any corrections to errors (debugging) evidenced by the test. Upon completing this stage, all the sheets which don't concern the User role will have to be hidden, leaving visible just the interface ones (Input and Output). This final trick will further strengthen the student skill to distinguish the roles, as well as his/her conceptual framework of a computer system.

The project software tool

The software tool is the latest result produced within the project. Through a multi-stage process, the software supports the student during the resolution phases of a problem, asking him/her to reflect on the problematic situation on hand to identify and classify in advance the data involved (constants, input and output). The intermediate stages drive the student towards the incremental construction of the most important products of the problem resolution activity: a table containing all the data and the sequence of actions needed to achieve the required results. Finally (if enabled and on demand), the software tool can generate a ready-to-test source program in one of the implemented computer languages. This Excel application aims to be a valuable educational tool to enhance the ability to solve problems while approaching the world of computer programming. The emphasis on methodological aspects and the degree of difficulty of the problems the software

can be deal with, which was kept down as a design choice, don't make it a tool for experts. Some software constraints and guidelines significantly increase its potential as a tool for monitoring and assessment. Also, its view-based structure easily allows to play each of the roles involved, one at the time - an effective choice in this context.

The first stage of development made it possible the implementation of the basic model, fully automating the most repetitive steps of its construction. Furthermore, it opened the way to one of the most interesting and complex challenges of the project, i.e. supporting the student in constructing the sequence of actions which solves the problem (spreadsheet formulas). The next stage extended the target audience to include the novice programmers: other components were added to the core module at this end, each one specific for a programming language.

The application is structured on several sheets, the most important of which were directly inherited from the basic model of the project, already described above. The other ones have been added both for documentation purposes and, more importantly, for achieving the high degree of automation provided by the tool. Furthermore, the main panel of the application lets you select each time the desired "view", that is a subset of relevant sheets, according to the role you are planning to take. In the current version, the software offers the following views:

1. *Problem Solving*, the point of view of anyone engaged in building the solution for a problem, but not at all involved in computer programming aspects;

2. *User*, the one to select when planning to take the role of an end user, interested towards the effective resolution of a problem (what the user wants are just the results) rather than in the underlying procedure;

3. *Programmer*, the preferred view when the focus is on designing algorithms, with no refer to a specific programming language;

4. *Test*, a composite view suitable for testing an algorithm previously designed, with embedded a special worksheet for the execution tracing;

5. *Pascal*, which lets you request the automatic generation of code in Pascal language;

6. *Small Basic*, which lets you request the automatic generation of code in Small Basic language;

7. *Jeliot,* which lets you request the automatic generation of a Java program which can be animated soon after by Jeliot 3, a Program Visualization application downloadable for free under GPL license (Jeliot WebSite). Method calls, variables, operation are displayed on a screen as the animation goes on, allowing the student to follow step by step the execution of the program.

8. *Scratch*, which allows for the automatic translation of the pseudo-code in the JSON format used by Scratch 2.0 for its .sb2 files. Also, the tool can export the algorithm in the notation used by ScratchBlocks, so the students can obtain a picture of the scripts which they can reproduce in the Scratch editor: educators could think of this chance as a good practice to move the first steps in the visual environment.

9. *Authoring*, for an overview of all the sheets in your application, reserved to users enabled to manage, develop and maintain the software tool.

The backbone of the whole application is the table containing all the data (Figure 2), encapsulated in a separate sheet. It can be edited row by row, being monitored by the software, which allows to suspend and resume its fulfillment at will. You can also modify the information already entered, but only for some fields of the table, appropriately highlighted. The tool allows you to enter the resolving procedure driving the editing process of formulas within the Program sheet (Figure 3):

Figure 2 The table containing all the data, encapsulated in a separate sheet

It automatically suggests and highlights only those cells that need a formula for calculating the values of Working / Output data, using information previously entered in the data table. As for the table above, this activity can be resumed several times to safeguard the possibility of introducing further working data, as required by the problem-solving process. This is especially important to easy the design of algorithms with the top-down method, one of the keys to succeed in computer programming.

Strong points, failings and critical issues

The tool interface based on views is functional for the achievement of some project goals, namely a clear understanding of the roles and a methodical approach to problem solving. It also plays in favor of the tool flexibility, for example hiding the sheets specific for the programming at the sight of students not concerned with. However, the ability to quickly produce well-structured Excel applications, driving the student to focus on the problem to be solved, is surely the point of greatest strength of the project. This is true taking also into account its ability to automatically generate programs in some of the most widely used programming languages in education. Somehow failings issues are limited to the user interface, both from a graphical and functional perspective.

Figure 3. Tool arranges rows for working and output data within program sheet

So far, no critical issues or failings came out, apart from the already mentioned impossibility to enjoy the tool advantages without the availability of computers. However, a longer period of experience with the software is necessary to get more reliable feedback.

Future research directions

The project has reached a good level of maturity that makes it usable in education pathways addressed to the target clarified in the introductory part of this paper. Some research and/or developing directions that could be investigated in the future include the followings:

- extending the range of problems that can be addressed, for example by implementing the support for conditional statements, but keeping clear in mind that one mayor goal of the project is to make software developing easier for the novice. In every area, after all, a well-started beginner must be able to walk with his own legs, and the framework for 21st Century Learning Design leaves no doubt about it;

- improving the interface of the project software tool and developing App versions for mobility;

- strengthening the support provided to the students in the design phase of the algorithm, also evaluating the possible use of planning techniques, widely used in artificial intelligence.

Conclusion

In this paper, the EXCEL4PS&SP project has been presented. On one hand, it boosts the educational value of Excel to support learners in analyzing and solving problems; on the other, it aims to promote an original and innovative use of the spreadsheet in teaching and learning the basics in computer programming. The built-in tool allows for the fast design of prototypes to solve simple sequential problems. It is also able to generate source code in several programming languages, even block-based scripts in Scratch, hopefully opening new horizons for novice developers as well for educators in the STEM disciplinary area.

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Scratch File Format (2.0), url: https://wiki.scratch.mit.edu/wiki/Scratch_File_Format_(2.0)

ScratchBlocks, url: http://scratchblocks.github.io/