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Effectiveness of Cloud Systems and Social Networks in Improving Self-directed Learning Abilities and Developing Positive Seamless Learning Perceptions

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Abstract: This study aims to analyze the conditions which affect students' perception on self-directed abilities and seamless learning using cloud systems and social network applications. A combination of qualitative and quantitative methods was used in the study. Forty teacher candidates from the Near East University who took the course "Special Learning Methods" participated in the study. The study was carried out in one academic semester (12 weeks) according to the blended learning approach. Each learner had an individually networked laptop or another mobile device which included a "clip to EverNote". The results indicated that Mobile Supported Seamless Learning spaces (MSSL) support flexibility in place and time of learning, improve learners' self-directed learning, and change their perceptions on seamless learning.

Keywords*:* Seamless learning, cloud systems, mobile learning
Categories*:* L.3.6, L.3.0, L.3.5

1 Introduction

With the development of mobile communication and information technologies, the use of individual mobile devices is at a rapid increase. The development of such technologies calls upon the necessity to take new approaches within education ([Martin et al. 2011]; [Hsu and Ho, 2012]; [Sandberg, Maris and Geus, 2011]; [Schepman et al. 2012]; [Uzunboylu and Ozdamli, 2011]; [Ozdamli, 2012]; [Girgin, Kurt and Odabasi, 2011]; [Aboderin, Fadare and Kumuyi, 2012]). Multi-functional applications, advanced hardware and network technologies offer new possibilities for supporting new ways of learning, collaborating and communicating [Wang, Wiesemes and Gibbons, 2012]. Mobile applications gain value especially within the university education framework. Learning through mobile devices is often referred to as "m-learning". However, m-learning is not only about using or learning to use a mobile tool.

Mobile learning applications provide their users with resources that are available anywhere at any time; by enabling suitable learning means and elements, as well as applicable learning methods and correct planning of their learning means, mobile learning applications present their users the opportunity to learn everywhere [Hsu and Ho, 2012]. [Gedik et al. 2012] indicated that mobile learning provides advantages, especially for young people, with regards to focusing. Therefore m-learning is increasing in popularity; however, not all university students have mobile devices to support it [Ozdamli, 2011]. According to [Schepman et al. 2012], cross-platform

software has the potential to allow education practitioners to provide mobile support to their learners' learning, while offering similar functionality to non-mobile users via more traditional computing platforms. Using cloud informatics technologies enables individuals to connect from their mobile devices and/or desktop computers depending on their preferences. In their studies, [Hwang, Wu and Ke, 2011] have stated that present trends are progressing towards cloud computing, and with these systems students are able to carry out their own learning with ease and cooperation. [Chung et al. 2012] have concluded that the reason for the increase in demand for cloud systems is the increase in digital device usage and the wide regional use the Internet has to offer. Social networks with their forever increasing usage also act as cross-platform software. In Cyprus, 95% of Internet users also own a Facebook account. According to the September 2012 update of the Social Bakers website, the total number of Facebook users in Cyprus is reaching 548100 and has grown by more than 24920 in the last 6 months. When the use of Facebook in Cyprus is studied according to age, the age range of 23-34 takes first position with a ratio of 31%; and university students, i.e. individuals within the 18-24 age range, come second with a ratio of 28%. According to the statistics provided by the Marketing Gum website, 13% of Twitter users are individuals within the 18-24 age range. [Bicen and Cavus's, 2011] study has also shown that university students in Cyprus spend a significant amount of their time using Facebook.

With the introduction of the use of such technologies in education, seamless learning spaces have left their mark on the agenda [Chan et al. 2006]. These processes make learning more personal and meaningful because seamless learning refers to student-centred learning. Students have to think on their own, take initiative, monitor their own progress, solve problems and therefore are more aware of the complexity of how their new knowledge is constructed and presented; such experience should develop their competence in independent learning and lifelong learning [Zhang and Looi, 2011]. [Sha et al. 2012] indicated that m-learning spaces provide a means by which learners can exercise agency to manage their own learning. According to [Bekhradnia, 2009], independent study accounts for a larger proportion of the learners' time when compared to time spent in class on education. Independent study implies that activities such as reading, taking notes, researching information, organising and problem solving are carried out by the students in line with their own will. As known, students with high self-direction abilities can be more inclined to independent study. Besides, lifelong learners tend to have higher self-directed ability levels [Uzunboylu and Hursen, 2011]. According to [Svedberg, 2010], the self-directed abilities of students are important indicators to whether they are ready for seamless learning. [Knowles, 1975] explained that self-directed learners are proactive and take the initiative in learning rather than passively wait to be taught as reactive learners.

In his study, [Graham, 2003] stated that when teachers use the learning strategies in an appropriate way, this earns the students the ability to control their learning and also strengthen their self-directed abilities. It is stated that students who have high self-directed abilities also carry out their learning in a more meaningful manner within the scope of their own responsibility [Garrison, 1997]. Researchers have concluded that individuals with high self-directed ability levels are more willing to learn new things, see problems, are open to new experiences, and also enjoy learning

([Taylor, 1995]; [Petrides, 2002]; [Idros et al. 2010]).However, no studies have been conducted on the effects of cloud systems on self-directed ability levels and seamless learning perceptions. Therefore, this study aims to pinpoint the conditions which affect students' perception on self-directed abilities and seamless learning using cloud systems and social network applications. In order to achieve this objective, the authors sought answers to the following questions:

- Is there a significant difference between the pre-test and post-test scores of learners' self-directed learning levels?
- Is there a significant difference between learners' perceptions on mobile supported seamless learning spaces?
- What are the learners' opinions of mobile supported seamless learning spaces?

1.1 Cloud Systems

Cloud systems are the possibility of any application to be accessible over the Internet. One of their most important features is that users can access cloud systems from their own mobile device without the need for much investment in the technologies. They are systems that are not dependent on devices. They can function in any portable or non-portable platform. They also carry out processes without the need of an Internet connection. Cloud systems have their own personal security settings, enabling individuals to share data within the cloud as they desire. Systems have limitless number of users. Information can be synchronised when required. Users can access their cloud systems from anywhere in the world without the need of being bound to an office or region. Though cloud systems present companies with a productive environment, recently personal users have started to benefit from this productivity too. The use of such systems within the environment of education should also be researched.

[Bal, 2010] states the main characteristics of a cloud system are as follows:

- Independence from any devices and platforms; easy access from all platforms and devices;
- The possibility to use it without an Internet connection;
- Limitless number of users and authority;
- The possibility to synchronise with local data.

In this study, a cloud system called the EverNote software was used. Taking notes is one of the exact elements of the learning process. During the learning process learners fill many exercise books. Organising these notes well is a very important factor of personal development. With EverNote, is it possible to keep not only written notes, but also audio and visual notes. Learners can record audio notes for themselves. They can record the voice of their instructors. Learners can also take photographs and convert them into notes. Once all the recorded notes are synchronised, they can be accessed from any other device whenever they are needed. Meanwhile, instructors and students can share their synchronised notes in various environments, for example on their Twitter or Facebook pages or groups.

1.2 Self-Directed Learning

The concept of self-directed learning is not a new educational concept; however, in many countries it has made its mark again. The concept self-directed learning first appeared in the 1970s. Whereas self-directed learning was easily accepted in higher education organisations, it was not easily adopted. For an organisation, to have self-directed individuals demonstrate an important change of paradigm. Having self-directed skills this means that individuals keep their skills up-to-date within the organisation which they work for, presenting practical advantages to their work place [SDL, 2009]. Thus, it is essential that students develop their self-directed skills. [Knowles, 1975] explained the importance of self-directed learning by emphasizing that when individuals made an attempt at learning driven by their own desire, they learnt much better, at a deeper level, and permanently. [Lounsbury et al. 2009] also stated that there was a correlation between student success and self-directed learning.

Self-directed students take an active role in planning their learning and keep to the plan they have created without the need for any encouragement. They know how to access and use various means and resources required for learning. They learn from their mistakes and take risks. [Cimen, 2012] stated that self-directed students can carry out their own learning using distant learning education materials and teaching software, as well as learn about subjects that are more advanced than those covered by students in class and even subjects that are not covered in school.

[Hiemstra, 1994] indicated that several things are known about self-directed learning:

- Individual learners start to take far more responsibility for their learning.
- When we say self-directed learning, one must not understand it as learning isolated from other individuals.
- Self-directed learners appear able to transfer learning in terms of both knowledge and study skill.
- Many activities and resources are needed for self-directed studies. For example, the learner should be able to read by him or herself and participate in study groups or dialogues taking place in electronic environments.
- Teachers also can actively participate in self-directed learning. They can carry out dialogues with students, ensure the safety of the resources, and assess printouts.
- Some educational organisations have started to apply progressive programmes, unconventional courses, and individualistic study options, as well as open learning programmes that enable self-directed learning.

1.3 Seamless Learning Spaces

Today, students live in a digital world. Instant messaging, video sharing, photograph sharing, social network tools, podcasting and blogs have all become part of their daily lives. Mobile phones are not only used to make calls, but to take photographs, upload social mediums, create mobile blogs or surf on the Internet. These technologies give students the opportunity to communicate, cooperate, share and learn with their peers, teachers, and family members regardless of time or place. In their study, [Looi et al. 2010] state that students carry out their learning in much more informal environments than school.

Personal, portable, wireless network technologies have penetrated into every area of the learners' life. As a result of their easy accessibility, technology supported learning has emerged, and because of this seamless learning spaces (SLS) have left their mark on the agenda [Chan et al. 2006]. In seamless learning spaces, learning can take place not only in private spaces individually, but also in public spaces cooperatively [Sharples, 2006]; [Chan et al 2006].

[Seow et al. 2008] list the main elements within seamless learning spaces as: space, time, situation, group, and cognitive tools. When we take a closer look at the space element, the learners can physically or virtually be in different spaces. [Bielaczyc, 2006] states that with the use of mobile devices learners can share their opinions with others and are encouraged to take part in structured activities. Time plays an important role in the shaping and questioning what occurs within seamless learning spaces. The designed activity situations affect the students' learning, application and planning. The group learning of the seamless learning space includes the learners, teachers, and domain specialists. With the students using their mobile devices to record data, capture images, upload data onto online environments, and record references, mobile devices have become cognitive tools [Seow et al. 2008].

2 Related Research

[Seow et al. 2012] noted that the design of seamless learning spaces and activities for environmental education using mobile, wireless, and online technologies in schools have become quite popular. The learning spaces and activities were designed to help students learn about environmental issues, specifically reduce, reuse and recycle (3Rs), and apply such understanding to practice. Their study indicated improvements in the students' understanding of the 3Rs and internalisation of their understanding through application of the 3Rs concepts.

[Rege and Keanne, 2003] stated that mobile learning brought a new face to medical education and increased the managerial productivity of course assessment. [Wentzel et al. 2005] stated that in a study they carried out in 3 universities during a geography information science lesson, mobile devices had a positive effect on teachers and students. They have also mentioned that the use of mobile devices in education has positively affected the students' attention span, learning effort, and reaction towards reading, interaction and communication.

The advantages of mobile learning are well described in literature. [Kress and Pachler, 2007] indicated the most obvious benefits of mobile learning are ubiquity, flexibility, interactivity, multi-functionality, and nonlinearity. [Kim et al. 2012] have developed a mobile based learning model for children and measured its effectiveness. In a study using 210 Indian children aged between 6-14, it was observed that game based mobile technology learning caused children to play mathematical games without the need of any adult instruction and intervention, therefore leading them to carry out higher cognitive behaviour. Then again, it was determined that while the ratio of the schooling among females in India was 80% and of males was 74%, in field studies conducted using mobile technologies the hegemony of male students was detected. [Sha et al. 2012] stated that the findings of their study where 67 students were divided into two groups showed that although during the learning of students of all ages the applications that mobile learning provided created some difficulties in

regards of self-directed skills, the environment mobile learning had to offer supported the students' self-learning and played an important role in the realisation of higher cognitive behaviour.

In their research on independent study behaviour involving 61 undergraduate student of Chester University [Schepman et al. 2012] showed that the EverNote note taking tool enabled a multifunctional and flexible environment within higher education.

As a result of his 12 week study with 8 university students on clinical skills using mobile devices, [Clay, 2011] found out that all participants had a positive opinion of mobile devices being used as a learning tool. [Gromik, 2012] carried out a case study where students made video recordings using mobile devices to boost their confidence in speaking while learning a foreign language; the results showed that the number of words students used in their monologues increased. In a study by [Bankowski, 2001] carried out in Hong Kong University with first-year students, it was found that in tasks that require independence and creativity, students faced problems when it came to analysing potential information sources, defining, placing, detecting, and ordering suitable findings, and therefore independent learning skills and the development of these abilities were necessary. The researcher prepared the "Academic English" programme and presented the students with materials and education for independent academic tasks. At the end of the study the majority of the students stated that the programme was much better at preparing them for the requirements of academic English and that it also improved their independence.

In meetings they carried out with students after they used the Milexicon mobile language education environment which had been developed for self-directed students, [Underwood, Luckin and Winters, 2012] found that students considered these technologies useful in learning. In the study [Lounsbury et al. 2009] carried out with 398 middle school, 568 high school, and 1159 college students, a relationship was found between successes at all levels and the level of self-directed learning. It has also been indicated that there is a relationship between self-directed learning and personality traits.

3 Methodology

A combination of qualitative and quantitative methods was used in this study. Surveys were used for quantitative analysis and interviews were carried out for qualitative study.

3.1 Participants

40 teacher candidates from the Near East University all taking the course "special learning methods" participated in the study. 22 (57%) of the teacher candidates were female and 18 (43%) were male. This selection was representative of the gender balance at the institution. The mean age was 22.3 years (Min 20, max 26, SD 1.5 years). All participants had mobile devices (mobile phone, notebook, and tablet pc). While 34 (86%) of the teacher candidates had Internet connection from their mobile phones, 6 (14%) didn't. However, all students could use the free wireless connection found in the university. 35.7% of the students used the Internet via their mobile

devices for 3-7 hours per day, 35.7% for 1-2 hour/s, 21.4% for less than 1 hour, and 7.1% for more than 7 hours. All participants were free to use the Web or PC version in addition to their mobile devices. All students were in the fourth year of their study.

3.2 Design of Mobile Supported Seamless Learning Space

In the designing of the MSSLS, the application of learning theories is an important consideration. According to [Jacobs 1999] using learning theories when designing the learning eases the process of creating a relationship between the information, the student, and the environment. There are, of course, a number of learning theories that have been presented over the years. However, for this MSSLS model the theory of constructivism is applied. In the design of the spaces, an attempt to answer the two questions: "what?" and "how?" has been made. The answer to the "what" question lied in deciding which technologies to use. These were Wi-Fi, Bluetooth, wireless Internet and mobile devices, EverNote, Facebook and Twitter. The answer the "how" question determined which pedagogical theory was going to be used. This was the abovementioned theory of constructivism. This is a theory that provides students with the possibility to create information by seeing, experiencing, reading, and perceiving. It was assumed that by creating their own information while studying in a MSSLS environment, students will increase their self-directed learning skills.

The following concepts for a MSSLS have been developed:

- Thanks to the EverNote cloud system, more than one student can carry out their tasks within the system individually or cooperatively, whenever they want and in whichever environment. They can also use the system offline. All students can edit their text and materials freely, take photographs, make video and audio recordings, and take notes.
- Students can share the notes they have created on their Twitter or Facebook pages and groups whenever they want.
- Students are free to work with their mobile phones, PDAs or desktop computers.
- Students can carry out their uninterrupted communication from groups set up on social networks and always be aware of each other's work.

EverNote has a lot of functions. It has some tools such as Skitch, Evernote Hello, Wev Clipper, EchoSign, Voice2Note, CallNote, MindJet, and EyeFi. Skitch is a drawing and photo annotation tool that allows you to quickly sketch out an idea or add notes, maps and screenshots. Evernote Hello integrates calendar and Evernote account so user has related information. Web Clipper is a bookmark replacement. EchoSigh enables users to electronically sign documents and keep them in Evernote account. With the Voice2Note, users can record an audio note with app itself. It does not transcribe it, but you can save audio and then add written notes to it later. CallNote records Skype phone conversations and puts the recording in Evernote. User can even record group calls. With the MindJet users visualize their ideas into mindmaps – it drops them into notebooks. EyeFi is a wireless camera memory card that you can set to sync with your Evernote account.

The course materials were prepared interactively according to Sharable Content Object Reference Model (SCORM) standards. Course materials (course notes, visuals, texts, videos, sound, files and widgets) that were reviewed by the field experts were embedded into the EverNote, and the links about the course were also added.

Moreover, the expectations of instructors from students throughout the term and their expectations from projects were explained in detail at the beginning of the study. EverNote, Facebook and Twitter accounts were set up by the researcher. The reason two social networks were used was to reach the students quicker; a connection was established between the two networks enabling anything shared on one network to be seen on the other. Therefore, when students connected to either one of them they would see something shared on the other.

3.3 Application

Starting from April 2012, learners were trained in a computer lab which had a data projector and screen for the trainer. At the beginning of the training, Self-Rating Scale of Self-Directed Learning (SRSSDL) and Mobile Supported Seamless Learning Perception Scale (MSSLPS) were applied to the learners to determine Self-directed learning adequacies and seamless learning perceptions before the study.

Each learner had an individually networked laptop or another mobile device which included a "clip to EverNote". Learners were shown an overview clip about EverNote. Learners were given a brief outline of EverNote's functions and were invited to sign up for an account. The trainer showed a web clipping using the web interface. The trainer also used tags and showed how to create ''notebooks'', use the search function, export notes, and email notes in and out of EverNote. They were also shown how to create to-do lists and check items on these lists as finished. After they were shown how to synchronise their notes, they were also told how to upload the application to their mobile devices.

Learners were shown how to take snapshots and voice notes using the mobile tool application, and how to synchronise these. Learners were also shown how to share notes via Facebook or Twitter. The trainer distributed the students hand outs on the use of EverNote. The training took approximately 90 min. At the end of training trainer asked whether learners had any additional training needs; 37 said no, 3 said yes. Thus, trainer studied again with 3 learners. And then it was considered training as adequate.

The study was carried out in one academic semester (12 weeks) according to the blended learning approach. The learners enrolled in the course and communicated with the instructor for 2 hours a week in a technology integrated class, and for the rest of the week they communicated asynchronously and synchronously on the Internet.

The learners' tasks throughout the study were to research, discuss the given topics with their friends, and to develop their course projects. The learners discussed the projects which they developed online after uploading them on EverNote and sharing them on Twitter or Facebook Pages. The instructor was attentive and helped the learners when they asked for help. Moreover, the instructor managed the learning spaces, organised the activities, followed the synchronous and asynchronous learners' activities and analysed them. Learners uploaded their works to the spaces and presented comments to their friends. Feedback on these studies was provided both online and in class environments. At the end of the 12 weeks learners presented the projects. On completion of the presentations and evaluations, the scales were applied to the learners again. Moreover, the researcher interviewed 15 learners face-to-face for 15-20 minutes.

3.4 Data Collection and Analysis

3.4.1 SRSSDL

The Self-Rating Scale of Self-Directed Learning (SRSSDL) scale (α=.95) designed by [Williamson, 2007] was used. The scale was composed of 60 items. The scoring ranged from 5 "Always" to 1 "Never". The survey was offered online in order to improve the response rate. [Williams, 2007] indicates that learners, who score high on this scale, indicating high level of self-directedness in their learning process, should also be supported in order to maintain and further develop their abilities in becoming lifelong learners. Scores should be between 60 and 300. Following table indicates the learners' level of self-direction in learning.

Range	Level	Interpretation
60-140	Low	Teacher guidance is required for the learning process. Any changes necessary for improvement must be identified and a possible re-structuring of the methods of learning must be done.
141-220	Moderate	These students are progressing toward becoming self-directed learners. Areas for improvement must be identified and evaluated, and a strategy can be adopted with teacher guidance when necessary.
221-300	High	Students are effective self-directed learners. The goal is to maintain progress by identifying strengths and methods for consolidation of the students' effective self-directed learning.

Table 1: Score levels for self-directed learning scale

3.4.2 MSSLPS

Mobile Supported Seamless Learning Perception Scale was developed by [Ozdamli, 2011] (α=.95). The scale had two dimensions and was composed of 25 items. First dimension related to advantages of m-learning (13 items), and second dimension is related to status of m-learning applications to use in courses (12 items). Each question was scored on a 1- to 5- point Likert scale, where 5 represented a highly positive perception of learners.

3.4.3 Interview

As for the qualitative part of the study, an interview form which was semi-structured and did not include leading questions was constructed to examine the learners'

experiences during the semester. The interview form consisted of 3 questions. In order to maintain the validity of the interview's content the questions were prepared by the author; 5 field experts were consulted and the necessary modifications were made to the interview form used in the light of their recommendations. An appropriate environment was prepared for the learners to give accurate and sincere answers to the questions during the interviews. A voice recorder was used during the interviews, each of which lasted approximately 15-20 minutes.

In the analysis of the data, paired sample *t*-test, mean and percentage were used.

4 Results

4.1 Findings about the Self-Directed Learning Levels of Learners

Paired sample t-test analysis was applied to see if there was a difference between the self-directed learning skill levels of students before and after they worked on mobile supported seamless learning spaces. The results of these paired sample t-test analyses are presented in the table below.

	N	Mean	SD	sd	t	P
Pre-test	40	216.47	34.51			
Post-test	40	233.22	28.82	39	-4.971	.000

*Significant at the .05 level of confidence

Table 2: The self-directed learning levels of the learners before the study and after the study

A significant increase was observed between the self-directed learning levels of learners before (M=216.47, sd=34.51) and after (M=233.22, sd=28.82) the learners studied in MSSLS. In general, there was a significant increase in the self-directed learning levels of the students after they studied in MSSLS. While the students' self-directed learning levels were moderate before they studied on MSSLS, they had reached high levels by the end of the term. For example, whereas before the study students gave the answer 'occasionally' to the statements "I consider teachers as facilitators of learning rather than providing information only" and "I self-assess before I get feedback from instructors", after the study they tended to give the answer 'always'. This result demonstrates that mobile supported seamless learning space positively affected students' self-directed learning activities.

4.2 Students' Perceptions on Mobile Supported Seamless Learning

In order to find out whether there were any statistically significant differences between students' perceptions studying in MSSL, paired t-test was carried out. The mean and standard deviation values of students' perceptions are presented in [Tab. 3].

Factors		N	Mean	SD	sd	t	P
Advantages	Pre-test	40	3.91	.54		-6.003	
	Post-test	40	4.25	.30	39		.000
Status of applications in courses	Pre-test	40	4.17	.62		-3.905	
	Post-test	40		.40	39		.000
General	Pre-test	40	3.89	.53		-5.666	
	Post-test	40	4.21	.34	39		.000

*Significant at the .05 level of confidence

Table 3: The learners' perceptions on MSSL before and after the study

The findings of the analysis carried out after the study to determine the students' perceptions on mobile supported seamless learning applications showed a significant positive shift in their perception ($t=-6.003$, $p<.05$). When we interpret the findings we can say that the students' perceptions on the advantages of these applications were affected in a positive way. Similarly, it was found that their perceptions on the effectiveness of EverNote, social networks, and other mobile supported applications during lessons also showed a positive increase by the end of the term ($t=-3.905$, $p<.05$).

In the table above, one can see that generally speaking the students' perception on mobile supported seamless learning spaces increased significantly ($t=-5.66$, $p<.05$). The findings show that their attitude towards the advantages and effectiveness of these spaces has improved. With this, we can say that the students benefited from the advantages these spaces provided them during the term.

4.3 The Students' Opinions on Using Mobile Supported Seamless Learning Spaces

After completing the study, the researchers asked the students several questions duting face-to-face interviews in order to find out their opinions on the study. In response to the question "What are the most important advantages and disadvantages of using EverNote, social networks and mobile devices in lectures?" the students stated that the most important advantage of EverNote was that they could access their folders and work whenever they wanted and from whatever device available. As their mobile devices had continuous Internet connections, they also could instantly see any sharing that was made in the social network sites. Many students mentioned how easy it was to reach their friends and teachers whenever they wanted. In addition, most students mentioned that this study was interesting and entertaining and, consequently, their motivation increased. Besides, those students mentioned that integration with lectures in popular social networks such as Facebook and Twitter always attracted their attention. Some students mentioned that continuously following the sharing took up a lot of their time. However, some of the students claimed that the application did not have any negative effects.

The answers of students to the question; "Would you prefer your lectures to be only on the Mobile Space or both in class and Mobile Supported Seamless Learning Space?" demonstrated that all of the students preferred using both of them. The fact that the students did not exactly move on to distant learning gives the impression that they are not ready for a transition to only mobile learning.

The students' answers to the question "Which of the lectures could be more successful when using Mobile Supported Seamless Learning Space" showed that it could be used in all the lectures. Most of the students considered that it could be used perfectly in all the lectures because there was an interactive environment and offered instant learning possibilities. The students have also indicated that in lessons which require collaborative working this space would be very effective. A group of students stated that with the cloud systems sound and video recording feature, all lessons carried out in class could be recorded and therefore could possibly be used in all activities taking place inside or outside the classroom. Learners who studied in MSSLS stated that these experiences would affect their future classes. They indicated that they wanted to use these systems in future courses and in daily learning activities. Therefore, MSSLS should improve learners' self-directed learning and lifelong learning competences.

5 Discussion

In this paper, we have discussed the effectiveness of mobile supported seamless learning space in developing self-directed learning abilities and students' perceptions on seamless learning. It was found that most of learners showed positive attitude towards seamless learning space and usage of cloud systems and social networks. The study results were positive and were in favour of the mobile supported seamless learning space. All of the learners expressed their satisfaction with learning with mobile devices, cloud system, and social networks. [Cavus and Ibrahim, 2009] who studied the use of mobile devices in learning activities had similar findings. An important result of the experimental study which was carried out with the learners studying in mobile supported seamless learning space was the statistically significant higher self-directed learning ability level compared to that before the study. Similarly, a study by [Sze-Yeng and Hussain, 2010] implied that the web technology platforms help develop self-directed learning abilities among adult learners. In their study, [Sha et al.2012] indicated that mobile learning supported spaces positively affect students' management of their learning activities. This result demonstrates that mobile supported seamless learning space affected students' self-directed learning activities positively. Therefore, it can be claimed that mobile supported seamless learning spaces could be used to improve learners' self-directed learning abilities.

The results of the study also indicate that learners' perceptions on seamless learning became more positive at the end of the study. Also, when the acquired findings are assessed, a positive shift was observed in students' perception on the advantages of these spaces and the effectiveness of their application. As in the [Zhang et al. 2010] study, the students' perceptions changed after using mobile technologies for learning purposes. The learners that studied with mobile devices were found to have more positive perceptions in many previous studies ([Maniar, 2007]; [Wang et al. 2009]; [Williams and Bearman, 2008]; [Fahad, 2009]; [Caglar and Demirok,

2010]). Therefore, it can be said that students benefited from the advantages of the space during the term and that the space was useful. The results of the learners' interviews confirm that the learners studying with mobile devices have an advantage such as access to documents, receiving rapid feedback from the lecturer and the peers. The interactivity of the spaces was the main reason for their satisfaction. Consequently, this shows the benefits of MSSLS. Clearly, it was seen that mobile supported seamless learning spaces increased students' self-directed learning levels and perceptions on seamless learning.

Additionally, the results of this study indicated that sharing and learning information using EverNote and social networks such as Twitter and Facebook encouraged learners to attend to courses effectively. Similarly, [Hung and Yuen 2010] study pointed out that the use of Facebook and other social websites had positive effects on learning. [Schepman et al. 2012] found similar results of using EverNote in lectures.

6 Conclusion

The advantages of using web tools and mobile devices in education are accepted by many researchers ([Bal, 2010]; [Looi et al. 2010]; [Hsu and Ho, 2010]; [Ozdamli, 2011]; [Ozdamli, 2012]; [Bicen, 2012]). While many researchers mention the positive effects of mobile learning, some indicate that students without mobile devices or a continuous Internet connection this may experience some problems. In order to overcome the negative effects, a cloud system could be useful. In this study EverNote was used as a cloud system. The EverNote system has a cross platform that enables its use on desktop computers and mobile devices. Moreover, students can work on the platform without the need of a continuous Internet connection and only go online when their studies are synchronised. To enable the continuous communication of the students among themselves and with their teachers, the highly popular social networks of our day, Twitter and Facebook, were used. These tools are available free of charge on the Internet, and the lecturer could choose the ones appropriate in her/his own context.

As in every research, there were a number of limitations to this study. The first limitation relates to the sample size of the study. Nevertheless, it is the authors' suggestion that any further research in this area should strive for larger sample sizes so that more elaborate analysis can be performed and the studies should be longitudinal. Only computer education instructional technology department students were surveyed. Nevertheless, it is suggested that any further study of Seamless Learning Spaces should strive to include different departments so that more elaborate analysis can be performed and the studies can be longitudinal.

In conclusion, the results indicated that MSSLS support flexibility in place and time of learning and increase learners' self-directed learning levels and perceptions on seamless learning. Also, MSSLS in education provides students with a reformist, creative and progressive environment. MSSLS allow learners to engage in unique and individual experiences.

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