Pre-service teachers' opinions on cloud supported social network

Seher Ozcan *, Department of Informatics, Gazi University, Ankara, Turkey.
Sahin Gokcearslan, Department of Informatics, Gazi University, Ankara, Turkey.
Volkan Kukul, Department of Informatics, Gazi University, Ankara, Turkey.

Abstract

Pre-service teachers are expected to use new technologies such as Google+ which facilitates contacting, sharing in certain environments and working collaboratively with the help of cloud support in their lessons effectively. This study aims to examine pre-service teachers' opinions regarding the use of Google+ to support lesson activities. In this study the data was collected using semi-structured interview techniques carried out with pre-service teachers (n=15) chosen by purposeful sampling. The purposes of using Google+ were sharing, chatting and communication, whereas Google Docs was mostly used for its efficiency, interaction, the prudential purpose of use and to support teaching. When the views of the pre-service teachers regarding the use of Google+ were examined it was found that interface being thought to be more complex than other social networks affected the teachers' first impressions negatively. As the negative first impression towards Google+ changed in time, it was stated to have provided a number of teaching opportunities. Some suggestions regarding the opportunities Google+ offers were also made.

Keywords: Google+, social networks, pre-service teachers' opinions, cloud computing.

* ADDRESS FOR CORRESPONDENCE: **Seher Ozcan,** Department of Informatics, Gazi University, Ankara, Turkey.
E-mail address: seherbasegmez@gmail.com

1. Introduction

People need to socialize all their lives and have been in places where they were able to socialize to satisfy this need. Together with the developing technology the means of socializing transferred to the Internet environment. With the emergence of web 2.0 which aims at interpersonal social communication (Davis, 2008) the web turned into a platform where innovative technologies were built which started to present people various environments in which they could upload and share content (Cormod & Krishnamurthy, 2008). Social networks, which have become common within the last years, are environments where people can share content such as video and photographs etc, (Boyd & Ellison, 2007) and where they contact other people and thus are able to socialize (Murray & Waller, 2007). According to the Turkish Statistical Institute (TUIK), in the first three months of 2014 78,8 % of individuals used the internet to access social networks (TUİK, 2014). The Pew Research Company also found similar results in their study. Approximately half of the young people in countries such as the USA, Russia, Czech Republic and Spain use social networks (Pew Research, 2012). The fact that social networks are used so widely has caused a change in people's business and private lives as well as education lives (Ponnudurai & Jacob, 2014). Students spending so much time with social networks has resulted in the development of the idea of making use of these environments while planning teaching (Mazman & Usluel, 2010). The opportunities presented by social networks to students such as organizing information, sharing ideas, giving feedback and interpreting, commenting on others' shares, learning from others, taking the responsibility of one's own learning (Boyd & Ellison, 2007; Wang, Woo, Quek, Yang & Liu, 2012) have aroused the attention of educationalists and the features of social networks such as interaction, cooperation, information and source sharing have begun to be used (Ajjan & Hartshorne, 2008; Mason, 2006; Selwyn, 2007), and thus students were made to become more active in the teaching environment.

In terms of social media contexts, learning has been an indispensable part of the university experience as well as being autonomous, informal and high in terms of self-motivation (McLoughlin & Lee, 2010). Social networks are environments that enable the students to interact with their teachers and classmates outside of the classroom (Mazman & Usluel, 2010). When the fact that one of the standards of 21st century students is communication and cooperation, students being able to interact with the specialists, teachers and other students from different places, in different times might be the answer to the question of why social networks should be used in education. Also, the use of technologies that allow cooperation in education increases active participation through creating content and fondness of the student through course content and enriches the learning process (The International Society for Technology in Education (ISTE, 2007a) Parker & Chao, 2007). Especially social networks such as Facebook, Twitter, and Google+ receive attention for the free applications they offer to the customers. For instance Google Docs, Google Circles and Hangout within Google+ facilitate collaborative study, interaction and sharing, and enrich the learning environment.

1.1. Google+

Although the purpose of Google+ and Google applications, which are among the most widely used social networks, are not education-oriented, with their tools they enable the students and teachers to create and facilitate exciting opportunities to support online collaborative learning (Cheung & Vogel, 2013; Revere & Kovach, 2011). When it first appeared the only way to sign up Google+ was through invitation; however, now anyone with an active Google account can join Google+ (Kaste, 2011). In terms of education, Google applications that make collaborative work easier are Google Docs, Circles, Sparks, Hangout, Google Sites and Google+, which integrate all of them in one social network. Google Documents is an application which offers simpler office applications and enables document sharing on Google accounts. Circles enables you to create environments and share whatever you want to with each environment (Erkollar & Oberer, 2011). Google+, which facilitates the creation of discussion groups through this feature, (Yee & Hargis, 2011) helps users to access articles and videos related to

their interest via Sparks. Another striking feature is Hangout, which makes video talk with up to 10 people possible. The distinctive feature of Hangout is the fact that it allows the sharing of documents created on Drive (Cohen, 2012), which helps the teacher hold online discussions with the students and talk about projects (Erkollar & Oberer, 2011) as well as making lessons more enjoyable and effective (Yensen, 2012), and contributing to finding creative methods while using technology for lessons (Educause Learning Initiative, 2008). The reason for choosing Google+ for this research is the fact that it can gather students in a mutual area, make room for sharing and organizing documents and enable synchronicity and collaboration while doing everything mentioned above. Moreover, the feature of being able to share a topic only with the related environment is another prominent feature of Google+.

1.2. Cloud computing

There are many definitions of cloud computing. More than twenty definitions are reported to exist in the literature (Vaquero, Rodero-Merino, Caceres & Lindner, 2008) one of which is "clouds, or clusters of distributed computers, providing on-demand resources and services over a network, usually the Internet, with the scale and reliability of a data center."(Grossman, 2009). According to another definition "Clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services)" (Vaquero et al., 2008). Today many companies are making use of the advantages of cloud computing (Hamlen & Thuraisingham, 2013). Data being transferred to the cloud environment removed the need for users to save their data on extra hardware. Other benefits of Cloud Computing can easily be integrated into education.

Cloud computing offers practical solutions for teachers to organize their lessons. Teachers have the opportunity to work with their students synchronously at any time by means of the applications, tools and services (Jou & Wang, 2013). They can access the documents sent by the student without needing external hardware and thus they can continue education activities anywhere. The students being able to work on the same document simultaneously helps design education environments that support collaboration. Owing to this feature cloud computing plays an important role in gaining student collaboration (ISTE, 2007a), which is one of the student standards of the 21st century. Applications such as Dropbox, OneDrive, EverNote, and Google Drive are among cloud applications to be used in education, but since Google+ is integrated with Google Drive, Google+ was chosen as the cloud computing tool in this study.

1.3. Purpose

The fact that young people use social networks for most aspects of their lives makes the teachers integrate these technologies with their classroom environment. Therefore, pre-service teachers should have the skills to design and develop learning experiences of the digital age (ISTE, 2007b) and be well-quipped individuals. Based on the fact that social networks are a part of our lives and provide opportunities to support collaboration, it is considered significant to raise rising generations of teachers' awareness on how this kind of applications might contribute to their lessons and thus it is thought that gaining these skills would play a significant role in their professional lives. For this reason Google+, which is thought to be serving the purpose of the study, was chosen as an example of social network and the aim was to examine the views of students regarding the use of Google+ to support course activities.

2. Methodology

An exploratory qualitative research design was used to address our research questions. An interview method was used to evaluate pre-service teachers' perceptions regarding the learning environment.

2.1. Participants

Maximum diversity sampling was used in order to determine the study group and the purpose of this sampling method is to determine the similarities and commonalities among the situations where there is diversity, not generalizing by ensuring diversity (Patton, 2005; Yildirim & Simsek, 2006). During the process 5 classrooms from the departments of pre-school teaching, classroom teaching, and history teaching were included. The reason why these departments were chosen was the fact that the instructor used Google+ tools and features in order to support the lessons during the spring term of 2013. 150 students attended the lesson in these classrooms. 15 volunteer pre-service teachers - 3 from each classroom - participated in the study group. The pre-service teachers were categorized into three groups, namely "Good", "Average", and "Low", by considering the participation, sharing, posts or comments on the posts. The participants were chosen by this categorization via a maximum diversity sampling method, which is a purposeful sampling method. The aim of the researchers was to be able to receive a wider range of answers to the questions on the basis of the views of these students.

Table 1. Participant info

Student	Sex	Department	The level of using Google+
NR1	Female	Preschool	Low
NR2	Female	Primary School Teaching	Good
NR3	Female	Primary School Teaching	Average
NR4	Male	Primary School Teaching	Good
NR5	Male	History Teaching	Average
NR6	Male	History Teaching	Low
NR7	Female	History Teaching	Good
NR8	Female	History Teaching	Good
NR9	Male	Preschool	Good
NR10	Female	Preschool	Average
NR11	Female	Preschool	Average
NR12	Female	Primary School Teaching	Low
NR13	Female	Primary School Teaching	Average
NR14	Male	History Teaching	Low
NR15	Male	Preschool	Low

2.2. Procedure

The pre-service teachers were interviewed following the four-week application process. The interview method is considered useful in terms of ensuring accurate and complete data regarding the research (Judd, Smith & Kidder, 1991). A semi-structured interview method was used during the data collection process. The interview questions were prepared by the researchers and four experts were asked for their opinions on the questions; the questions were finalized in line with these opinions. In this study Google+ was used to support ICT course activities of the pre-service students. In the first week of the four-week process Google+ tools were introduced. In the second and third weeks computer-based education was discussed and in the final week distance education was discussed. The

instructor uploaded the presentations and materials via the Drive application of Google+ in the beginning of the application. The students who studied the presentations and completed their preparation process participated in the lessons actively via the question-answer method. The students shared their course-related materials with their classmates and the instructor via Drive. The ones who did not attend the lesson could access the course materials and discussions asynchronously thanks to the advantages of Cloud Technology whenever they wanted to via tablet computers, mobile phones or laptops. Following the application, face-to-face interviews were recorded with the approval of the participants. The interviews, which included open-ended questions, were done in the ICT laboratory and took 20 minutes on average for each participant. The recordings were transcribed later and shown to the participants to verify that the recordings were correct and complete and to ensure data reliability. Open-ended questions were prepared in order to carry out an effective interview by obtaining more detailed data. The Technology Acceptance Model (TAM), which was developed by Davis, Bagozzi and Warshaw (1989), was selected as the baseline to prepare open-ended questions and it examines the behaviors of accepting and using information technologies. In addition, pre-service teachers were asked about the tools of Google+ that support learning and their future plans to use these tools. A 10-item interview form was prepared for the interviews by examining the relevant literature and 6 experts experienced in qualitative research were consulted for their opinions. The interview form was prepared in line with the expert view and the 6-item final form was prepared. The interview questions were as follows:

1. For what purpose(s) do you use Google+?

2. How would you evaluate Google+ in terms of usefulness?

3. Are there any difficulties you have while using Google+?

4. In your opinion which Google+ tools or features are appropriate to use to support learning?

5. Which Google+ tools or features would you consider using in the future to support learning activities?

6. Would you find a lesson supported with Google+ beneficial?

2.3. Data analysis

The data obtained within the context of the study were analyzed using a "content analysis" method. Content analysis is analyzing the data under certain concepts and themes via which the data is conceptualized and then the concepts are organized systematically and finalized with the themes created during the analysis process (Patton, 2005).

3. Findings

The themes created by coding the questions related to the use of Google+ tools were presented. Student statements regarding the views the pre-service teacher mentioned 5 or more times.

3.1. The purpose of using Google+

The first research question was "For what purpose(s) do you use Google+?" and the related findings were presented in Table 1.

Table 2. The purpose of using Google+

The purpose of using Google+	f
Sharing	13
Chatting	9
Communicating	9
Creating Documents	6
Interaction	3
Following	3
Other	11

In Table 2 the themes created as a result of coding were sharing, chat, communication and creating documents. 13 of the interviewed pre-service teachers stated to use Google+ for sharing. The student NR10 said, "*I use Google+ to share videos mostly. My friends share documents and I can access them. It is far better than other social networks and in terms education it is more appropriate; sharing documents and creating circles are rather good features of Google+.*" Similar findings regarding content sharing were also found in other studies (Corrocher, 2011) and the advantages of Google tools for sharing were reported (Cheung & Vogel, 2013). 9 of the students reported using Google+ to chat. The student NR05 said*, "I use Google Talk tool[s?] for chatting and messaging; it is very pleasant and effective.*" Similarly, Frazel (2009) pointed out that Google talk tools enabled sending files and video talk, and would be an effective tool in terms of being used via various mobile devices for in-class and non-class activities. 9 of the students stated that they use Google+ for communication. The student NR15 said, *"I use Google+ to talk to my friends and to make video calls."* 6 of the pre-service teachers reported using Google+ to create documents. The student NR 04 said, *"We have the opportunity to interact with each other and organise the documents together. While working together, our friend can make a snap correction and you can see it."* In the study that examined the student behaviours developed after using Google+ in a lesson activity Wu (2014), Google+ was reported to be an effective tool for communication and sharing documents. According to the study results, the students exhibited a positive attitude and satisfaction regarding the new teaching environments supported by Google+.

3.2. Usefulness

The second question of the research was "How would you evaluate Google+ in terms of usefulness?" The findings regarding this question were presented in Table 3.

Table 2. The Evaluation of Google+ in terms of user-friendliness

Ease of use of Google+	f
Ease of use	14
Accessibility	12
Document Sharing	9
Advantages compared to other social networks	6
Chatting	4
Other	16

When Table 3 was examined, it could be seen that the themes found were ease, usefulness, comparison with other social Networks, sharing and documents. 14 of the pre-service teachers stated that Google+ was easy to use. The student NR01 said, *"It is easy to use, everything is in one place."* 12 of the pre-service teachers found Google+ easily accessible. The student NR02 said, *"We can use many things simultaneously. We can access our documents and chat quite easily."* 9 of the pre-service teachers focused on document sharing. The student NR04 said, *"I like learning and sharing new things, so sharing documents is rather important for me."* 6 pre-service teachers compared Google+ with

other social networks. NR08 said, *"Document sharing and video conference are great features; the other social networks do not facilitate this."* Similarly, Google+ was reported to offer appropriate tools for learning activities and to be easy to use (Yee & Hargis, 2011).

3.3. Features that make Google+ difficult to use

The third question of the research was "Are there any difficulties you have while using Google+?" The findings regarding this question were presented in Table 4. After the coding, 3 themes were found: "negative first impression, complicated interface and document sharing".

Table 3. Features causing difficulty in using Google+

Difficulty of use of Google+	f
Negative first impression	8
Confusing interface	5
Document Sharing	5
Language	3
Disadvantages compared to other social networks	1
Other	2

Eight of the pre-service teachers mentioned negative first impressions of Google+. The student NR08 said, "This kind of application has unique features and symbols. Because I was not used to these symbols, I had difficulty in the beginning." 5 of the pre-service teachers stated that Google+ had a complicated interface. The pre-service teacher NR04 said, "We did not know what was where and, how we could access it, maybe that's why it was difficult." 5 pre-service teachers also stated having difficulty in sharing documents. The student NR06 said, "Google documents were difficult to use, The application could be more illuminating." Unlike these findings, it was stated that Google+ was similar to Facebook, one of the most famous social networks, in many ways and was not complicated to use (Curran, Morrison & Mc Cauley, 2012); however, in one study many participants (14/15) mentioned, "it was easy to use due to the interface design and responsiveness" (Watson, Besmer & Lipford, 2012).

3.4. Google+ features appropriate to supporting teaching

The fourth question of the study was "In your opinion, which Google+ tools or features are appropriate to use to support learning?" The related findings were presented in Table 5.

Table 4. Tools appropriate to support teaching

Google+ tools to support teaching and their features	f
Environments	13
Google documents	11
Communicating/contact	7
Chatting	7
Sharing	7
Other	18

Five themes were found as a result of the coding: "Circles, document sharing, communication/contact, chatting, and sharing". 13 of the pre-service teachers set forth that the Google Circles tool of Google+ was appropriate to support teaching. The pre-service teacher NR14 said, *"Thanks to the Circles, we can share as if we were in a classroom. Via circles a person can share whatever she/he wants to with a circle."* Similarly to this finding, Yensen (2012) referred to the use of the circles tool for supporting students and Wu (2014) pointed out the use of circles for dividing the students into groups.

11 of the pre-service teachers said the document-sharing feature of Google+ was an appropriate tool for supporting teaching. The pre-service teacher NR05 said, *"Every individual can use Google+ by her/his branch. Instructors can share sources via Google documents. We can access the sources even if we did not attend a lesson."* A positivie opinion was stated by Wu (2014). According to Wu Google+ is an effective information, transmission and storing tool, which enables students to share information, and will increase students' level of interaction and communication thus rendering the learning process more enjoyable. 7 of the pre-service teachers stated that Google+ was an appropriate environment to support teaching by enabling communication/contact. The student NR06 pointed out that *"It can be used for non-class activities and absentees."* 7 of the pre-service teachers stated that the Google+ chat tool was an appropriate tool to support teaching by enabling communication/contact. The student NR1 said, *"The discussion environment is very enjoyable and I think it was our best lesson. We liked talking online. I find chatting rather useful. I like talking online better than talking face-to-face. It increases class participation."* Similar opinions such as Google+ enabling communication, interaction between the teacher and the student and, being used to reach a consensus and encouraging passive students were also expressed (Wu, 2014). 7 of the pre-service teachers stated that Google+ was an appropriate environment to support teaching by enabling sharing. The student NR06 said, *"It can be used to get information and also to organize a meeting with friends. We can plan by keeping our seats."*

3.5. Google+ tools which may be used in the future

The fifth question of the research was "Which Google+ tools or features would you consider using in the future to support learning activities?" and the related findings were presented in Table 6.

Table 5. Google+ tools to be considered for use in the future

Google+ tools to be considered for use in the future	f
Document Sharing	11
Video conference	6
Circles	6
Communicating	6
Being independent of time	5
Other	14

When the pre-service teachers were asked if they would use Google+ tools or features in future to support learning activities, all of them answered positively and their preferences were collected under 6 headings which were "document sharing, video conference, circles, communication and being independent of time". 11 of the pre-service teachers stated that they would use Google+ for sharing documents. The student NR09 said, *"As a teacher who feels comfortable in the information era, I can teach Google+ to my students and create an assignment system by sharing my documents and I can share my documents with other classrooms via Circles tool."* 6 of the pre-service teachers indicated that they would use video conference features in the future and NR06 said, *"I will have the opportunity to study after school. I might use video conference since it is more useful than face-to-face interviews."* Another prominent title was circles. The student NR05 said, *"We can gather certain*

people in a common environment via Google circles. We can divide classrooms by circles and start a certain topic and teach a historical event by commenting on it." 5 of the participants reported using Google+ since it would give them time independence. The student NR04 said, *"It is good to be online anytime, anywhere. Voluntary participation would be encouraged rather."* Similarly, in a study regarding using Google+ in the future conducted in an institution that provided online teacher education it was revealed that students' perceptions of social presence and educational presence increased thanks to Google+ and that there was no difference between WebCampus and Google+, they were both equally effective." Pre-service teachers suggested teachers to use Google+ tools in the future (Strudler & Grove, 2013).

3.6. Perceived benefit

The sixth question of the research was "Would you find a lesson supported with Google+ beneficial?" and the related findings were given in Table 7.

Table 7. Perceived benefit

Benefit	f
Document Sharing	6
Permanency of learning	2
Class participation	2
Efficient course environment	2
Accessibility	2

Fourteen of the pre-service teachers stated that they found lessons supported with Google+ useful and sharing documents was the most prominent theme. The student NR07 said, *"We can continue to study thanks to Google+ documents tool. What is taught in lessons might be forgotten. Words fly away."* The results of a study in which Google+ was used for collaborative learning in project-based learning were also similar to this study. According to the results, information sharing in a collaborative learning environment affected attitudes and behaviors regarding the Google application whereas the students desire to use technology did not affect it.

4. Discussion

In this study, pre-service teachers' views regarding the use of Google+, an example of social networks, to support lessons were obtained and the purposes of their usage were determined. When the students' purposes of usage regarding this social network were examined, it was seen that sharing, chatting and communication were the outstanding purposes of usage. While this situation shows similarity with the students' purposes in using other social networks (Mazman & Usluel, 2010), creating and sharing documents via Google+, unlike other social networks, stands as an outstanding theme. Besides Google documents enabling the students and teachers to share freely, developing cloud based learning environments makes observing the students easier and creates opportunities for mobile learning (González-Martínez, Bote-Lorenzo, Gómez-Sánchez & Cano-Parra, 2015). Google+ allowing the student to share her/his document with her/his friends presents a good opportunity to be assessed by the student's peers. The peer assessment process during which students organize each other's text collaboratively provides effective learning (Tal-Elhasid & Meishar-Tal, 2007) and assessment with high correlation is ensured owing to teacher assessment (Tseng & Tsai, 2007). Also, it allows the students to access their document from any computer with an internet connection without worrying about the software version or compatibility problems, which meets their everyday life needs (Educase Learning Initiative, 2008). When the views of the pre-service teachers regarding the use of Google+ were examined it was found that the interface being thought to be more complex than other social networks affected the teachers' first impressions negatively. Generally social networks'

interfaces being simple may have resulted in pre-service teachers perceiving Google+ as having a complex interface. Furthermore, they reported having had difficulty in understanding some of the symbols and abbreviations when they used Google+ for the first time, which might have stemmed from the fact that some of the expressions on Google+ were unusual to them (e.g. circles) and did not have Turkish equivalents (e.g. hangouts). With reference to the fact that social networks should be user-friendly and have simple interfaces to be successful (Osman & AbRahim, 2011; Shaw, 2014) Google+ should eliminate the negative first impression on users. However, it was also seen that the teachers' first impression changed after they used Google+. The fact that ease of use ranked first within the theme about the usefulness of Google+ was an important indicator of this situation. In terms of usefulness, sharing documents comes after easiness of use. While the teachers compared Google+ with other social networks, they also pointed out the importance of document sharing. The reason for this may be Google+ running synchronously with Google Docs, accessing documents through internet connection without external hardware and working together with their friends. The fact that pre-service teachers highlighted Google documents shows the significant role of cloud computing for social networks. In a similar study about using a different social network as LMS (Wang et al., 2012) emphasized that the social network they used did not satisfy their needs completely. Thus, the researchers used the documents application of Google to store the learning materials and benefited from a different website to collect data. These applications being free (e.g. Google Docs, Forms...), may be thought of as an opportunity for educationists who want to use social networks as LMS. Pre-service teachers elaborated on the point that features such as chat, multiple video talks and document sharing offered by Google+ made it a distinctive social network and that it facilitated more interaction.

While referring to the opportunities for interaction presented by Google+, pre-service teachers emphasized that it enabled interaction within both the learning environment and social environment, which shows that social networks offer learners an opportunity to interact and learn outside the learning environment (Selwyn, 2007; Ajjan & Hartshorne, 2008).

Documents might have attracted pre-service teachers due to creating a collaborative study environment and accessing documents without external hardware thanks to cloud technology (Educase Learning Initiative, 2009; Sultan, 2010; Siegle, 2010). However, when the pre-service teachers were asked which features they would consider using, it was seen that they would prefer document sharing, video conference and circles, respectively. Circles being the most striking feature in terms of supporting learning yet being a less preferable application in the future may have stemmed from the fact that pre-service teachers found it complicated to use or that they could not learn how to use it sufficiently. For this reason, teachers being informed on how to support learning via Google+ applications may affect pre-service teachers' professional ideas about using these applications positively.

4. Conclusion

In conclusion, limited use of Google+ in terms education may be an indicator of the fact that the educational potential of Google+ is not fully known. In order to raise awareness of this, instructors should make use of social networks more while planning their lessons. Planning project-based teaching about the educational use of social networks might be useful for pre-service teachers in terms of becoming aware of the fact that they could use social networks in their future professional lives. It is also suggested that studies on learning activities done on tablet computer and mobile phones in which Google+ tools can be used should be carried out. Moreover, a content analysis to be done on the log records of students related to their social network interactions is thought to be important. There are 3 limitations of this study the first of which is application duration being short. Most of the students learned about Google+ and the applications via this lesson, the ones who knew Google+ previously used only some features of Google+ and none of the students had used Google Documents or Circles before, which shows that Google+ awareness of the students was low.

Ozcan, S., Gokcearslan, S., & Kukul, (2015). Pre-service teachers' opinions on cloud supported social network. *World Journal on Educational Technology. 7*(2), 107-118.

Therefore, if a longer study prepared to raise awareness of such a population were carried out, it would be more beneficial. As a result of the fact that term ended, the study lasted four weeks. 150 students participated in the study, but interviews were held with 15 students chosen via purposeful sampling. The views of other students could have been collected via a questionnaire, which would create data diversity.

References

Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt web 2.0 technologies: theory and empirical tests. *The Internet and Higher Education,* 11(2), 71-80.

Boyd, D. M., and Ellison, N. B. (2007), Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210-230.

Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers & Education*, *63*, 160-175.

Cohen, J. N. (2012). Review: The Potential of Google+ as a Media Literacy Tool. *The Journal of Media Literacy Education*, *4*(1), 9. Retrieved from:
http://digitalcommons.uri.edu/cgi/viewcontent.cgi?article=1086&context=jmle

Cormode, G., & Krishnamurthy, B. (2008). Key differences between Web 1.0 and Web 2.0. *First Monday*, *13*(6).

Corrocher, N. (2011). The adoption of web 2.0 services: An empirical investigation. *Technological Forecasting and Social Change*, *78*(4), 547-558.

Curran, K., Morrison, S., & Mc Cauley, S. (2012). Google+ v Facebook: The comparison. *TELKOMNIKA Telecommunication, Computing, Electronics and Control*, *10*(2), 379-388.

Davis, F.D., Bagozzi, R. ve Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Davis, M. (2008). *Semantic Wave 2008 Report: Industry Roadmap to Web 3.0 & Multibillion Dollar Market Opportunities. Executive Summary.* Retrieved from:
http://www.eurolibnet.eu/files/REPOSITORY/20090507165103_SemanticWaveReport2008.pdf

Educause Learning Initiative (2008). 7 things you should know about Google Apps. Retrieved 10 Novomber 2014 from: https://net.educause.edu/ir/library/pdf/ELI7035.pdf

Erkollar, A., & Oberer, B. (2011). Trends in Social Media Application: The potential of Google+ for education shown in the example of a bachelor's degree course on marketing. In *Software Engineering, Business Continuity, and Education, 257,* 569-578.

Frazel, M. (2009). *Using Google and Google tools in the classroom: Grades 5 and up*. Teacher Created Resources, Westminster, Calif.

González-Martínez, J. A., Bote-Lorenzo, M. L., Gómez-Sánchez, E., & Cano-Parra, R. (2015). Cloud computing and education: A state-of-the-art survey. *Computers & Education*, *80*, 132-151.

Grossman, R. L. (2009). The case for cloud computing. *IT professional*, *11*(2), 23-27.

Hamlen, K. W., & Thuraisingham, B. (2013). Data security services, solutions and standards for outsourcing. *Computer Standards and Interfaces, 35*(1), 1–5.

International Society for Technology in Education (ISTE). (2007a). *ISTE standarts students.* Retrieved 24 November 2014 from: http://www.iste.org

International Society for Technology in Education (ISTE). (2007b). *ISTE standarts teachers*. Retrieved 24 November 2014 from: http://www.iste.org

Jou, M., & Wang, J. J. (2013). Observations of achievement and motivation in using cloud computing driven CAD: Comparison of college students with high school and vocational high school backgrounds. *Computers in Human Behavior, 29*(2), 364–369.

Judd, Charles M.; Smith, Eliot R. & Kidder, Louise H. (1991). *Research methods in social relations* (6th edition). Fort Worth, TX: Holt, Rinehart, and Winston, Inc.

Kaste, M. (2011). *Facebook's Newest Challenger: Google Plus.* Retrieved 24 November 2014 from:
http://jagonews.com/2011/07/google-plus-facebooks-newest-challenger-preview/

Ozcan, S., Gokcearslan, S., & Kukul, (2015). Pre-service teachers' opinions on cloud supported social network. *World Journal on Educational Technology. 7*(2), 107-118.

Mason, R. (2006). Learning technologies for adult continuing education. *Studies in Continuing Education*, *28*(2), 121-133.

Mazman, S. G., & Usluel, Y. K. (2010). Modeling educational usage of Facebook. *Computers & Education*, *55*(2), 444-453.

McLoughlin, C., & Lee, M. J. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, *26*(1), 28-43.

Murray, K. E., & Waller, R. (2007). Social networking goes abroad. *International Educator*, *16*(3), 56-59.

Osman, F. Y., & Ab Rahim, N. Z. (2011, November). Self-disclosure and Social network sites users' awareness. *In Research and Innovation in Information Systems (ICRIIS), 2011 International Conference on* IEEE, 1-6.

Parker, K., & Chao, J. (2007). Wiki as a teaching tool. *Interdisciplinary Journal of e-learning and Learning Objects*, *3*(1), 57-72.

Patton, M. Q. (2005). *Qualitative research*. John Wiley & Sons, Ltd.

PEW RESEARCH, (2012). Social Networking Popular Across Globe. Retrieved 20 November 2014 from: http://www.pewglobal.org/2012/12/12/social-networking-popular-across-globe/

Ponnudurai, P., & Jacob, T. T. (2014). Facebook: A shift from social to academia. *Procedia-Social and Behavioral Sciences*, *123*, 122-129.

Revere, L., & Kovach, J. V. (2011). Online technologies for engaged learning. *Quarterly Review of Distance Education*, *12*(2), 113-124.

Selwyn, N. (2007). 'Screw Blackboard... do it on Facebook!': an investigation of students' educational use of Facebook. Ponencia. En: Poke.

Shaw, C. (2014). *Implementing an online social network for health communication* (Unpublished Master Thesis). The University of New Mexico, Albuquerque, New Mexico.

Siegle, D. (2010). Cloud Computing: A free technology option to promote collaborative learning. *Gifted Child Today*, *33*(4), 41-45. Retrieved July 12 2014 from: http://files.eric.ed.gov/fulltext/EJ898571.pdf on

Strudler, N., & Grove, K. (2013). *I see you: Using the affordances of Google+ to increase social and teaching presence in an online undergraduate teacher education course.* ISTE 2013, San Antonio, TX.

Sultan, N. (2010). Cloud computing for education: A new dawn?. *International Journal of Information Management*, *30*(2), 109-116.

Tal-Elhasid, E., & Meishar-Tal, H. (2007). Wikis in academic courses: Models of usage and collaboration. *Learning in the technological era*, 127-136.

Tseng, S. C., & Tsai, C. C. (2007). On-line peer assessment and the role of the peer feedback: A study of high school computer course. *Computers & Education*, *49*(4), 1161-1174.

TUİK, (2014). Hane halki bilisim teknolojileri kullanim araştirmasi. Retrieved November 15, 2014 from: http://www.tuik.gov.tr/PreHaberBultenleri.do?id=16198

Vaquero, L. M., Rodero-Merino, L., Caceres, J., & Lindner, M. (2008). A break in the clouds: towards a cloud definition. *ACM SIGCOMM Computer Communication Review*, *39*(1), 50-55.

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., & Liu, M. (2012). Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology*, *43*(3), 428-438.

Watson, J., Besmer, A., & Lipford, H. R. (2012, July). + Your circles: sharing behavior on Google+. In *Proceedings of the Eighth Symposium on Usable Privacy and Security* (p. 12). ACM.

Wu, T. T. (2014). Using smart mobile devices in social-network-based health education practice: A learning behavior analysis. *Nurse Education Today*, *34*(6), 958-963.

Yee, K., & Hargis, J. (2011). Using Google+ for instruction. (Notes for Editor-1) *Turkish Online Journal of Distance Education*, *12*(4), 1302-6488.

Yensen, J. (2012). Mentoring and performance support for graduate students using Google+. *Online Journal of Nursing Informatics (OJNI)*, *16*(3).

Yildirim, A., & Simsek, H. (2006). *Sosyal bilimlerde nitel arastirma yontemleri.* Ankara: Seckin Yayinevi.