Higher Education Studies; Vol. 7, No. 1; 2017
ISSN 1925-4741 E-ISSN 1925-475X
Published by Canadian Center of Science and Education

The Effects of Web 2.0 Technologies Usage in Programming Languages Lesson on the Academic Success, Interrogative Learning Skills and Attitudes of Students towards Programming Languages

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Received: January 28, 2017 Accepted: February 14, 2017 Online Published: February 22, 2017

doi:10.5539/hes.v7n1p114 URL: http://doi.org/10.5539/hes.v7n1p114

Abstract

It is observed that teacher candidates receiving education in the department of Computer and Instructional Technologies Education are not able to gain enough experience and knowledge in "Programming Languages" lesson. The goal of this study is to analyse the effects of web 2.0 technologies usage in programming languages lesson on the academic success, interrogative learning skills and attitudes of students towards programming languages. "Pre-test-Post-test Control Group Quasi-Experimental Design Model" is used as research model in this study. Participants are divided into two groups named experimental group and control group. The work group chosen from the population for this study consists of 75 students in total receiving education in the 2nd grade of Computer and Instructional Technologies Teaching Department of Faculty of Ahmet Keleşoğlu, Necmettin Erbakan University in 2015-2016 academic year. "Academic Success Test" developed by researcher, "Attitude Towards Programming Languages Scale" which is adapted into Turkish by Durak (2013) and "Interrogative Skills Scale" developed by Aldan, Kandemir and Saraçoğlu (2013) are used in the study. As a result of the study, it is concluded that students receiving education within the experimental group are more successful. When analysing their attitudes towards programming languages, it is concluded that attitudes of students in experimental group are more positive than that of those in control group. Analysing the effects of students using and not using cooperative learning environment developed with Web 2.0 technologies on their interrogative learning skills, it is determined that post-test grades of experimental group are higher than those of control group. According to the result of the study, a learning environment designed with Web 2.0 technologies has high-level effects on students' academic success and attitudes towards programming languages and has medium-level effect on their interrogative learning skills.

Keywords: Web 2.0 technologies, programming languages, academic success, interrogative learning skills

1. Introduction

Changes consistently occur in communities due to environmental factors. Within this process, communities which do not comply with technological developments fall behind the developing world and cannot contribute to their social development (Gokçearslan & Bayir, 2011). Communities need to comply with technological developments. It is easy for communities adapting to technological changes to find their places among developed communities (Akkoyunlu et al., 2010). Particular developments are being experienced also in computational fields as well as in other fields of technology. Occurring developments create a particular effect on communities' lives. These developments also lead to changes in learning and teaching processes. Therefore the adaptation of learning individuals to technological developments and their raising as individuals accessing information easily with the help of technology are very important (Seferoglu, 2009). Technology has been being used in educational environments since 19th century (Ritz & Martin, 2013). Technology use in communities enable students the opportunities of developing their skills with different activities and of creating products they develop in different ways in order to increase their self-confidence. Moreover students have the chance to control their products again with the help of technology (Autio et al., 2015). Positive attitudes of instructors as well as students towards technology are important in terms of affecting students' attitudes in positive way (Rohaan et al.,

2012). Changes occur also in educational technologies according to the needs of communities (Goktas et al., 2012). Erdogmus and Cagiltay (2009) define educational technologies as the usage of technology which emerges with facts created by behavioral and physical sciences in educational environments in order to increase learning environments' productiveness. Within the time we live in, communities need to place enough importance on education in order to lead a comfortable life and to not fall behind the world. Therefore individuals who catch on technological improvements quicker and who are used to life-long learning should be raised (Akpinar et al., 2005).

Today, individuals have the opportunity to realize their learning easily with interacting with themselves without time and place limitations thanks to developments experienced in information and communication technologies (Genc, 2010). In 2003, O'Reilly Media put forward a new term named "Web 2.0" which enables the easier sharing of information on internet. All internet users take advantage of the opportunities of producing information and developing the existing information with the help of Web 2.0 technologies. Also contents they produce can be shared more easily by other users (Karaman, Yildirim, & Kaban, 2008). Applications which operate depending on internet show increase and with this increase, online learning concept has been occurred (Yılmaz et al., 2005). Owing to online learning technologies, learning process is realized more rapidly and productively with the opportunity of studying without time and place limitations of individuals. Additionally, individuals have the opportunity to access information they desire without the help of anyone else (Mutlu et al., 2005).

Clements and Gullo (1984) reached to the conclusion that computer programming increases problem solving skills in their study related to computer programming. The fact that individuals are not interested in programming languages causes their consideration of programming as boring and difficult (Genc & Karakus, 2011). Several problems are faced in terms of the way of teaching in programming languages lessons, programming languages to be taught and learners. One of the biggest problems which individuals newly learning programming languages face is that programming languages have a complex structure (Catlak et al., 2015). Computers have a big place in our lives now. Individuals have the opportunity to solve problems they face in their daily lives with computer software products developed for this purpose. This reveals the importance of computer software products. This reveals the conclusion that individuals receiving education in the field of programming need to receive good quality education in order to develop the mentioned software products (Perry, 2009).

One of the instruction applications of constructivist learning is interrogative learning. Directing questions to individuals in the learning process is important in terms of community's possession of thinking individuals. Primarily, questions are posed in learning based on interrogation. Afterwards, solutions to these questions are produced. A result is reached by collecting relative information regarding the posed question. Lastly the individuals analyse the process. In constructivist learning process, besides their interrogation skills, also research skills of individuals develop and their interest in learning increase (Akinoglu, 2004). Interrogative learning strategy is one of the most efficient learning strategies instructors use primarily (Cotton, 1989). Interrogative learning is defined as a strategy type in which students learn information they gain depending only on instructors, books, experiments and activities they perform in a way different than traditional methods in the literature. The main goal of interrogative learning is the realization of learning in which students interrogate the information they encounter from childhood to adulthood (Celik et al., 2005). Just as in cooperative learning methods, students produce ideas by studying as groups also in interrogative learning method. They structure the new information they gain by sharing the results they found as a result of idea generation process with other group members in their minds (Taskoyan, 2008).

When analysing researches regarding Web 2.0 technologies:

Karaman, Yildirim and Kaban (2008) concluded in their studies named "Learning 2.0 Becomes Widespread: Researches Regarding The Usage of Web 2.0 Applications in Education and Their Results" that Web 2.0 applications support learning, create an appropriate environment for group works and serve to develop high-level thinking skills.

80 computer teacher candidates receiving education in the faculty of education of a state-owned university are reached in a study by Korucu and Cakir (2014) named "Opinions of Computer Teacher Candidates Towards Dynamic Web Technologies" and it is determined that a big majority of computer teacher candidates use dynamic web technologies for communication, sharing and social purposes. Moreover, it is also determined in the study that they do not use dynamic web technologies for educational purposes. Besides, they suggest that teacher candidates should be taught regarding technology use and a lesson regarding how to use cooperative

technologies should be added in Computer and Instructional Technologies Education Departments of universities.

When analysing studies regarding programming languages:

Ozyurt and Ozyurt (2015) have reached to 325 students receiving education in Computer Technologies Department in their studies named "A Study Regarding the Determination of Attitudes of Computer Programming Students towards Programming and Their Programming Self-Efficacies". Data obtained in the study were analysed with Mann Whitney U-test, Kruskal-Wallis test and Spearman Brown's rank correlation coefficient. According to the results obtained in the research, attitudes of students towards programming showed up as positive and their programming self-efficacies are at medium-level. It is determined that there are meaningful differences in terms of sexes, class levels and education types of students towards programming. Besides, it is revealed that there is a positive and medium-level correlation between the attitudes and self-efficacies of students towards programming. They suggest that activities which enable the development of problem-solving and critical thinking skills should be performed in programming lessons in order to fertilize this positive attitude even more.

Lau and Yuen (2008) reached to 217 secondary students between the ages of 14 and 19 in their studies named "Exploring the Effects of Gender and Learning Styles on Computer Programming Performance: Implications for Programming Pedagogy". The effects of sex and learning styles on computer programming are sought in the study. As a result of the study, they concluded that academic skills have a different effect on programming knowledge and that sequent students show better performance in general when compared to randomly selected students.

As a result of their studies named "The Beliefs of Electrical and Computer Engineering Students' Regarding Computer Programming", Anastasiadou and Karakos (2011) suggested that positive attitude development of students towards computer programming reflects positively on the professional lives of students and that factors causing negations in students should be eliminated.

1.1 Goal and Importance of the Research

Computers play a big role in our lives now. Software products developed for computers are increasing day by day. In order to show ourselves as a country in the field of software and to raise individuals capable of coding, programming lessons given in universities should be productive. This study is considered to be able to contribute to the productive delivery of programming lessons. Programming languages is a lesson in which applied works can be more successful rather than theoretical studies. Additionally, the product which will be produced as a result of group work will probably be more successful than that of individual work. This study is important because students interact with each other more easily in their studies owing to Web 2.0 technologies. Due to widespread usage of Web 2.0 technologies, it is estimated that these technologies can be easily integrated into programming lessons and this study is important because it can create positive effect on students' attitudes towards the lesson.

It is obvious that academic success in programming lessons is low in general. As a result of this lowness, decreases are experienced in motivation of the students. Therefore they usually fail in learning process (Jenkins, 2002). The goal of this study is to analyse the effect of Web 2.0 technologies usage in programming lesson on students' attitudes towards programming languages, academic success and interrogative learning skills.

Within this framework, research questions directing this study are as the following:

1) Is there a meaningful difference between the "academic success" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

2) Is there a meaningful difference between the "attitudes towards programming languages" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

3) Is there a meaningful difference between the "interrogative learning skills" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

2. Conceptual Framework

2.1 Constructivist Learning

According to Constructivism, individuals are restructuring old knowledge with new knowledge. The constructivist approach is not like traditional teaching methods, but an approach in which the student is active.

Individual characteristics and learning environment are important in organizing information, which is structured by individuals according to their own information and that individuals acquire information in different forms (Ozmen, 2004). In the constructivist learning approach, learning by discovering and learning information is an important part of individuals. Individuals need to make efforts to solve these problems in the face of problems they encounter (Yasar, 1998).

2.2 Cooperative Learning

There are many definitions in the literature about cooperative learning. When these definitions are examined; Collaborative learning is defined as the process by which individuals with different abilities, genders and abilities are grouped in the direction of a determined common goal, and by continuing to work cooperatively in these groups (Holm et al., 1987).

2.3 Web 2.0

It is a second generation web-based web services announced by O'Reilly Media in 2004, such as social networking sites, virtual webmasters, and tools for online communication. Web 2.0 is defined as the new generation of new technologies that meet the needs of individuals as well as their needs on the web (Sendag, 2008). Web 2.0 technologies include Youtube, Delicious, MySpace, Facebook, Second Life, Library Thing, Ning, Flickr, Twitter, Meebo, etc. (Peltier-Davis, 2009).

2.4 Delphi Programming Language

It is based on the built-in Pascal programming language (Akpinar, 2008). It is a completely visual programming language. Because of the widespread use of Pascal training, many students prefer the Delphi programming language (Alabay, 2001).

3. Method

3.1 Research Group

The work group chosen from the population for this study consists of N=75 computer teacher candidates in total from two branches (2B, experimental group-N=40 and 2A, control group-N=35) receiving education in the 2nd grade of Computer and Instructional Technologies Teaching Department of Faculty of Ahmet Kelesoglu, Necmettin Erbakan University in 2015-2016 academic year. Table 1 demonstrates the sex status of the work group.

Table 1. Sex distribution of work group

Sex	Experimental Group		Control Group		Experimental and Control Group	
	f	%	f	%	f	%
Male	22	55,0	19	54,3	41	54,7
Female	18	45,0	16	45,7	34	45,3
Total	40	100,0	35	100,0	75	100,0

3.2 Research Model

Quantitative research model is adopted in this study as research model and "Pre-test-Post-test Control Group Quasi-Experimental Design Model" is used (Campbell & Stanley, 1966). In studies where pre-test-post-test control group experimental design is used; academic works are applied with the measurement of the experimental subject in terms of the dependent variable both before and after the research application. Besides, in cases where all variables can't be controlled (Cohen et al., 2013) and particularly in studies performed in education technology field, it is the most frequently used design by researchers (Kılıc-Cakmak et al., 2013). Participants are divided into two groups as experimental and control group in the research (Karasar, 1999). These groups are formed randomly. The effect of the experimental operation on different variables is analysed by applying data collection tools to both groups before and after the application. In other words, measurements are realized in both groups in the same way before and after the experiment (Buyukozturk et al., 2012).

The independent variables of the research are; learning method supported by face to face and cooperative learning method supported by face to face and with Web 2.0 technologies. The dependent variables of the

research are: academic success, attitude towards programming languages and interrogative learning skill. Experimental design used in this research is shown on Table 2.

Table 2. Quasi-experimental design table regarding the research model

Groups	Pre-test	Method	Post-test
G_D	O_1	$X_{İÖ}$	O_2
G_K	O_1	$X_{YYÖ}$	O_2

GD=Experimental group

GK=Control group

$X_{İÖ}$=Learning method supported by Web 2.0 technologies

$X_{YYÖ}$=Face to face learning method

O_1=Experimental and Control group pre-test application

O_2=Experimental and Control group post-test application

3.3 Data Collection Tools

"Academic Success Test" developed by researcher in order to determine academic success of students, "Attitude Towards Programming Languages Scale" which is translated into Turkish by Durak (2013) and "Interrogative Skills Scale" developed by Aldan, Kandemir and Saracoglu (2013) are used as data collection tools in the study. A table of specifications related to achievements is prepared while preparing Academic Success Test and each achievement consists at least of 2 questions. "Attitude towards Programming Languages Scale" is developed as "Attitude towards Mathematics Scale" by Tapia and Marsh in 2014. Cronbach Alfa credibility coefficient of the scale is found as 0,97. As a further stage, Durak (2013) translated the scale which is adapted towards Programming Languages into Turkish. Durak (2013) evaluated the scale in terms of language and meaning unity in the direction of Turkish and foreign language experts' opinions. The Turkish form of the scale is completed in the direction of received opinions by performing the necessary arrangements. As its current situation, the scale is named as "Attitude towards Programming Languages Scale". The scale consists of 4 factors, 40 articles and 5 point likert type in total. The Cronbach Alfa credibility coefficient of the scale is found as 0,93. "Interrogative Skills Scale" is developed by Aldan, Karademir and Saracoglu in 2013. Interrogative Skills Scale consists of 3 factors, 14 articles and 5 point likert type, 3 factor structure is obtained and each factor is named respectively as "Knowledge Acquisition", "Controlling Knowledge" and Self-confidence" in the accordance with theoretical framework. Cronbach-alpha value related to each factor in the scale and to the entirety of the scale is calculated. Cronbach-alpha credibility coefficients are; .76 for "Knowledge Acquisition", .66 for "Controlling Knowledge", .82 for "Self-confidence" and .82 for the entirety of the scale.

3.4 Analysis of Data

SPSS 21 (Statistical Package for Social Sciences) version program is used for the analysis of data obtained during the research. T-test for related samples is used for the comparison of data obtained from pre-test applied to students before the research and from post-test applied to students after the research. T-test for unrelated samples can be used for testing whether the difference between two unrelated sample averages is meaningful or not (Buyukozturk, 2011).

4. Findings and Interpretations

4.1 Findings Regarding Academic Success

4.1.1 Research Question 1

Is there a meaningful difference between the "academic success" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

4.1.1.1 Experimental Group Pre-Test-Post-Test Comparison (Paired T Test)

Comparison results of pre-tests and post-tests realized to determine the academic development status of experimental group students at the end of application are shown in Table 3.

Table 3. Comparison results of pre-test-post-test of experimental group

	Test	N	$\bar{X}$	Ss	Sd	t	p
Experimental Group	Pre-test	40	59,05	15,09	39	24,733	.000
	Post-test	40	85,87	10,10			

*p<0.05.

A difference is observed between the pre-test grades and post-test grades of experimental group (pre-test average is $\bar{X}$=59,05; post-test average is $\bar{X}$=85,87) statistically for *p<.05 relevance level (p<0.05). It is determined that experimental group students increased their academic success as a result of cooperative application supported by Web 2.0 technologies (Table 3).

4.1.1.2 Control Group Pre-Test-Post-Test Comparison (Paired T Test)

Comparison results of pre-tests and post-tests realized to determine the academic development status of control group students at the end of application are shown in Table 4.

Table 4. Comparison results of pre-test-post-test of control group

	Test	N	$\bar{X}$	Ss	Sd	t	p
Control Group	Pre-test	35	55,22	14,77	34	22,108	.000
	Post-test	35	78,48	10,93			

*p<0.05.

A difference is observed between the pre-test grades and post-test grades of control group (pre-test average is $\bar{X}$=55,22; post-test average is $\bar{X}$=78,48) statistically for *p<.05 relevance level (p<0.05). It is determined that there is a meaningful difference in their academic success as a result of application (Table 4).

4.1.1.3 Experimental-Control Group Post-Tests Comparison (Independent T Test)

When compared the "Academic Success" of students used cooperative learning environment (experimental group) and of students who didn't used cooperative learning environment (control group), the results are shown on Table 5.

Table 5. Inter-groups (experimental and control) post-test comparison (t-test) results

	Groups	N	$\bar{X}$	S	Sd	t	p
Post-test	Experimental group	40	85,87	10,10	73	3,040	.003
	Control group	35	78,487	10,93			

*p<0.05.

The result is .00<.05 thus is meaningful for *p<.05 relevance level in post-tests performed on experimental and control groups after application. It is determined that post-test grades of experimental group are higher than those of control group in post-tests performed (experimental group post-test average is $\bar{X}$=85,87; control group post-test average is $\bar{X}$=78,487) (Table 5). This result demonstrates that the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on academic success. Effect magnitude values are calculated as η2=.112. In these circumstances, when considering the effect magnitude value (η2=0.112), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "broad" effect magnitude on academic success.

4.2 Findings Regarding the Attitude towards Programming Languages

4.2.1 Research Question 2

Is there a meaningful difference between the "attitudes towards programming languages" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

4.2.1.1 Experimental-Control Group Post-Tests Comparison (Independent T-Test)

When compared the "Attitudes Towards Programming languages" of students used cooperative learning environment developed by Web 2.0 technologies (experimental group) and of students who didn't used cooperative learning environment (control group), the results are shown on Table 6.

Table 6. Inter-groups post-test comparison results

	Groups	N	$\bar{X}$	S	Sd	t	p
Post-test	Experimental group	40	150,10	18,53	73	3,040	.000
	Control group	35	134,42	14,95			

*p<0.05.

The result is .00<.05 thus is meaningful for *p<.05 relevance level in post-tests performed on experimental and control groups after application. It is determined that post-test grades of experimental group are higher than those of control group in post-tests performed (experimental group post-test average is $\bar{X}$=150,10; control group posttest average is $\bar{X}$=134,42) (Table 6). This result demonstrates that the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on attitudes towards programming languages. Effect magnitude values are calculated as η2=.179. In these circumstances, when considering the effect magnitude value (η2=0.179), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "broad" effect magnitude on attitudes towards programming languages.

4.3 Findings Regarding Interrogative Learning Skills

4.3.1 Research Question 3

Is there a meaningful difference between the "interrogative learning skills" of students using cooperative learning environment developed by Web 2.0 technologies and of those not using cooperative learning environments?

4.3.1.1 Experimental-Control Group Post-Tests Comparison (Independent T-Test)

When compared the "Interrogative learning skills" of students used cooperative learning environment developed by Web 2.0 technologies (experimental group) and of students who didn't used cooperative learning environment (control group), the results are shown on Table 7.

Table 7. Inter-groups post-test comparison results

	Groups	N	$\bar{X}$	S	Sd	t	p
Post-test	Experimental group	40	39,40	14,68	73	2,638	.010
	Control group	35	30,77	13,46			

*p<0.05.

The result is .00 <.05 thus is meaningful for *p<.05 relevance level in post-tests performed on experimental and control groups after application. It is determined that post-test grades of experimental group are higher than those of control group in post-tests performed (experimental group post-test average is $\bar{X}$=39,40; control group posttest average is $\bar{X}$=30,77) (Table 7). This result demonstrates that the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on interrogative learning skills. Effect

magnitude values are calculated as η2=.087. In these circumstances, when considering the effect magnitude value (η2=0.087), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "medium" effect magnitude on interrogative learning skills.

5. Discussion and Conclusion

This study aims the easy and efficient understanding of programming languages by students and the provision of increase of its permanence with new methods rather than traditional methods. In accordance with this goal, control group students are requested to perform programming languages lesson with traditional methods for 1 semester and experimental group students are requested to perform programming languages lesson with new technologies for 1 semester and to complete a project they determine in groups by using new technologies.

Web 2.0 technologies play an efficient role in the process of information accession (Kitsantas et al., 2016). It is observed that Web 2.0 technologies earn cooperative working habits, increase the quality of learning, earn high-level thinking skills, help constructivist learning, provide positive effect on individual development and provide individuals to take responsibilities in educational environments (Karaman et al., 2008). Within this context, a difference is observed between the pre-test grades and post-test grades of experimental group (pre-test average is $\bar{X}$=59,05; post-test average is $\bar{X}$=85,87) statistically for *p<.05 relevance level (p<0.05) as a result of comparison of pre-tests and post-tests performed in order to determine the effect of Web 2.0 technologies on academic success. It is determined that experimental group students increased their academic success as a result of cooperative application supported by Web 2.0 technologies. Ekici and Kiyici (2012) also observed that academic success of students using Web 2.0 technologies is higher than those of students receiving traditional education. It is stated that the quality of education can be increased by integrating Web 2.0 technologies into learning processes of students (Karaman, Ekici, & Akgun, 2011). There is a positive correlation between social networks within the Web 2.0 technologies and face-to-face communication (Jacobsen & Forste, 2011). Usage of information and communication technologies in educational environments contributes positively to increasing educational efficiency and to constructivist learning (Venkateshvd, 2016). AlJeraisy, Mohammad, Fayyoumi and Alrashideh (2015) state that academic success of students increased and students react to these technologies positively as a result of Web 2.0 technologies usage in educational environments. In line with this, a difference is observed between the pre-test grades and post-test grades of control group (pre-test average is $\bar{X}$=55,22; post-test average is $\bar{X}$=78,48) statistically for *p<.05 relevance level (p<0.05) as a result of comparison of pre-tests and post-tests performed in order to determine the status of academic success of control group students. It is determined that there is a meaningful difference in their academic success as a result of application.

When compared the "Academic Success" of students used cooperative learning environment (experimental group) and of students who didn't used cooperative learning environment (control group), the result is .00<.05 thus is meaningful for *p<.05 relevance level in post-tests performed on experimental and control groups after application. It is determined that post-test grades of experimental group are higher than those of control group in post-tests performed. This result demonstrates that the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on academic success. Effect magnitude values are calculated as η2=.112. In these circumstances, when considering the effect magnitude value (η2=0.112), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "broad" effect magnitude on academic success.

Several problems are faced in terms of the way of teaching in programming languages lessons, programming languages to be taught and learners. One of the biggest problems which individuals newly learning programming languages face is that programming languages have a complex structure (Catlak et al., 2015). When compared the "Attitudes Towards Programming languages" of students used cooperative learning environment developed by Web 2.0 technologies (experimental group) and of students who didn't used cooperative learning environment (control group), the result is .00<.05 thus is meaningful for *p<.05 relevance level in post-tests performed on experimental and control groups after application. It is determined that post-test grades of experimental group are higher than those of control group in post-tests performed. This result demonstrates that the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on attitudes towards programming languages. Effect magnitude values are calculated as η2=.179. In these circumstances, when considering the effect magnitude value (η2=0.179), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "broad" effect magnitude on attitudes towards programming languages. There are a number of applications which are able to facilitate this process and to

maximize the learning in programming education. With these applications, individuals are able to comprehend how to write software more easily and to determine mistakes they do (Kert & Ugras, 2009).

In accordance with constructivist approach, the minds of individuals in educational environments are defined as empty plates and this provides individuals learning according to their lives. Ausbel argues that what is important in educational environments is that the learning should be meaningful (Ozmen, 2004). Interrogative learning is defined as a strategy type in which students learn information they gain depending only on instructors, books, experiments and activities they perform in a way different than traditional methods. The main goal of interrogative learning is the realization of learning in which students interrogate the information they encounter from childhood to adulthood (Celik et al., 2005). When compared the "interrogative learning skills" of students used cooperative learning environment developed by Web 2.0 technologies (experimental group) and of students who didn't used cooperative learning environment (control group), as the result of the research, the realized application is in favour of the experimental group. Besides, eta-squared value is calculated in order to determine the magnitude of the effect of cooperative learning environment designed with Web 2.0 technologies on interrogative learning skills. Effect magnitude values are calculated as $\eta 2=.087$. In these circumstances, when considering the effect magnitude value ($\eta 2=0.087$), it can be stated that cooperative learning environment designed by Web 2.0 technologies has a "medium" effect magnitude on interrogative learning skills.

It is obvious in the conclusion of the research that the usage of Web 2.0 technologies in programming languages lesson contributes to a more efficient learning of programming languages by students and to the learning of programming knowledge permanently and meaningfully by students. Moreover, the usage of Web 2.0 technologies in educational environments increases the quality of the education (Tuzun, 2007).

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Note

Note 1. This study is prepared with the help of the post graduate study of the first author.