

## Two Birds with One Stone: Enhancing Technology Perception with Peer Interaction using Web 2.0\*

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### Abstract

The contribution of pre-service teachers using Web 2.0 tools for peer interaction to provide the other pre-service teachers is more remarkable than pre-service teachers who use Web 2.0 tools for individual purposes. This research aims to determine the change of technology perceptions of pre-service teachers studying in learning environments created by using Web 2.0 tools which were Wikipedia, Facebook and blogs. This research also strives to reveal the underlying causes of this change within the context of peer learning. Sixty-nine pre-service teachers who attended Computer-2 Class in a large public university participated in this research and the sequential explanatory mixed method was applied. In this research the qualitative data were collected by using Scale of Technological Perception in the form of pre and post-tests. Then, quantitative data were collected by interview forms to determine the effect of learning type on technology perception and their choice of peer or individual learning. The findings obtained from qualitative data indicate a significant difference between pre and post test scores as the score is higher in post-test regarding technology perceptions. The analysis of the interviews show that peer learning promotes computer skills, high level learning skills. In addition, it develops affective features such as socializing, interaction and psychological effects.

**Keywords:** information and communication technologies, pre-services students' technology perception, peer interaction, technology skills

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## **Bir Taşla İki Kuş: Web 2.0 Kullanarak Akran Etkileşimi Yoluyla Teknoloji Algılarını Artırma**

### **Öz**

Öğretmen adaylarının Web 2.0 araçlarını akranları ile kullanımı esnasındaki etkileşimi, onlara bireysel amaçlar doğrultusundaki kullanıma göre dikkate değer düzeyde katkı sağlamaktadır. Web 2.0 araçları, kullanıcıların etkin biçimde yer aldığı bir web ortamı yaratmıştır. Öğretmen adayları; bilgiye ulaşma, bilgiyi yapılandırma ve yayma sürecinde kullanabileceği bir araçla yüzyüzedir. Bu araştırmanın amacı, Web 2.0 araçlarından Vikipedi, Facebook ve Ağ Günlüklerinin kullanıldığı öğrenme çevresinde öğretmen adaylarının teknoloji algılarındaki değişimi belirlemektir. Araştırma, aynı zamanda akran öğrenimi bağlamında bu değişimin altında yatan nedenleri ortaya koymayı amaçlamıştır. Bir devlet üniversitesinde öğrenim gören Bilgisayar 2 dersini almakta olan altmış dokuz öğretmen adayının katıldığı araştırmada ardışık açıklayıcı karma desen kullanılmıştır. Araştırmada nicel veri, ön test ve son test olarak uygulanan “Teknoloji Algısı” ölçeği ile toplanmıştır. Nitel veri ise görüşme formları aracılığıyla öğretmen adaylarının akran ve bireysel öğrenme yolu tercihlerine göre toplanmıştır. Araştırma sonuçlarına göre; öğretmen adaylarının teknoloji algılarına yönelik ön test son test puanları, son test puanları lehine anlamlı farklılık göstermektedir. Öğretmen adaylarının teknoloji algıları Web 2.0 araçlarının kullanımı ile artmakta ve bu artış anlamlı biçimde farklılaşmaktadır. Görüşme analizi sonuçlarına göre ise, akran öğrenmenin bilgisayar ve üst düzey düşünme becerilerinin yanı sıra kültürel yönden de gelişim sağladığı belirlenmiştir. Bununla birlikte sosyalleşme, etkileşim ve psikolojik öğeler gibi duyuşsal özelliklerin de geliştiği saptanmıştır.

**Anahtar Sözcükler:** bilgi ve iletişim teknolojileri, öğretmen adaylarının teknoloji algıları, akran etkileşimi, teknoloji becerileri

## Introduction

In recent years, the rapid spread of technology has resulted in education and technology integration (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012). The current push to prepare students for the 21st century (Bellanca & Brandt, 2010; Ertmer et al., 2012) has put more technology in classrooms (Ruggiero & Mong, 2015). Especially, web technologies have provided students with new experiences different than they used to. Web 2.0 tools (e.g. blogs, wikis, podcasts, social bookmarks, and social networks) constitute one group of web technologies that offer several powerful digital and social media instruments supporting participation and interaction in various digital formats (Çakır, Yükseltürk & Top, 2015).

The available technology lets students collaborate with peers on projects, engage more deeply with content, practice skills, and receive feedback on their progress (Hamdan, McKnight, McKnight & Arfstrom, 2013). Web 2.0 tools provide an educational environment facilitating student peer integration, which produces a bi-directional benefit for the dissemination of technology in education and effective peer interaction. Therefore, not only the effect of peer interaction on students' technology perception and technology utilization skills but also the impact of technology on peer interaction are substantial.

## Literature Review

### Peer learning by using Web 2.0

According to constructivist learning approach, learning means producing new ideas by connecting the past information with the new information (Wheatley, 1991). According to social constructivism information is created with a co-decision of a social group. In social context while the meaning is configured individuals affect the other individual's' thoughts by sharing the meaning which they created and are affected from these individuals (Fer & Cırık, 2007). Social constructivism enables the students to collaborate with peers thereof and thereby provides learning. Given social constructivist studies it is observed that learning using peer exhibits better performance than individualized education (Dillenbourg, Baker, Blaye & O'Malley, 1995).

One of the platforms which will support learning based on collaboration with peer technically is online learning environments. For learners online learning environment provides place and time flexibility (Waschull, 2001); ease of access to source; collaboration ability (USA Education, 2009); reusing and updating of materials and sources; personalized education; new education methods; evaluation; and documentation (Cook, 2007). For learners while online learning environment offers an opportunity for co-learning with peers (Chiong & Jovanovic, 2012) it also supports communication, interaction and collaboration (Chan & Ridgway, 2006; Halic, Lee, Paulus & Spence, 2010; Kang, Bonk & Chun Ki, 2011).

Today, Web 2.0 technologies which are one of online learning environments are the environments which are commonly used among youths. Web 2.0 technologies are second generation web based online systems which are created by internet users jointly (Peltier-Davis, 2009), the users of which may act with an active collaboration and sharing logic (Agopyan & Beklen, 2008). For example blogs which are one of Web 2.0 technologies are such web sites in which computer users share something for the other internet users. The users may display each other's pages and write comment. The user may create and publish his/her own web page context without any need for technical skill while preparing his/her blog. The user may add comment and discussion to publications; thereby an interaction with the other users can be achieved (Alexander, 2006).

Blogs develop writing skills of the user, encourages critical thinking with collaborative learning; and provides an active learning and feedback (Ocak, Gökçearslan, Solmaz, 2014). Seitzinger, 2006). One of Web 2.0 tools, which supports collaborative writing is wiki (Pifarré & Fisher, 2011). Wikis provide collaborative writing, joint document creation and preparation; and information sharing (Gökçearslan & Özcan, 2011; Peled, Bar-Shalom & Sharon, 2012; Wichmann & Rummel, 2013). Each wiki user may be a reader or a user who wants to access the information; however this user may be a writer who wants to share information. So it can be part of a community based on a "multi" learning approach created jointly instead of "single" approach created by an individual access (Altun, 2008). Facebook which is one of Web 2.0 technologies to be used for supporting collaborative learning provides a personalized profile for users. It offers an opportunity for users to communicate, share information, create a friend list, create a photograph album, post to a friend's wall, create a group, share their opinions during group discussions, and play game (Selwyn, 2007). Facebook usage among peers improves motivation and courage (West, Lewis & Currie, 2009), enables the students to take a positive attitude with respect to learning and increases learning outcomes (Kirschner & Karpinski, 2010). The features represented by Web 2.0 tools support peer education.

### **Learning using peer and technology perception**

In many studies relating to peer education it was found that collaboration of peers had a positive effect on learning process. It was found that collaboration with peer facilitated learning process (Topping, 2005; Kavanoz & Yüksel, 2010) and had a positive effect on academic performance; class attendance of a student and evaluation result (Hurley, McKay, Scott & James, 2003). Moreover it was found that the students participated in collaborative group study with peer thereof took a positive attitude for mathematics (Hooker, 2010); behavioral disorders of the students exhibiting behavioral disorders were reduced and their academic success was improved (Kiarie, 2003); oral problem solving performances of the students who had visual disability were increased (Karakoç, 2002); reading and mathematics skills of preschool students were affected positively (Weidinger, 2005); reading fluency and reading comprehension performances of high school students were developed

positively (Fuchs, Fuchs & Kazdan, 1999); success and attitude of the students were developed positively in science lessons (Sencar-Tokgöz, 2007); interest of students in physics lessons and success of students in the lesson were increased (Demirci, 2005); and knowledge and skills of students studying medicine were developed (Tanrıöver, İzbirak, Akan, Gürol, Demirtaş, Kaspar & Vitrinel, 2010).

It was found that in the studies carried out in different fields in the literature, peer learning affected learning outcomes. In the case of peer interaction in the field of information and communication technology it has not been found any study relating to the computer skills of the students and the way they perceive the computer in national and international literature. It is thought that evaluation of changes in computer using skills and the computer perception of the students who studied in online learning environments supporting peer learning will contribute to the literature. It was found that the computer perception of the students was positive; they were disposed to participate in the activities relating to computers; they expected to be successful; they solved any problems relating to the computers perseveringly and patiently and they were in a positive relationship with their computer performances (Murphy, Coover & Owen, 1989); and they solved any problem relating to computer usage in an easier way (Usluel & Seferoğlu, 2003). Moreover, the way students perceive the technology is an important factor in terms of popularizing Information and Communication Technologies (ICT) and being a technology manufacturer/developer instead of being a technology consumer. Using Web 2.0 technologies which are commonly used by peers in their daily lives and which support collaborative studies for educational environments is important as they improve the computer skills and affect the computer perceptions, thereby contributing to popularizing the ICT integration. It was found that in the study to Sadaf, Newby and Ertmer (2012) which investigated the Web 2.0 perceptions of pre-service teachers these technologies perceive the computer positively by offering an opportunity for meeting the requirements of digital era students, improving the interaction with learning and peer and participating in the interaction from everywhere.

Web 2.0 environments may be both a “*tool*” which supports learning using peer and a “*method*” for improving the computer skills and the computer perceptions of the students. Thus, learning using peer in Web 2.0 tools technically supports communication and interaction between the students (as a tool) whereas it may contribute to improving the computer skills and technology perceptions of the students (as a method). When used as a method it may contribute to popularizing ICT and improving the computer skills of the students. Thus, a trend which will provide popularizing of ICT in educational environments may be observed. However, it has to be revealed that what kind of interaction is present between the technology perception and peer education and the underlying cause of this interaction. Starting from this point the purpose of this study was to determine perceptions of the students and causes of changes in their perceptions as a result of Web 2.0 technologies usage experiences of the students who executed a group study with peers thereof. This study is important in terms of changes in perception relating to technology using skill

and the technology per se by using Web 2.0 tools of peer education. Data provides a source for educators with respect to offering a suggestion for learning environment design with peer using Web 2.0 tools in the computer education; a source for researches with respect to Web 2.0 tool usage in learning environments with peer in popularizing ICT; and a source for both educators and researches with respect to effect of Web 2.0 usage both as a tool and a purpose on computer skills, communication skills and the other educational acquisitions. Answers for the following questions were sought for this purpose:

1. Are there any significant differences between pre-testing and post-testing scores belonging to technology perceptions of the students who experienced collaborative learning by using Web 2.0 technologies?
2. What are the knowledge and skills acquired from peers by the students who experienced peer learning by using Web 2.0 technologies?
3. What are the affective acquisitions of the students who experienced peer learning by using Web 2.0 technologies?
4. What are the reasons of the students for working individually or with peer by using Web 2.0 technologies?

### **Method**

#### **Design of the Study**

A sequential mixed design was used in the study as the change in students' perceptions for quantitative aspect and the reason of this change for qualitative aspect had to be revealed. Sequential mixed design studies are the studies in which quantitative data is collected in the first phase and qualitative data is collected in the second phase (Creswell, 2013). In the study a significant difference was detected in technology perceptions of the students in the first stage whereas qualitative solutions were considered in the second stage in order to determine the reasons of this change.

#### **Study Group**

Study group consists of 69 pre-service teachers who attended school observation in a public university in the school year 2013-2014. Student distribution by genders is provided in Table 1.

Table 1

*Distributions of Study Group Students*

<b>Gender</b>	<b>f</b>	<b>%</b>
Male	35	50.7
Female	34	49.3
Total	69	100.0

When Table 1 is examined it is seen that 50.7% of pre-service teachers are male students (n=35) whereas 49.3% of them are female students (n=34).

### **Data Collection Tools**

Data collection tools used in the study are provided below:

#### **Technology perception scale**

“Technology Perception Scale” developed by Tinmaz (2004) was used in order to measure the perceptions of the students on using technology in education. This scale consists of 28 items in total. According to validity and reliability study carried out by Tinmaz (2004) the scale has two factors and Cronbach Alpha coefficient of the first factor was calculated as .89 whereas Cronbach Alpha coefficient of the second factor was calculated as .81. Internal inconsistency coefficient for whole test is .86. Reliability coefficient for this study was found .96.

#### **Interview form for determining effect of peer education on technology perception**

The object of the interview form for determining effect of peer education on technology perceptions is to investigate whether the underlying causes of technology usage in education and perception changes are caused by peer education; and their relationships. Interview form consists of five open-ended questions which provide detailed information and which are prepared in accordance with interview question preparing techniques. The questions consist of three main themes: effect of peer collaboration on technology perception, on computer skills and on creativity. Interview form takes its final form after feedbacks are obtained from domain experts. The questions in the interview form are provided below:

1. What can you say about your friend's contribution to you when creating an environment using Web 2.0 technologies?
2. What have you learned from your group mate?
3. What do you think about your friend's effect on your creativity when creating an environment?
4. What are the contributions of your group mate to your computer skills when creating an environment?
5. Do you prefer doing such study individually or in group? Why?

### **Data Analysis and Study Steps**

Content analyzes were performed on the collected data and congruity ratios were calculated (0.89) between coders for the encodings performed separately by the researchers. Peer education is carried out systematically. All practices and activities to be done should be configured before providing education, their durations and planning should be determined and the groups should be specified. In the following

meetings the things having been completed and solutions for activities which haven't been completed should be predetermined (Doğan & Ulukol, 2010; Tümer, 2007).

Peer education in the study was carried out within Computer-II lesson. In Computer-II lesson applications in three fields relating to technique, pedagogics and context about Web 2.0 technologies and their usage in education were developed. Tasks were assigned weekly for lesson environment designs using Web 2.0 technologies. In this context tasks were assigned weekly for students such as technical applications like file sharing, file receiving, video/picture uploading and creating a forum/group/discussion, and content creation relating to selecting the contents about acquisitions chosen by the students; distributing these contents by weeks; and configuring the same.

The students in the study were randomly grouped and enabled to study with their group mates during the term. During the study course “Facebook”, “Wiki” and “Blog” were the preferred ones which were used commonly among Web 2.0 technologies taught in the lesson and which were accessed easily by the students; and each group were divided into three groups of 23 students in total. Groups were assigned randomly in such a manner that each group comprised at least two students. “Technology Perception Scale” was applied to the students at the start of the research. The above-mentioned applications were assigned to the students during the term and an application of 14 weeks was performed. During the term, works presented every week were discussed and scored in the class. At the end of the term “Technology Perception Scale” was reapplied to the students.

After application, data (meets normality assumptions) providing the required assumptions in order to compare the pre-testing and post-testing scores obtained from Technology Perception Scale (TPS) were subjected to t-test for the related sample. After a significant difference between pre-testing and post-testing scores was determined in the analysis results, interviews were made with the students to determine the causes. After data obtained from each student interview were transcribed, these data were subjected to inductive content analysis. Data were coded in two cycles; in the first cycle contrast coding and in vivo coding were performed whereas in the second cycle focused coding and pattern coding were performed.

Strategies such as diversity (triangulation), long-term interaction, expertization and participant verification are proposed in order to provide credibility of qualitative data (Linkoln & Guba, 1985; Patton, 2014). In this study two experts worked with a practitioner in order to provide credibility during the study. The experts provided feedbacks relating to process monitoring and evaluating, raw data reviewing and raw data suitability. Moreover, credibility of the study is increased by explaining in detail the number and characteristics of the participants, the way they are chosen, data collection tools used in the study and analysis techniques (Creswell & Miller, 2000). Data collection tool and analysis techniques used in the study method were described in detail above. “Detailed description” may be made in order to provide transmissibility in the qualitative study (Meriam, 2009). In this study while finding

were presented, data obtained via interviews were presented by interpreting the same and transmissibility of the study was tried to be performed by supporting the themes obtained as a result of data analysis via direct citations.

**Results**

Under this title, it is aimed to answer research questions by supporting with data analysis.

1. Are there any significant differences between pre-testing and post-testing scores belonging to technology perceptions of the students who experienced collaborative learning by using Web 2.0 technologies?

Results of t-test performed in order to determine significance of the difference between average scores of pre-testing and post-testing results for related samples are provided in Table 2.

Table 2

*T-test results for TPS scores-related sample*

	N	X	s	Sd	t	p
Pre-test	69	43.14	22.02	68	-4.988	.010
Post-test	69	57.89	19.62			

It was seen that a significant increase between technological perception scores for the study was found after the studies of the students with peer about Web 2.0 technologies ( $t(68)=4.98, p<.01$ ). It was seen that before the application average scores of technology perception were  $X=43,1$  whereas these scores (X) were increased to 57.9 after studies with peer. This finding demonstrates that studying with peer has an important effect on increasing the perceptions of the students for the technology. Upon finding a significant difference after studies with peer with respect to using Web 2.0 technologies data obtained as a result of the interviews made in order to determine how this effect improves the students are provided below.

2. What are the knowledge and skills acquired from peers by the students who experienced peer learning by using Web 2.0 technologies?

It was benefit from qualitative data in order to revealing the reason of effect of studying with groups on students' technology perception.

The patterns obtained from the interviews with the students are provided in figure 1. It was determined that after the obtained data were coded students' acquisitions obtained from the studies with peer about Web 2.0 technologies were bidirectional: "effect on learning" and "affective features".

## 120 TWO BIRDS WITH ONE STONE: ENHANCING TECHNOLOGY PERCEPTION WITH PEER INTERACTION USING WEB 2.0

In students' opinions studying with peer supports learning in terms of "Development of General Computer Skills" and "Usage of Web 2.0 Tools". It was determined that in case of "Development of General Computer Skills" the students learned picture and graphic creation, shortcut keys, rapid keyboard usage and internet usage from their peers.

*"...I further looked at many pictures and videos to put them in my blog. These helped me to have a vivid imagination and to improve my creativity. I tried to provide a colorful and dynamic ambiance and to create a colorful world."*

*"My friend helped me to prepare graphics, to create interesting tables and to prepare applications."*

*"He/she allowed us to practice our information on hardware and software..."*

*"I have learned a lot of things about computer usage. I learned shortcut keys from my friend..."*

*"They provided a positive contribution for me. I did not use the technology and the internet for education but I can find the information that I seek faster. Briefly, I figured out the key words."*

*"...computer made me move faster."*

In students' opinions peers provided support for the skills such as creation of Blog, Facebook and Wiki environments, addition of video, picture and writing, file sharing, making arrangement and data input to the system with respect to "Web 2.0 tool usage" theme;

*"I learned many things that I did not notice or I missed from my group mate. For example, I missed the video part while sharing something after created a blog, but my group mate said to me that we could add videos and showed me"*

*"As me and my group mate have not ever created a blog we learned how to create and design a blog, how to share a video and a picture."*

*Before this education I did not use the computer so much but I improved myself about organizing font style, type size and graphics; and adding and arranging videos. I understand which command works for which function, I can say that my usage speed of keyboard has improved"*

*"...I learned more about file extensions and blog usage that I knew previously.", "...I learned to use link and to share picture and video"*

In addition, students specified that their skills such as orthographic usage, report preparing and information arrangement except for computer usage were improved when they studied with their peers.

*"I learned new things. For example, I learned how to prepare a report by help of my friend."*

*"When preparing a report I did not know how to use but my friend helped me about these arrangements."*

*"My group mate was better than me about orthographic rules. I realized so many things that I have not thought before with his/her helps"*

*"I learned how to edit pages, what and how to add something, how to share a writing and picture from him/her."*

The students specified that studying with their peers was effective to see alternative aspects and to develop creativity and discussion skills. In addition, they specified that studying with their peers enabled them to gain a different point of view and to see effectiveness of collaboration, thereby providing communication persistence. Based upon all these coding processes it can be said that some of the students studying with peer have developed "high level thinking skills" thereof.

*"My group mate thought things that I did not. Thus, blog had different point of views, different likes and different expression techniques."*

*"...Of course. We did our homework by discussing and exchanging opinions with each other."*

*"I learned to think multidimensional instead of thinking one-dimensional."*

*"...I learned mostly about creativity from him/her, he/she told me thing that did not occur in my mind."*

*"As I said he/she mostly contributed to my creativity rather than my computer skills."*

In addition to these the students specified that their point of view for learning changed when they studied with peers. The reasons for this is that peers simplify the work and play a facilitating role for learning; and that students learns practical information and they have fun while doing these.

*"... He/she made me share something and do it in a correct and rapid way."*

*"He/she allowed me to learn some of fast writing techniques."*

*"...He/she helped me to use faster and how to access some information faster"*

*"...They helped me to be more practical."*

*"...He/she helped me for the problems that I encountered while using computer."*

*"Of course they had effects on me. I had fun."*

122 **TWO BIRDS WITH ONE STONE: ENHANCING TECHNOLOGY PERCEPTION WITH PEER INTERACTION USING WEB 2.0**

*“... Studying together was more effective when education combined with entertainment.”*

3. What are the affective acquisitions of the students who experienced peer learning by using Web 2.0 technologies?

It is seen that as a result of interviews studying with peers not only supports some acquisitions about learning but also supports some acquisitions in terms of affective aspect. According to coding obtained from data, affective features are grouped into three information category: psychological change, interaction and effect to socialization.

The students specified that in the studies which they performed via Web 2.0 technologies they improved their friendship relationships and this is resulted from the fact that they learned to have a healthy communication. Moreover, the students emphasized that collaboration increased cooperation and spirit of sharing. As a result, the students specified that collaboration improved their socializing skills.

*“I learned to be sharer, helpful and most importantly good-humored.”*

*“... information and idea exchange facilitates our work and also enriches our social sharing.”*

*“... studying with a group is more amusing. We share and discuss our ideas.....”*

*“I learned how to study and to use social media from my group mates.”*

The students stated that they learned to collaborate, job share and show patience while studying with their peers on Web 2.0 subject, and that their collaboration and responsibility feelings developed. Considering all these information categories, it may be said that studying of the students with their peers over Web 2.0 has improved their interaction skills.

*“...due to collaboration, we could prepare a funnier blog page with alternatives”*

*“...we exchanged ideas. We helped each other...”*

*“...yes, we created an environment by collaborating with group mates. We had information exchanges...”*

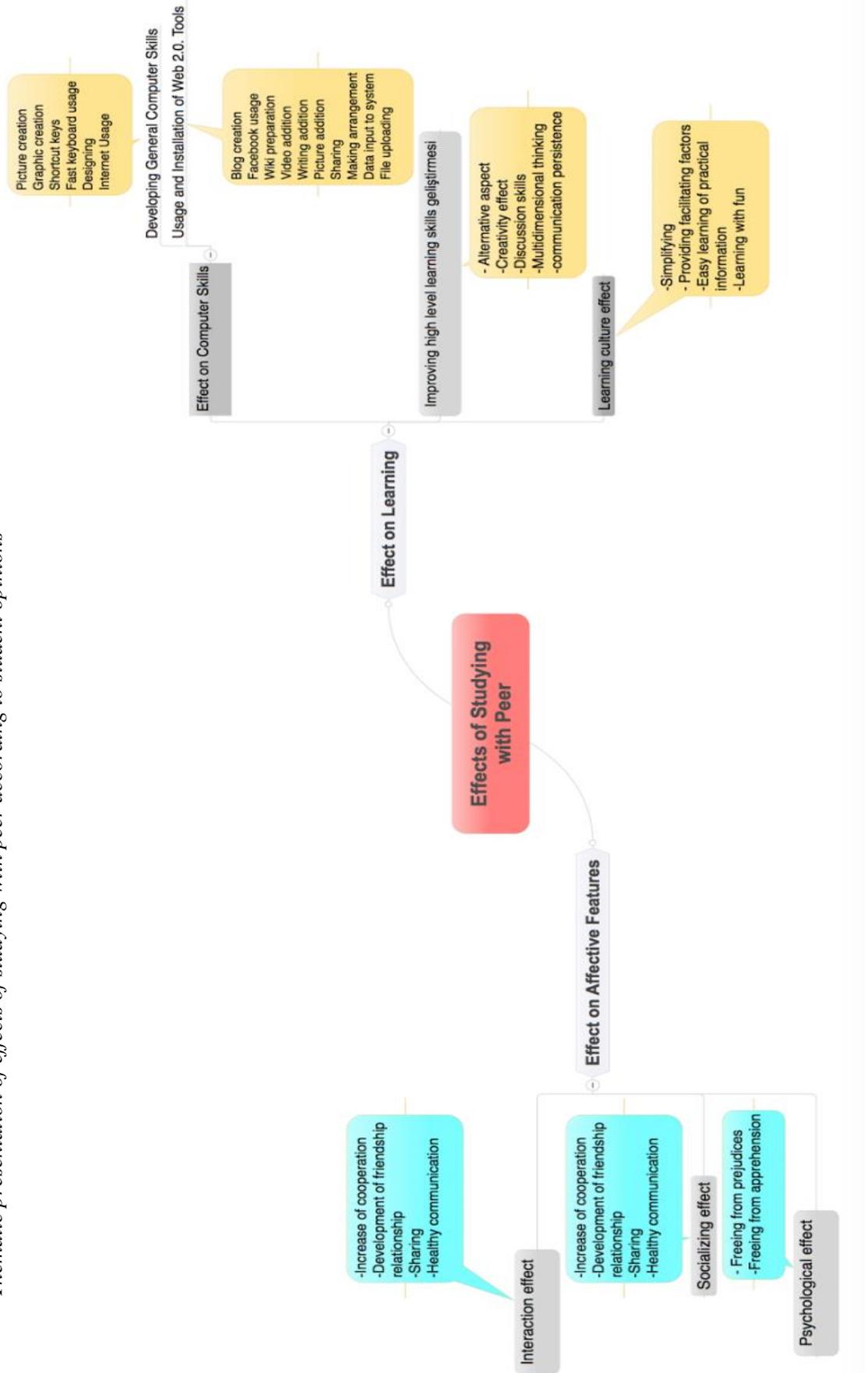
*“I learned that much study was needed and responsibility should be fulfilled on time”*

*“The most important thing I learned while creating a blog was patience along with effectively using it”*

*“... to move together. I learned to combine our thoughts”.*

Figure 1

*Thematic presentation of effects of studying with peer according to student opinions*



Also, the students who studied with peers stated that group works helped them to eliminate the prejudices regarding technology and diminish anxiety level about technology usage.

*“Firstly it was too anxious, then I learned that I shouldn’t worry this much and we should not be prejudiced”*

*“...I was too worried while using computer, it lessened thanks to my friend”*

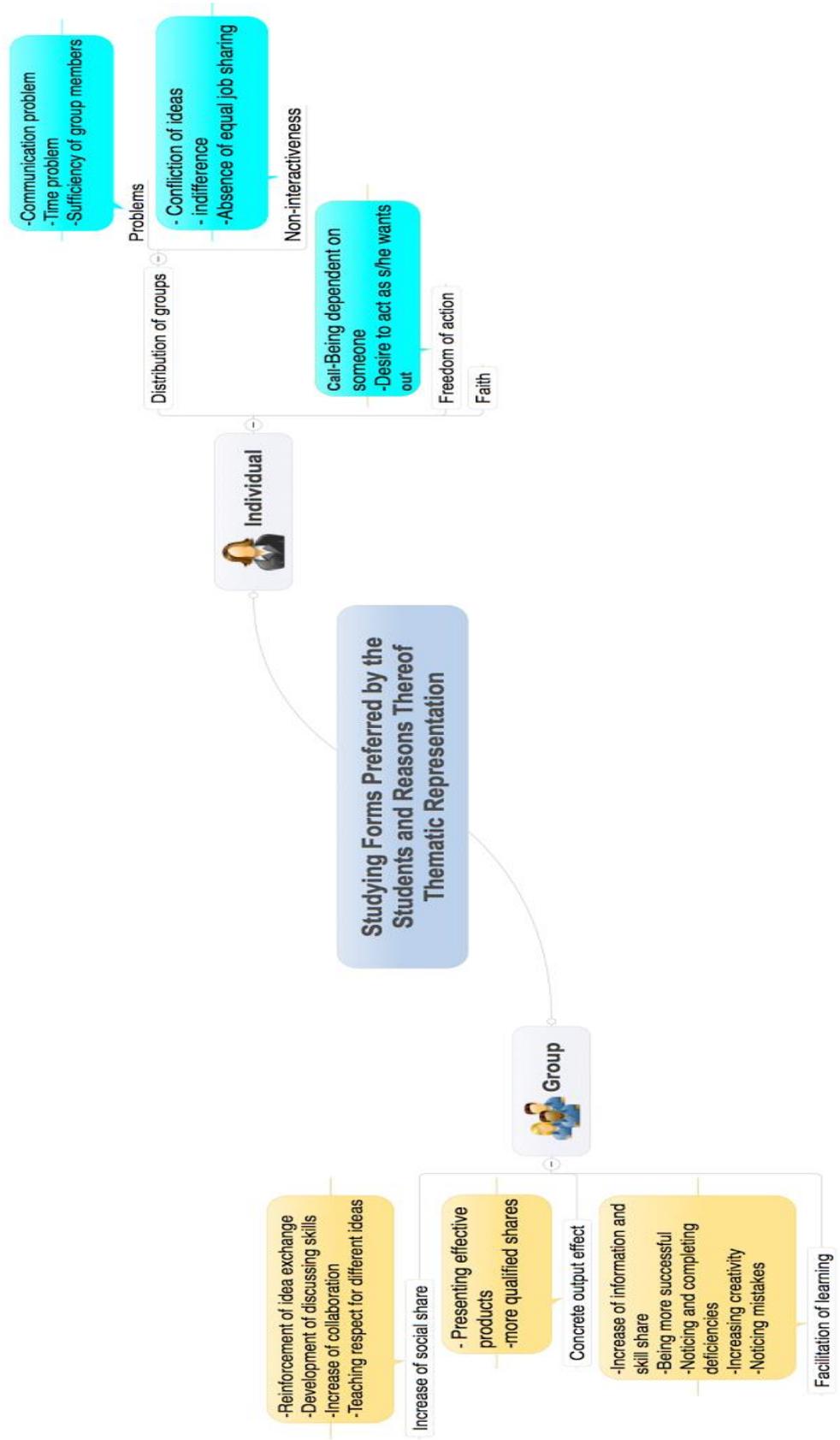
*“I didn’t know how to create a blog and I thought that I would be hard, but, it wasn’t actually, I understood when my friend explained me.”*

When generally summarized, it is seen that the effect of the studies of the students with their peers are positive and have different angles on learning event. Also, it is seen that these gains gave effect on affective features as well. Due to interaction, the students may be said to have developed socialization feelings from different perspectives. Starting from this point, we state that students studying with peers on Web 2.0 environment have improved their skills regarding using technology and this situation influence positively the students’ technology perception

4. What are the reasons of the students for working individually or with peer by using Web 2.0 technologies?

In this chapter, it was tried to determine the themes regarding the effect of peer study and individual study on students’ technology perceptions separately. In another dimension of the study, studying type preferred in courses relating to technology by the students and their reasons were investigated. Fifty-two of the students stated that they wanted to study with group, thirteen of them stated that they wanted to study individually and five of them stated that they wanted to study in both ways. As a result of interviews made by the students, reasons behind preferences are given below (Figure 2).

Figure 2  
*Studying Forms Preferred by the Students and Reasons thereof Thematic Representation*



The students desiring to work with group stated that they preferred it as group work's increasing social sharing, concrete output effect and facilitation of learning. The students indicated that working with their peers on Web 2.0 enforced idea exchange, improved discussing skills, enhanced cooperation and taught showing respect to different ideas. From this point, it may be said that working with peers enhanced social share of the students.

*"I would like to work as a group because making information and idea exchange facilitates our work and enriches our social sharing"*

*"... with group, because there may be better shares when done together"*

*"It may be more advantageous to work as a group. We can make idea exchange with our group friends. We can make idea exchange"*

*"I would like to work as a group as we can learn what we miss thanks to our group friends and we can present a better work"*

*"I prefer group work. What is missing for one friend can be completed by the other"*

*"I would like to work with a group. Because a better work is revealed with different opinions. Missing points are completed"*

*"In this situation, we could create a funnier blog page with alternatives."*

The students preferred working with group within "concrete output effect" in terms of revealing effective products and making more qualified shares. Moreover, among the reasons of preferring working with group, there are faster learning of different information and skills, being more successful, noticing and completing deficiencies, increasing creativity and noticing mistakes.

*"Because we could present more creative ideas by seeing the deficiency and mistake of the subject we prepared."*

*"I would like to work with a group. Because it enabled us to notice and complete deficiencies and unnoticed points of each other"*

*"I prefer making group study. One can complete the point the other misses"*

*"I would like to study as a group. Because much more creative ideas can be presented. This adds a lot to creativity of people relating to this subject"*

*"I would like to be in a group because different people present different creativities"*

*"...I am a fan of group because one can learn a lot in that way. Constant information exchange and task distribution enable more success. Like in the proverb, 'two heads are better than one'"*

*“Studying as a group may be more advantageous. We can make idea exchange with our group mates. We can make information exchange. We can help each other. More diverse ideas enable us to present a more qualified study.”*

Among students, there are the ones preferring to study alone along with those preferring the group study. Among the reasons of those preferring to learn individually about Web 2.0, there are provision of freedom of action, problems in distribution of groups and the idea that individual study is more effective. The students state that individually studying will provide freedom and will save from being dependent on a person. But, they precondition that information will not be incomplete while expressing this.

*“Individual. I have a change of doing better.”*

*“...I would like to work individually. If I have complete information, I do not want to be dependent on someone.”*

*“Individual. Because everyone should act in line with what they want.”*

Moreover, the students state that they prefer individual studying due to inequalities and problems in distribution of groups. They indicated that they had the problems of communication and timing when they worked with groups and that the group members did not have sufficient interest. Also, they stated that there was confliction of ideas, inability to provide job sharing and problems of interaction due to indifference, thus they prefer to study individually.

*“I would like to work individually. Because you cannot study with your group mate or you try to do your best but your group mates do not care. That’s why I wanted to work alone, and that’s what happened.”*

*“...individual because you cannot meet your group mate all the time”*

*” I would like to do such a study individually. Because you cannot see your group mates all the time.”*

*“I prefer working individually in such studies. Because sometimes our tastes may differ from our group mates. Sometimes what I want to share in my blog or anywhere else may not be liked by my group mate, in this case I get upset for not doing what I want. Or else, if I share it, then my friend gets upset as s/he doesn’t like it. Briefly, conflicts may arise, and this is not a good situation. But I can make group study with like-minded friends who I can get on with. Because I feel pleasure while doing that. In that, I can’t say that I never work with any groups”*

Furthermore, five students stated that both group and individual study was effective. They stated to prefer studying both ways as studying with a group increased the shares and individual study developed self-studying skills. They stated that in case the group members were from people they know or have more information group studies would be more effective, or would be unsuccessful.

Generally looking, it is remarkable that majority of the students prefer group study. In their opinion, the greatest gain is social achievements. Along with all these, existence of the students desiring to study individually cannot be disregarded. However, considering that they focus on the problems in the group work, perhaps they may prefer working with a group in case of the elimination of the problems such as communication, telecommunication and group distribution. Especially, when considered reason of preferences of students performed by group study (See Figure 2), it is cleared that group study can support the students with regard to increasing technology perception. The two points emphasized by students such as facilitating learning as cognitive properties and increasing the social share as affective properties can promote students' technology perceptions.

### **Discussion and Conclusion**

The fact that economy is information-based has enforced social change. Accordingly, industry society predominant in the past is seen to be replaced by a new, information-based and service sector-directed society (Kaymas, 2010). In this change process, information and communication (ICT) technologies has become the most important component of information economy (OECD, 2010). ICT is an important driving force of daily life and economical activities (European Commission, 2011). This change in information and communication also reflects competencies of international organizations and competences evolve towards individuals' being digital citizens and effective use of technology in occupational improvement (ISTE, 2008). The key of popularization of information and communication technologies among individuals are again schools and courses in schools. Schools help students, as from early ages, reflect and manage their learning critically, work individually and in collaboration and develop competences to use all advantages provided by new technologies (European Commission, 2008). In popularization of information and communication technologies within school systems, peers have an important role along with teacher and administrators. Particularly, studying of students being in constant interaction in schools is also effective in technology use and popularization of ICT. From this point, it was aimed with this study to determine the change in perceptions of students working with their peers in Web 2.0 technologies subject towards technology and to reveal the effect of studying with peer on this change.

In the study, firstly the change in perceptions of students making studies relating to the use of Web 2.0 technologies with their peers towards technology was examined. Consequently, it was concluded that there was a significant increase in perceptions of the students studying with their peers towards technology. In a study conducted by Usta and Korkmaz (2010) with pre-service teachers, it was reported that positive perception towards technology affected attitude towards teaching profession, and as literacy level of technology increased, positive attitudes towards the use of technology in education process enhanced as well. Starting from this point of view, it may be said that this significant increase towards technological perceptions may be a basis-provider for using technology by pre-service teachers in

learning activities with the students. This may be said to be one of the most important factors in popularization of technology in education environments of peers.

As a consequence of interviews conducted for determination of whether this change in perceptions of the students was caused by studying with their peers, it was concluded that studying with peer about Web 2.0 technologies raised new achievements for learning and affective features. When generally summarized, it is seen that the effect of the studies of the students with their peers are positive and have different angles on learning event. Among achievement towards learning there are developments of computer and high level learning skills and other effects. The pre-service teachers stated that they learned development of computer skills such as installation of Web 2.0 tools and learning its use as well as graphical design, rapid use of keyboards, learning of shortcuts and internet use from their peers as well as learning report preparation and information arrangement. Similarly, in study of Sencar Tokgöz (2007) comparing traditional education and peer education in science lesson, it was concluded that peer education enhanced success with respect to traditional success. This situation in perceptions of the students being with their peers towards learning and technology contributed them to have achievements that can be used later. The pre-service teachers stated that studying with peer improved high level learning skills such as creativity, discussing ability, gaining different points of view, multi-dimensional thinking and idea exchange. In a similar study, it was also stated that the pre-service teachers were able to see more points of view due to the nature of discussion environments and enabled more reflection and supported high level thinking by enabling two-fold higher reflection with respect to individual studies (Brown, 2014).

Among competences expected from 21<sup>st</sup> century students, there are basic content information, information literacy, interdisciplinary information, problem solving, critical thinking, communication and collaboration, creativity, life information, occupational skills, cultural competence and ethical consciousness (Mishra & Kereluik, 2011). When gains of the students were examined, it was expressed that competences of the students studying with group were mostly acquired by studying with peers. The students stated that they learned Web 2.0 technologies faster and learned practical information easily and by fun. In similar studies made on study subject with Web 2.0 tools, similar results were expressed (Clark, Logan, Luckin, Mee & Oliver, 2009). Study results have a feature highlighting the importance of studying with peers on popularization of ICT in informational level. Because the students gain the skill required for ICT thanks to their peers.

Moreover, studying with peer seems to be effective in terms of attaining some affective gains. Among gains for affective features, there are socialization, learning collaboration and faith towards these technologies. The students stated that studying with peers contributed to socialization by increasing collaboration and share, improving friendship relationship, enabling being good-humored. Moreover, they stated that it supported them in terms of increasing responsibility feeling, enabling job sharing and teaching patience. In studies of Huang, Hood and Yoo (2013) and

Bennett, Bishop, Dalgarno, Waycott and Kennedy (2012) conducted on the effect of Web 2.0 tools on learning, active participation of the tools was determined. It was revealed with studies that social networks had features of improving communication skills of students and teachers, expanding participation, strengthening peer support and enabling collaboration-based learning (Lepi, 2012). Starting from this point of view, in these acquisitions of the students relating to cooperative study, features of Web 2.0 tools may be effective. This reveals the supporting feature of peer learning with Web 2.0 tools. When worked with their peers the students expressed that they got rid of prejudices towards technology and they had less worries on using technology. Furthermore, positive faiths of pre-service teachers towards Web 2.0 technologies and more effective learning of the students in this way are remarkable (Lei, 2009). When these acquired features are examined, peer learning may be important in gaining and popularizing some behaviors in ethical use of ICT.

These gains will support students in their adult periods as well in constant education compulsion within the scope of lifelong learning in 21<sup>st</sup> century. Moreover, gaining information of students in Web 2.0 and computer use provide proof on usability of learning with peer on computer and technology-based courses. Because what is expected from 21<sup>st</sup> century students is that they develop themselves in accordance with technological developments. Students having gained such studying habit can adopt technological integration without problems and become leaders in popularization of technology. Consequently, it may be said that students performing peers study on Web 2.0 technologies gain some positive gains academically and socially and have important roles in popularization of ICT in information and ethical level.

When type of study preferred about Web 2.0 technologies was examined, it was determined that 74% preferred peer, 18.58% preferred individual and 7.14% preferred both studies. When generally examined, it was remarkable that majority of the students preferred group study. The students preferring to study with group indicated that they preferred due to its contribution of improving interaction skills, revealing concrete outputs, facilitating learning, reinforcing idea exchange, developing discussing skills, increasing information, skill, social share and collaboration, and teaching to respect other ideas. The students also indicated that they preferred in terms of revealing effective products, making qualified shares, faster learning of different information and skills, being more successful and noticing and completing deficiencies. Similarly, in study of Koç (2011) conducted with pre-service teachers, it was concluded that peer assessment increased awareness towards own successful and weak sides, supported learning from successful and weak sides of their friends, increased responsibility of learning and development mutual support, increased collaboration and interaction, developed openness to critics, developed empathic and critical thinking, brought application skill of peer assessment and reinforced friendship relationships. In study of Shamir, Mevarech and Gida (2008), it was concluded that learning with peer help was more effective than individual learning.

Positive effect of group study has important consequences in terms of futuristic policies of teacher-raising institutions. According to the students, the greatest benefit of working with group is social gains. Studying with group teaches the consciousness of adaptation to social norms and living with other people within the socialization process. Moreover, they agree that studying with group accelerate the process of achieving academic gains. Because the students mostly stated that they learned faster and their practical information enhanced. From this point, studying with peer may be regarded as not only academic gains given at schools, but also as a tool of transferring academic information learned in time to each other. Because during this process, the students transfer their previous academic gains to their friends. This situation brings up active use with peers among the factors affecting the popularization of ICT.

Existence of the students that want to work individually cannot be disregarded. Among the reasons of preference of this studying type of the students preferring individual learning, there are provision of freedom of action, problems in distribution of groups and the idea that individual study is more effective. The students also state that they preferred individual study due to inequalities and problems in distribution of groups, problems of communication and timing, confliction of ideas and inability to provide job sharing. In similar studies, it was concluded that reasons such as selection of peer volunteers, conflicts experienced in school during education and insufficient success of selected peers did not prevent the usability of peer education (Module 1 peer education, 2009; Tümer, 2007). Nevertheless, some tools are presented to provide job sharing and minimizing communication and timing problems of web 2.0 technologies groups. The students focusing on the problems of working with groups may present group study in case of the elimination of the problems such as communication, telecommunication and group distribution.

The students indicating the effectiveness of both group and individual study stated that they preferred both types as group study increased shares and individual study developed self-studying skills. They stated that groups studies would be more effective when group members are those who they wanted and those having more information than themselves, otherwise they might be unsuccessful.

In sum, it may be said that studying with peer relating to Web 2.0 technologies brings academically and affectively positive gains to students and it may be used in technology-based courses. Moreover, use of Web 2.0 in different technology-based courses supports the students academically and provision of gains relating to life. In line with feedbacks from the students, studying with peer may be used as an effective tool in popularization of ICT. This improvement in computer skills may be said to have positive results in use of informatics technologies and lessening of computer *anxiety* levels of pre-service teachers.

Consequently, the study results provide a combined perspective for Web 2.0 technologies and determining peer relationship. The study results relating to the change in perceptions of the students towards technology will contribute to

researches and applications towards the use of Web 2.0 technologies in teacher education. Considering positive perception and study preferences relating to collaboration with peers in online problem-based, project-based studies, the study will draw a perspective in design of learning environments for new generation pre-service teachers. Considering the effects of use of Web 2.0 technologies with peers on the change of learning (ICT skills, high level thinking, other effects) and affective change (socialization, collaboration learning, faith), the study results may be said to raise important results for integration of technology. It may be beneficial to repeat this study conducted on class pre-service teachers on different teaching fields and university departments.

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134 **TWO BIRDS WITH ONE STONE: ENHANCING TECHNOLOGY PERCEPTION WITH PEER INTERACTION USING WEB 2.0**

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136 **TWO BIRDS WITH ONE STONE: ENHANCING TECHNOLOGY PERCEPTION WITH PEER INTERACTION USING WEB 2.0**

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