

Learners' views about cloud computing-based group activities

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Abstract. Thanks to its use independently of time and place during the process of software development and by making it easier to access to information with mobile technologies, cloud based environments attracted the attention of education world and this technology started to be used in various activities. In this study, for programming education, the effects of extracurricular group assignments in cloud based environments on learners were evaluated in terms of group work satisfaction, ease of use and user satisfaction. Within the scope of computer programming education lasting eight weeks, a total of 100 students participated in the study including 34 men and 66 women. Participants were divided into groups of at least three people considering the advantages of cooperative learning in programming education. In this study carried out in both conventional and cloud based environments, between groups factorial design was used as research design. The data collected by questionnaires of opinions of group work were examined with quantitative analysis method. According to the study results extracurricular learning activities as group activity created satisfaction. However, perceptions of easy use of the environment and user satisfaction were partly positive. Despite the similar understandings; male participants were easier to perceive use of cloud computing based environments. Some variables such as class level, satisfaction, computer and internet usage time do not have any effect on satisfaction and perceptions of ease of use. Evening class students stated that they found it easy to use cloud based learning environments and became more satisfied with using these environments besides being happier with group work than daytime students.

Keywords: Cloud computing, programming education, extracurricular learning activity, group work

1 Introduction

Learner-learner interaction that reflects the interaction between learners and their peers is as important as teacher-learner and learner-content interactions in an individual's learning processes. In this context, peers, who come together to proceed formal and informal learning processes, constitute various study groups. These groups provide development

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opportunities to each individual, who creates the group itself, in a collaborative atmosphere as engaging both learning and teaching activities. Learning activities that peers perform with each other revealed the “collaborative learning” approach. Collaborative learning is described as a technic for students to help each other for a common purpose as constituting small mixed groups and also ensures them to learn in the process [1, 5]. Findings that collaborative learning has positive effects on student success and even that this technic is more effective compared to traditional teaching technics takes its place in literature [19, 31, 32, 40].

In-group communication is one of the effective conditions for individuals’ learning activities in collaborative learning processes. Collaborative learning activities could be organized in class or different physical locations where healthy communication could be maintained, in traditional approach. Therefore, technological developments remove location borders of collaborative learning activities for today and provide opportunities for learners to participate in learning processes and group studies in different locations with computer and internet technology. Even today, computer supported collaborative learning platforms can not only be performed with computers but also with mobile devices and other platforms that use many internet-based technologies. One of these technologies is cloud computing [10, 24].

Basic philosophy of cloud computing is to enable for information and applications to be reached independently from location and time. With cloud computing technology, its users can benefit from infrastructure (i.e. server, network and storage), platform (i.e. operating system and middleware) and software (i.e. application programs) services that require high level of budget and qualified workforce investment by allocating lower level of monetary and labor force source compared to localized service types [9, 37]. With these specifications, cloud computing technologies include internet-based applications in itself that allow users to benefit from generally physical sources and application software independently from location. Physical sources and software can be reached through web browser, and special application software [14] or through user interface of a software that is currently used, with communication and integration opportunities of cloud computing technologies.

Unlike the general notion, cloud computing technology is not only used in information technologies’ structure but also used as an important tool in teaching activities to reach innovative teaching applications and methods [16, 38]. Usability of cloud computing based tools independently from time and location and their convenience on reaching information with mobile technologies give possibility for this technology to be used in teaching activities. Popularity of cloud computing services in teaching platforms that are considered under “Software as a Service (SaaS)” category in software classification has increased day by day [21]. Software under SaaS category enables one or more users to reach the same source and them to manage this source in the framework of user authorities. With platforms in this category, more than one author can create the same document, use the same program and manage the same physical hardware. With this specifications, SaaS based applications become ideal platforms for learning processes for collaborative learning activities, and individual and group activities. Individuals who realize these facilities of the platforms focus on using tools in SaaS category (i.e. Google Docs, Dropbox, and Skydrive) in computer assisted collaborative learning and group study activities [30, 36].

In literature, it could be found that, with cloud computing support, collaborative group studies increase in-group communication, facilitate in-group information, idea and perception sharing and study results could be jointly evaluated within groups. It is stated that cloud computing technology can support collaborative, active and individual learning processes with the help of its communication and interaction opportunities [7, 25, 35]. Moreover, it is argued that learners can prefer to choose traditional learning tools due to easy to use characteristics of cloud computing based technological tools [4]. Without

hesitation, attention to cloud based teaching tools has increased since convenience that is offered by cloud based platforms to teaching propose material sharing and increase learner-teacher interaction through the documents that are created by learners [25]. In this context, especially with their potential sharing and interaction abilities, remote education platforms are considered from new perceptions and cloud based e-learning platforms that are liked by learners are created [23]. Additionally, it is also found in literature that flexibility of cloud based online collaborative learning platforms is an important factor supporting collaborative learning processes [33].

Today, use of cloud computing based teaching tools in different teaching activities has increased day by day. Especially, in programming teaching in which traditional tools and technics are used, cloud computing technologies, and communication and interaction facilities that are offered by this technology are utilized. Especially, in recent years, emerging of software development platforms, which work based on cloud computing, causes the major popularity of this idea for its possible use in business and academic world. For example, Nordio, Estler, Furia and Meyer [26] compared traditional and cloud based software development platforms in their studies, which they mentioned about their experience of software developing in cloud computing based platforms, and stated that cloud computing based software development platforms offered different flexibilities and conveniences to group members. Levin [22], stated that cloud computing platforms offered major conveniences to software developers in concurrently software development processes. Rajaei and Aldakheel [28] argued that cloud based tools could be used in engineering education however, a research must be conducted for this subject matter in order to be able to declare what kind of advantages could be offered by these tools, compared to traditional learning platforms.

The cloud computing specifications of Microsoft Visual Studio Online platform can be used as an alternative collaborative learning platform for programming teaching. In the view of this platform, this study was conducted for programming learning in terms of perceptions toward making extracurricular group duties in the basis of group studies in cloud computing learning platforms. In this direction, answers were sought for below listed questions under the coverage of this study:

- 1) What are the perception levels of participations in cloud computing based software development platforms for group studies?
- 2) Do perception levels of participations in cloud computing based software development platforms for group studies differentiate in terms of gender differences?
- 3) Do perception levels of participations in cloud computing based software development platforms for group studies differentiate in terms of class differences?
- 4) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of education time?
- 5) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of daily computer usage?
- 6) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of daily internet usage?
- 7) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of the mostly used type of software?

2 Method

This study aims to analysis the collaborative group studies, which are conducted through cloud computing based programming platform and under the coverage of extracurricular group learning activities, depending on perception levels.

2.1 Analysis technic

In this study, static group comparison technic was preferred. From weak experimental technics, static group comparison technic is a single factor technic which does not use random selection [6].

2.2 Population and sample

Sample of this study was determined using an appropriate sampling strategy. Convenient sampling is to include available, volunteer or occasionally accessible people to the research [18]. Sample of the study was comprised by students who enrolled to Computer Programming II course in University of Ataturk, Faculty of Engineering, and Department of Industrial Engineering.

100 students participated to the study as 34 were male and 66 were female. Age of participants ranged from 17 to 29. All of the students in the study previously had taken Computer Programming course and experienced Visual Studio Online development platform.

2.3 Data collection tools and process

Questionnaire, which was developed by the researchers about student opinions on cloud computing based group studies, was used to analyze participants' perceptions toward group studies. This questionnaire form was consisted of 16 questions. The questionnaire included three factors as group study satisfaction, perception of platform usage easiness, and platform usage satisfaction. Group study satisfaction factor was consisted of 6 questions as focusing on the satisfaction level of the participants for their group studies during learning processes. Perception of ease of use of platform factor focused on determining the participants' perceptions toward easiness of the platform in which cloud computing based group studies were conducted. Platform usage satisfaction focused on satisfaction levels of the participants for the platform in which cloud computing based group studies were conducted. Reliability co-efficiency of the questionnaire was found as .907. Reliability coefficients of each factor was found as .864, .887 and .848, respectively. The first factor explained 23.78% of the total variance while the second and third factors explained 22.99% and 21.66% of the total variance, respectively. The total variance that was explained by the questionnaire was 68.4%. Questionnaire that was developed for student opinions on cloud computing based group studies was applied as printed forms.

2.4 Implementation

The study lasted a total of 8 weeks. Participants made their homework in Visual Studio Online (VSO) during the study process. Cloud based software development specifications were added to the new version of Microsoft Visual Studio. Software developers can prepare a common project concurrently, and see and review all the codes that are created by project team with the help of cloud based tools that are offered in the platform, which was released in 2013 and named as "Microsoft Visual Studio Online". More than one software developers can work independently from time and location through VSO with cloud technology and make progresses on project management and create codes with only a web browser. Additionally, the developed codes were stored in servers that were managed by Microsoft. Therefore, the possible data loss cases that were experienced in traditional project management tools were avoided. For all these reasons, VSO was selected as the platform where the education would be delivered and it was targeted for the individuals,

who took programming education during the study period, to experience project development processes as creating similar structures with professional developer teams.

Participants were divided into three member groups depending on a volunteer basis for the study. Each of groups made their group studies in VSO. Prior to the study, 2-week pilot study was made to develop the groups' mutual study culture and they were expected to prepare 2 group homework during the pilot application period. After the pilot study, final groups were created as meeting the demands of some members who wanted to change their groups. During the pilot, a presentation was delivered to the participants about VSO platform in which they would prepare their homework. During the presentation process, a presentation including exercises was delivered to the participants that lasted almost 60 minutes. Additionally, various exercise duties were assigned to them for them to get familiar with VSO platform and their success rates in these exercises were observed. As overcoming the deficiencies, the participants ensured to get sufficient level to use the platform. Additionally, questions of the participants about VSO platform were answered and the difficulties that they had using the platform were eliminated.

2.5 Short period group duties (subject based)

Under the concept of this study, participants performed 5 short period group duties. Each of group study period was 1 week. The groups were informed about study evaluation criteria and deadlines. Their homework was evaluated depending on the criteria and necessary feedbacks were given to the students using detailed score tables. Group duties and the related subjects were presented in Table 1.

Table 1. Short period group duties and the related subjects

Homework Name	Subject
Homework 1	Basic Database Applications
Homework 2	Introduction to MS SQL
Homework 3	Web Programming and database development
Homework 4	Desktop Programming and database development (Basic): Dictionary
Homework 5	Desktop Programming and database development (Intermediate): Address book

2.6 Long term group duties (project assignment)

Under the scope of this study, free time group study was performed with project assignment that covered all objectives of the course. Groups chose one of 3 alternative projects. Projects had a basic structure that covered different exercises for both web and desktop programming. In the first of the application, evaluation criteria and deadline were presented to the assigned project. During 8 weeks, the prepared homework was evaluated depending on the criteria and necessary feedbacks were given to the students using detailed score tables.

3 Findings

A total of 100 students, as 34 male and 66 female, participated to this study that aimed to compare the group studies, which were performed through cloud computing platform under the scope of extracurricular learning activities, to the level of participants' perception. In this section of the study, findings were categorized depending on the research questions.

1) What are the perception levels of participations in cloud computing based software development platforms for group studies?

Perception levels of participants were analyzed through factors' average scores. The results were presented in Table 2.

Table 2. Participants' satisfaction scores

Factor	N	\bar{x}	Std.
Group study satisfaction	96	3,5868	,86179
Perceived ease of use of platform	89	3,1236	,94299
Platform usage satisfaction	94	3,3378	,96142

According to the factor scores in Table 2, participants' satisfaction levels for group studies was found as "I agree" ($\bar{x}=3,59$). Moreover, perception of ease of use of platform and platform usage satisfaction levels were found as "rarely agree" ($\bar{x}=3,12$; $\bar{x}=3,34$, respectively).

2) Do perception levels of participations in cloud computing based software development platforms for group studies differentiate in terms of gender differences?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on gender variable (Table 3). According to test results, data is not distributed normally.

Table 3. Results of normality test (gender)

Factor	Male			Female		
	Std.	sd	p	Std.	sd	p
Group study satisfaction	,892	28	,007	,936	54	,007
Perceived ease of use of platform	,906	28	,016	,971	54	,210
Platform usage satisfaction	,883	28	,005	,925	54	,002

Participants' perception levels in terms of gender variable were analyzed with Mann Whitney U test that did not require parametric test assumptions. Test results were presented in Table 4.

Table 4. Mann Whitney u test results (gender)

Factor	Group	N	Mean Rank	Sum of Means	U	p
Group study satisfaction	Male	31	55,18	1710,50	800,500	,104
	Female	65	45,32	2945,50		
Perceived ease of use of platform	Male	31	53,87	1670,00	624,000	,018
	Female	58	40,26	2335,00		
Platform usage satisfaction	Male	32	51,05	1633,50	878,500	,361
	Female	62	45,67	2831,50		

As seen in Table 4, there is not a meaningful difference between male and female participants' group studies satisfaction levels ($U=800,500$ $p>.05$). There is a statistically meaningful difference between male and female participants' perception of ease of use of platform ($U=624,000$ $p<.05$). Additionally, there is not a statistically meaningful difference between male and female participants' platform usage satisfaction levels. ($U=878,500$ $p>.05$).

3) Do perception levels of participations in cloud computing based software development platforms for group studies differentiate in terms of class differences?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on class differences (Table 5). According to test results, data for group study satisfaction and platform usage satisfaction factors is not distributed normally. On the other hand, data for ease of use of platform perception factor is distributed normally.

Table 5. Results of normality test (class differences)

Factor	1.Grade			2.Grade			3.Grade			4.Grade		
	Std.	sd	P	Std.	sd	p	Std.	sd	p	Std.	sd	p
Group study satisfaction	,955	19	,476	,908	23	,037	,819	23	,001	,836	14	,014
Perceived ease of use of platform	,937	19	,233	,948	23	,263	,934	23	,135	,911	14	,164
Platform usage satisfaction	,879	19	,021	,835	23	,001	,932	23	,122	,912	14	,171

In terms of class differences variable, participants' ease of use of platform perception factor was analyzed with One Way Anova from parametric tests and group studies satisfaction and platform usage satisfaction factors were analyzed with Kruskal Wallis H test that did not require parametric test assumptions. Test results were presented in Table 6 and Table 7.

Table 6. One Way ANOVA test results (perception of ease of use in platform)

Source of Variance	Sum of Squares	Sd	Avarage of Squares	F	p	Significant Difference
Inter-Group	6,303	3	2,101	2,430	.071	Yok
Intra-Group	70,911	82	,865			
Total	77,214	85				

As seen in Table 6, there is not a statistically meaningful difference among groups for ease of use of platform perception factor in terms of class differences ($F(3-82=2,43)$ $p>.05$).

Table 7. Kruskal Wallis H test results (group studies satisfaction and platform usage satisfaction)

Factor	n	Mean Rank	sd	X ²	p	Significant Difference
Group Studies Satisfaction						
1. Grade	20	39,00	3	4,046	.257	None
2. Grade	29	44,83				
3. Grade	24	47,71				
4. Grade	18	56,00				
Platform Usage Satisfaction						
1. Grade	20	33,55	3	9,332	.025	1.Grade-
2. Grade	28	50,11				2.Grade
3. Grade	25	41,72				1. Grade-
4. Grade	17	57,53				4.Grade

As seen in

Table 7, there is not a statistically meaningful difference between scores for group studies satisfaction factor in terms of class differences ($X^2(sd=3, n=91)=4,046, p>.05$). There is a statistically meaningful difference between scores for platform usage satisfaction factor in terms of class differences ($X^2(sd=3, n=90)=9,332, p<.05$). The meaningful difference in terms of class differences was analyzed with Mann Whitney U test. According to test results, there is a meaningful difference between 1st class and 2nd and 4th classes, and between 3th class and 4th class.

4) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of education time?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on education time (Table 8). According to test results, data for group study satisfaction and platform usage satisfaction factors is not distributed normally. On the other hand, data for ease of use of platform perception factor is distributed normally.

Table 8. Normality Test results (education time)

Factor	Morning			Night		
	Std.	sd	p	Std.	sd	p
Group studies satisfaction	,876	53	,000	,892	29	,006
Perceived Ease of Use of Platform	,966	53	,139	,957	29	,273
Platform usage satisfaction	,910	53	,001	,878	29	,003

In terms of education duration variable, participants' ease of use of platform perception factor was analyzed with Sample T Test from parametric tests and group studies satisfaction and platform usage satisfaction factors were analyzed with Mann Whitney U test that did not require parametric test assumptions. Test results were presented in Table 9 and Table 10.

Table 9. Mann Whitney U test results (education time)

Factor	Grup	N	Mean Rank	Sum of Means	U	p
Group studies satisfaction	Morning	60	42,93	2576,00	746,000	,011
	Night	36	57,78	2080,00		
Platform usage satisfaction	Morning	61	42,02	2563,50	672,500	,008
	Night	33	57,62	1901,50		

As seen in

Table 9, there are statistically meaningful differences between perceptions of the participants, who took education in night and morning, for group studies satisfaction and platform usage satisfaction factors (($U=746,000$ $p<.05$; $U=672,500$ $p<.05$) respectively).

Table 10. T test results (education time)

Factor	Group	N	\bar{X}	S	Sd	t	p
Perceived Ease of Use of Platform	Morning	56	2,9762	,95792	87	1,951	.049
	Night	33	3,3737	,87553			

As seen in Table 10, there is a statistically meaningful difference between perceptions of the participants, who took education in night and morning, for ease of use of platform factor ($t(87)=1951$, $p<.05$).

5) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of daily computer usage?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on daily computer usage (Table 11). According to test results, data is not distributed normally.

Table 11. Normality test results (daily computer usage period)

Factor	0-2 Hours			2-4 Hours			4-6 Hours			Greater than 6 Hours		
	Std.	sd	P	Std.	sd	p	Std.	sd	p	Std.	sd	p
Group studies satisfaction	,920	35	,014	,905	27	,018	,964	10	,830	,899	9	,248
Perceived Ease of Use of Platform	,943	35	,069	,953	27	,249	,979	10	,960	,834	9	,049
Platform usage satisfaction	,906	35	,006	,899	27	,013	,917	10	,335	,708	9	,002

In terms of daily computer usage period variable, participants' perceptions were analyzed with Kruskal Wallis H test that did not require parametric test assumptions. Test results were presented in Table 12.

Table 12. Kruskal Wallis H test results (daily computer usage period)

Factor	n	Mean Rank	sd	X ²	p	Significant Difference
Group studies satisfaction						
0-2 hours	41	50,11	3	5,429	,143	None
2-4 hours	30	53,72				
4-6 hours	14	39,46				
Greater than 6 hours	10	34,15				
Perceived Ease of Use of Platform						
0-2 hours	37	42,85	3	2,872	,412	None
2-4 hours	28	50,05				
4-6 hours	14	36,61				
Greater than 6 hours	9	46,28				
Platform usage satisfaction						
0-2 hours	39	47,55	3	3,169	,366	None
2-4 hours	29	51,90				
4-6 hours	16	37,13				
Greater than 6 hours	9	46,39				

As seen in

Table 12, there is not a statistically meaningful difference between scores for group studies satisfaction factor in terms of daily computer usage period ($X^2(sd=3, n=95)=5,429, p>.05$). There is not a statistically meaningful difference between scores for ease of use of platform perception factor in terms of daily computer usage period ($X^2(sd=3, n=88)=2,872, p>.05$). There is not a statistically meaningful difference between scores for platform usage satisfaction factor in terms of daily computer usage period ($X^2(sd=3, n=88)=3,169, p>.05$).

6) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of daily internet usage?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on daily internet usage (Table 13). According to test results, data is not distributed normally.

Table 13. Normality Test results (daily internet usage period)

Factor	0-2 Hours			2-4 Hours			4-6 Hours			Greater than 6 Hours		
	Std.	sd	P	Std.	sd	p	Std.	sd	p	Std.	sd	p
Group studies satisfaction	,925	39	,012	,938	21	,198	,936	9	,542	,889	11	,134
Perceived Ease of Use of Platform	,930	39	,018	,975	21	,838	,975	21	,838	,934	11	,453

Platform usage satisfaction	,933	39	,023	,798	21	,001	,914	9	,348	,802	11	,010
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In terms of daily internet usage period variable, participants' perceptions were analyzed with Kruskal Wallis H test that did not require parametric test assumptions. Test results were presented in Table 14.

Table 14. Kruskal Wallis H test results (daily internet usage period)

Factor	n	Mean Rank	sd	X ²	p	Significant Difference
Group Studies Satisfaction						
0-2 Hours	45	48,44	3	3,440	,329	Yok
2-4 Hours	24	53,52				
4-6 Hours	12	43,21				
Greater than 6 Hours	13	37,08				
Perceived Ease of Use of Platform						
0-2 Hours	41	40,43	3	1,763	,623	Yok
2-4 Hours	24	48,69				
4-6 Hours	10	46,45				
Greater than 6 Hours	12	44,79				
Platform Usage Satisfaction						
0-2 Hours	43	44,15	3	2,987	,394	Yok
2-4 Hours	23	54,59				
4-6 Hours	13	44,92				
Greater than 6 Hours	13	41,54				

As seen in Table 14, there is not a statistically meaningful difference between scores for group studies satisfaction factor in terms of daily internet usage period($X^2(sd=3, n=94)=3,440, p>.05$). There is not a statistically meaningful difference between scores for ease of use of platform perception factor in terms of daily internet usage period($X^2(sd=3, n=87)=1,763, p>.05$). There is not a statistically meaningful difference between scores for platform usage satisfaction factor in terms of daily internet usage period($X^2(sd=3, n=92)=2,987, p>.05$).

7) Do perception levels of participations for cloud computing based teaching platform differentiate in terms of the mostly used type of software?

Before analyzing participants' opinions related to their perception levels, Shapiro Wilk normality test was applied depending on the mostly used type of software (Table 15). According to test results, data is not distributed normally.

Table 15. Normality test results (the mostly used type of software)

Factor	Office Application Internet			Programming			Design		
	Std.	sd	P	Std.	sd	p	Std.	sd	p
Group studies satisfaction	,920	18	,131	,881	43	,000	,793	10	,012
Perceived Ease of Use of Platform	,953	18	,476	,957	43	,109	,831	10	,035

Platform usage satisfaction	,920	18	,132	,880	43	,000	,868	10	,094
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In terms of the mostly used type of software variable, participants' perceptions were analyzed with Kruskal Wallis H test that did not require parametric test assumptions. Test results were presented in Table 16.

Table 16. Kruskal Wallis H test results (the mostly used type of software)

Factor	n	Sum of Means	sd	X ²	p	Significant Difference
Group Studies Satisfaction						
Office Applications Internet	22	40,45	2	,123	,940	Yok
Programming	49	41,65				
Design	10	39,00				
Perceived Ease of Use of Platform						
Office Applications Internet	20	35,53	2	2,349	,309	Yok
Programming	47	42,64				
Design	11	33,32				
Platform Usage Satisfaction						
Office Applications Internet	22	38,41	2	1,037	,595	Yok
Programming	46	42,00				
Design	11	34,82				

As seen in Table 16, there is not a statistically meaningful difference between scores for group studies satisfaction factor in terms of the mostly used type of software ($X^2(sd=2, n=81)=,123, p>.05$). There is not a statistically meaningful difference between scores for ease of use of platform perception factor in terms of the mostly used type of software ($X^2(sd=2, n=88)=2,349, p>.05$). There is not a statistically meaningful difference between scores for platform usage satisfaction factor in terms of the mostly used type of software ($X^2(sd=2, n=77)=1,037, p>.05$).

4 Discussion and conclusion

This study aims to compare the group studies that were performed through a cloud computing based development platform in terms of participants' group studies satisfaction, ease of use of platform perception and platform usage satisfaction factors, under the scope of extracurricular learning activities. Group studies satisfaction levels of participants of this study was found high. This condition shows that they are content with group studies for extracurricular learning activities. Additionally, their perceptions toward cloud computing based learning platform usage easiness for group studies was found as "rarely agree". This condition shows that participant do not find usage of cloud computing based learning platforms are very easy and according to them, cloud computing based learning platforms do not provide any convenience compared to traditional learning platforms. Similarly, in their studies that Pike, Pittman, and Hwang [27] compared two different student groups that took web programming training and used either cloud based or one of the traditional tools (i.e. personal computer etc.) reported that usage of cloud based development platforms was considered by students more difficult than traditional development platforms. This condition might be attributed to the facts that participants have more experience on usage of traditional learning platforms and they might not want to change their habits, moreover, cloud computing based platform using participants are not allowed to enter into group

studies without making pre-preparation studies although they do not want to make any pre-preparation studies by themselves. Participants' satisfaction levels for cloud computing based learning platform usage were found as "rarely agree". This condition shows that participants partially like cloud computing based learning platforms and they do not find these platforms are entirely superior to traditional learning platforms. Therefore, cloud computing based software development platforms might not entirely meet the needs of traditional based (i.e. desktop, laptop etc.) professional software development tool sets although use of those platforms in educational institutions and activities are beneficial [12]. Moreover, it is observed that according to users' considerations, cloud based software development platforms are not "sufficiently beneficial to change the development platforms" in terms of currently used traditional development platforms. This result is similar to the results of the study that was conducted by Huang, Wang and Liu [17]. In the related study, a cloud based tool (Google Docs) was used in a course in which a web site was designed however a difference on students' learning motivation was not observed between those who used this tool and those who did not use.

There is not a meaningful difference between male and female participants' perceptions for group studies for extracurricular learning activities in terms of gender difference factor. Contrary to those studies that concluded that gender was considered as a factor affecting collaborative and group studies in engineering education [11, 34], this condition shows that both of the groups obtain a similar perception for extracurricular group studies. On the other hand, there is a statistically meaningful difference between male and female participants in terms of cloud computing ease of use of platform perception. In the observations of the related averages, male participants find usage of cloud computing based learning platform is easier than female participants. Male participants' attitudes to software usage process might be attributed to this condition. This finding can be explained with the role of computer concern that was determined in Gender Based Digital Separation model [8]. In the related model, technology usage concern of women was attributed to societal gender classification that have deeply affected individuals' behaviors starting from their early childhood. According to this view of point, boys are considered more competitive than girls by their parents and that they have better abilities in more masculine subjects (i.e. engineering etc.) and they are motivated to those areas during their education [8]. Another reason that female participants find software and internet based tools more difficult might be that majority of these tools have been designed in an industry that has been dominated by men [2, 15]. On the other hand, other reasons giving rise to this result can be listed as teaching strategies do not fit women's learning styles, they have more responsibilities in family duties compared to men, their desire to avoid occupations that are mainly held by men, their hesitation that is aroused from low level of self-sufficiency perceptions, compared to men, in spite of equal levels of performance [3]. Moreover, there is not a statistically meaningful difference between perceptions for cloud computing based learning platforms' usage satisfaction. This condition shows that female participants have similar level of satisfaction for usage of these platforms as male participants do although female participants find using these platforms more difficult than male participants. This conclusion can be interpreted as male participants in collaborative teams have more knowledge about the subject compared to female participants and cloud based platform using female participants have position notions for cloud based learning platforms because of the platforms' benefits although they have difficulties on using these platforms, as also stated in another study in this subject [13].

There is not a statistically meaningful difference between group studies' satisfaction among participants in terms of class differences. This condition shows that group studies satisfaction factor does not differentiate in class levels. Additionally, not having difference between groups can be interpreted as group studies have positive effects on academic success perception. Williams and Kessler [39] stated that students in dual programming

teams in programming education demanded less support from instructors and benefited helps from their teammates when they have difficulty on a subject. Moreover, the notion of both of the platforms have similarly positive effects on academic success reveals that effects of learning habits rather than the platform itself is put forward. There is not a statistically meaningful difference between perceptions for cloud computing based learning platforms' usage easiness in terms of class differences. This condition shows that participants have generally similar perceptions for usage easiness. On the other hand, there is a statistically meaningful difference between perceptions for cloud computing based learning platforms' usage satisfaction. Especially, there is a difference between the first graders and 2nd and 4th graders, in favor of upper classes. Additionally, there is a statistically meaningful difference between 3rd and 4th classes. Upper classes' higher level of satisfactions for platform usage can be attributed to their familiarity to development tools and their programming experiences [27].

There is a statistically meaningful difference between perceptions of the students, who take morning and night education, for group studies satisfactions in favor of the students, who take night education, in terms of education time. This condition shows that the students, who take night education, prefers group studies more compared to other group and education time is effective on planning the common study periods. As Layman [20] stated that this condition can be attributed to personal characteristics of participants and their desire to allocate less time for common studies. In other words, studying with group members in a location which is outside of course classroom is more difficult for various reasons (i.e. course Schedule intensity, social activity diversity etc.) for the students, who take morning education, while this kind of activity is more enjoyable and attractive in a similar time frame for the students, who take night education. Similarly, there is a statistically meaningful difference between participants' perceptions for cloud computing based learning platforms usage easiness, in favor of the students, who take night education. This condition might be attributed to that they can find more time to practice these platforms. Additionally, there is a statistically meaningful difference between participants' perceptions for cloud computing based learning platforms usage satisfaction, in favor of the students, who take night education. This condition can be attributed to that these students find the platforms easier to use.

There is not a statistically meaningful difference between participants' perception levels in terms of daily computer usage period. Similarly, there is not a statistically meaningful difference between perception levels of the participants who are categorized in terms of daily internet usage period and the mostly used software types. The results show that computer and internet usage levels are not effective on satisfaction levels toward group studies. This condition can be attributed to the fact that there is communication efficacy in the basis of group studies and technology usage level is not effective for communication. According to [29] there are four types of collaborative study model in software engineering projects, as compulsory, verbal, purpose based and individual. Individual and purpose based study models are the mostly preferred study models [29]. Similarly, study participants preferred generally individual and purpose based study collaborative study model during the application. Therefore, this condition can be the reason of that daily computer and daily internet usage period does not create a difference on participants' perceptions. Additionally, computer and internet usage period have not effects on cloud computing based learning platforms' usage easiness perception. Similarly, there is not a statistically meaningful difference between participants' perceptions for cloud computing based learning platforms usage satisfaction in terms of computer and internet usage period. This condition can be interpreted as computer and internet usage skills are not effective on ease of use of platform and satisfaction. Moreover, participants' general skill levels might have caused this result.

As a result, the individuals, who use cloud computing based learning platforms, are content that group studies are used for extracurricular activities. Additionally, participants do not think that cloud computing based platforms that they performed their group studies are easy to use. Besides, their satisfaction levels for cloud computing based group study platforms are very high. Satisfaction levels of male and female participants for group studies are similar. On the other hand, male participants find cloud computing based platforms easier to use compared to female participants. There is not a difference between male and female participants for usage satisfaction although male participants find cloud computing based platforms easier to use compared to female participants. Perceptions for group studies satisfaction and cloud computing based learning platforms usage easiness are similar in terms of class difference. Additionally, upper classes have higher satisfaction levels for cloud computing based learning platforms compared to primary classes. Night students are more satisfied from extracurricular group studies than morning students. Similarly, an advantageous condition for night students is present for cloud computing based learning ease of use of platform and satisfaction levels. Computer and internet usage period diversities do not have significant effects on satisfaction levels of group studies and cloud computing based learning platforms. A similar condition is also valid in cloud computing based learning platforms' usage easiness.

5 Suggestions

The present study was conducted with students from industrial engineering department. Conducting similar studies with different groups and students from different education level can strengthen the study results. Additionally, conducting similar studies for lessons which have different theoretic and application levels will make contribution to literature. Lastly, increasing cloud based tools usage experience as intensifying the courses which will be delivered through cloud based development platform can affect users' cloud based tools usage easiness perception and their satisfaction levels.

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