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A Longitudinal and Cross-Sectional Research on the Learning Approaches and Transactional Distance in Students of Blended Learning

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Abstract

The learning approaches and the change in the perception of transactional distance throughout the education period of the blended learning students, is an important topic. This study investigates whether the learning approaches and sense of transactional distance of the blended learning students changes during their education. In addition, the relation between the learning approaches and sense of transactional distance of the students has been studied. Longitudinal and Cross-Sectional survey models were used and the results of this study revealed that with the advancement of the studies, the deep learning approaches and sense of dialog of the students decreases, while the surface learning approaches and sensed control increases. No significant difference has been found in the structure flexibility, content organization and autonomy dimensions.

Keywords

Blended learning
Transactional distance
Learning approach

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Introduction

Blended learning has been introduced as a blend of the face-to-face and distance education systems. Although blended learning is a new notion and application, it is a widely used application today. So that while in 2009 there were 1.030.000 K-12 students registered in blended and online learning applications in the United States, this number is estimated to reach 5 million by the year 2016 (Picciano & Seaman, 2010). This increase is similar with the college students (Allen & Seaman, 2011). Similarly, Anadolu, Ankara and Sakarya Universities in Turkey have implemented blended learning systems.

According to Rosenberg (2006) blended learning is a model that mostly consists of face to face and online interaction, while integrating the education with the pace of the individual and the group. The education in such a model is; where the classroom education is very useful through an educator of high quality, the situation in which online education is more effective, and a sharp combination of the two. When the literature concerning blended learning is examined, it is seen that the most notable feature of the blended learning is that it combines different models, and as a result actualizes a purpose. When Graham (2006) and Whitelock and Jelfs (2003) examined the articles regarding blended learning, they have stated that there are 3 main elements which stand out. These elements are; integrating conventional learning and web-based online approaches, integrating the media and tools used in the e-learning environments and the educational approach.

Oliver and Trigwell (2005) recommend the assembly of contextual factors such as the theoretic knowledge, application, research and discovery alongside the integration of schools and purposes, educational activities and elements. It is stated that in theory, the strengths in blended learning are

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combined in order to overcome the deficiencies of face-to-face and online learning. In addition, the fact that in cases where it is not designed carefully, the total opposite happen, is not to be overlooked (Graham, 2006: 8). The success of these designs appears to be relying heavily on them being applied upon a hypothesis.

The increase of learning effectiveness in the face-to-face and online learning environments is ensured by the application having a hypothesis for itself and the researches aimed at this hypothesis being actualized. The fact that the blended learning applications are new, brings the reflection of the hypotheses used in the distance education to the blended learning. Moore's Transactional Distance (TD) hypothesis leads the theories in this field. This is because Rumble states that TD is not only in the distance education, but in all education environments and situations (as cited in Moore & Kearsley, 2012). With this aspect of it, TD is present in both face-to-face and distance education environments, and the fact that it is present in these environments that are the two dimensions of blended learning, causes TD to be an important hypothesis that is used in blended learning. When the literature is examined, Garrison (2000) observed TD to be a hypothesis which is the most acquainted with and used, Cicciarelli (2008) on the other hand, has found it to be the most important hypothesis the educators in online environments use very frequently. In addition to this, it is seen that this hypothesis is used in blended learning by Benson and Samarawickrema (2009), Dron, Seidel and Litten (2004), Horzum (2011) and Wheeler (2007). These studies propound that the hypothesis is important for the blended learning.

TD is "not only a physical distance, but also a psychological and communicational gap that causes potential misunderstandings between the student and educator behaviours; therefore, requires special organization and education procedures" (Moore & Kearsley, 2012). TD possesses an approach that is based on removing the communicational and psychological gap in the learning of the students. Two dimensions that affect the independent learning are defined in the hypothesis, distance (structure and dialog) and autonomy.

The distance dimension consists of two sub-factors, dialog and structure (Gunawardena & McIsaac, 2004). Dialog, inherently with its aspect of directing the students to think (Gorsky & Caspi, 2005) and exteriorly with the ability of enabling the two-way interaction with other individuals in the environment (Jung, 2000), describes the support to the learning of the student. Structure, involves the accessibility and existence of the components that are used in order to respond to the needs and the personal differences of the student in the learning environment (Saba & Shearer, 1994).

The increase of structure and decrease of dialogue in TD causes an increase the distance. Besides this, the opposite will decrease the distance. The decrease in the perceived distance increases the comprehension of the students and decreases the uncertainty, increases motivation, while decreasing the feeling of isolation, therefore creates the sense of belonging (Horzum, 2007, 2011; Jung, Seonghee, Lim & Leem, 2002; Murphy & Rodriguez-Manzaneres, 2008).

When independent learning is taken into consideration, autonomy will be added to the fact of distance. Autonomy involves the active participation of the students in the process of specifying the aims, education activities and evaluation standards (Moore, 1972, 1980). Autonomy is an element related to personality matters such as taking responsibility and developing the habit of studying independently (Moore, 1993). As the distance increases, the participation of the student decreases and their responsibility increases (Saba, 2003).

The aspect of control has been integrated into TD over time. Saba and Shearer (1994) have taken Moore's hypothesis into consideration along with the system dynamic models and defined two more variables in the hypothesis besides TD, that are student and instructor control. Dron (2006) named the control variable as transactional control. Transactional Control (TC) refers to choice. Some of these choices are made by the instructors, and some by the students. The part the choice is made by determines TC. The TC variable of Dron is not offered as a substitute for the TD hypothesis, rather it is a variable to aid explaining the components of TD. In TC, the instructor in control represents the structure, while the student in control represents autonomy and the dialog represents the balancing of

the control (Horzum, 2011). In TC, the increase in the learner control causes the teacher control to decrease, and vice versa. With this aspect, TC is a continuum between the controls of the instructor and learner (Dron, 2007).

When the studies related to TD in blended learning are examined, it can be noted that there are a limited amount of researches in this field. In Shinkle's (2003) study, 13 out of the 30 students attending an 18 month long doctoral program have completed the program. The rest have completed the program in a period of 3 months. During this period, although the dialog has been carried out via e-mail, the change of TD over time has been found. Dron, Seidel and Litten's (2004) study states that a negative relation between structure and dialog exists, and this occurs through the entire lecture. This study has continued for two years, and the emphasis is on the experience gain of the instructors in the course of time. Therefore, with this aspect there are evidences in this study regarding that TD may change over time.

In Wheeler's (2007) study, the TD perception of the learners have been investigated through face-to-face, e-mail and telephone communications, and as a result, e-mail has been determined to be an effective tool for dialogue. In Benson and Samarawickrema's (2009) study the TD classification in the e-learning applications including blended learning programmes has been stated. Horzum's (2011) research indicates that the gender of the learners, the main components they use in the system and the frequency they log into the system caused no change in their perception of TD. Although studies focused on the change in TD can be noted, it is seen that there are no studies conducted in order to find out whether the TD perception changes over time.

In blended learning, another element related to the learning outcomes that affect the progress of learning as much as TD, is the fact of individual differences such as success, motivation, satisfaction and belonging. The individual differences that affect the learning of the individuals must be properly supported in the learning environments (Haripersad, 2010). Ensuring the effectiveness of supporting the individual differences requires a proper blending of the positive aspects of the various components and applications the blended learning possesses (Yılmaz & Orhan, 2010).

The learning approaches are one of the important individual differences in blended learning. Learning approaches that consist of deep and surface learning have been first identified by Marton and Saljö (1976). In the deep learning approach, the student intends to acquire the knowledge by understanding the subject, materials and the components; and with this regard, uses the intrinsic motivation, and feels satisfied about discovering the topic in detail. As for the surface learning approach, the learner aims to invest the minimum effort possible in order to complete the basic tasks of the subject and only acquire the information they will remember (Chamorro-Premuzic, Furnham & Lewis, 2007; Greener, 2008). The student with deep learning, interiorizes programmes with low sense of distance that allow student control, are barely structured, strong in autonomy, and feature internal and external dialog, while the students using surface learning approaches are the opposite.

When the literature is examined, although there are studies that analyse the relation between blended learning and success, (Burton & Nelson, 2006; Ellis, Goodyear, Prosser & O'Hara, 2006; Ginns & Ellis, 2007; Yılmaz & Orhan, 2010) it is also seen that there are a limited amount of studies that investigate whether the learning approaches in blended learning change over time, and the relation between the sensed distance in blended learning and the learning approaches. The aim of this study is to investigate whether the learning approaches and perception of TD change through the period of study. In addition to this, another aim is to analyse the relation between the dimensions of TD and the learning approaches. It is considered important to contribute to the literature regarding the two dimensions, TD and learning approaches that directly affect the learning outcomes of the blended learning students.

Method

Longitudinal and cross-sectional survey models have been used in this study. In the cross-sectional model, the variables are measured once and instantly. On the other hand, in longitudinal survey model, there are reputational measurements of a given variable (Fraenkel & Wallen, 2006). In the beginning of this study, a designated group's learning approaches and perception of TD, they have experienced in blended learning environments have been measured repetitively for three years. In the last measurement, instant determination has been applied on students from two different classes objectively and compared. With this aspect, cross-sectional and longitudinal survey models have been used in the research.

Participants

The participants of this research consists of two groups for the two survey models: Longitudinal and Cross-sectional. The study group of the longitudinal survey model consists of 34 students who were on the third year of their blended learning program studies in the 2011-2012 academic year, in Computer and Instructional Sciences Education in the Faculty of Education of the State University located to the east of the Marmara region. The students filled the measurement tool with the same variables three times over the course of their education, in the 2009-2010 (while in 1st year), 2010-2011 (while in 2nd year) and 2011-2012 (while in 3rd year) academic years. While the students of the 3rd year of the program consisted of a total of 47 students, only 34 of them filled the measurement tools and are considered as members of the study group. 8 (23.5%) of these students are female students, and 26 (76.5%) male students.

As another aspect of the study, in order to analyze whether the sense of TD and learning approaches in students of other classes show differences over time, data suitable to cross-sectional survey model has been collected. The study group of the cross-sectional survey model of this study, consists of 111 students in 1st, 2nd and 3rd years of their studies in the blending learning program of the aforementioned university, faculty and department in the academic year of 2011-2012. In detail, 33 (29.7%) of these students were in the 1st year of their studies, while 44 (39.6%) in 2nd year and 34 (30.6%) were in their 3rd year at the time. 42 (37.8%) of this group are female, and 69 (62.2%) are male students. In addition, while 32 students (28.8%) have a job, 79 students (71.2%) are unemployed.

Blended Learning Program

The blended learning program in the aforementioned department of the faculty and university includes the application of the same subjects taught in the face-to-face program and in the same amount, order and semester. The timetable and curriculum used in the blended learning program are the exact same of the face-to-face program. The only difference between the two is that, in the blended learning program, in addition to the face-to-face classes, the application is blended with distance learning applications. The students in the blended learning program are chosen according to the blended learning program they have selected in the ÖSYM preference form as a result of their scores. The students take the same lessons throughout the same amount of time, which is a total of 8 semesters, with the students of the face-to-face program. Moreover, the students of the blended learning program receive 75% of the subjects as distance and 25% face-to-face learning. That is to say, while the student receives 3 hours of a subject that is 4 hours a week as distance learning, the remaining 1 hour is taught face-to-face by the teacher in a classroom located in the campus of the faculty. The students of the blended learning program that have classes 1 or 2 days a week are regularly attending the courses held in the faculty. Before the students attend the face-to-face courses, they read an e-book section in the distance learning application that is designed separately for every week's subject, watch a presentation and a video, and also ask questions through email, forum page or the chat system, if needed. The students that have followed the weekly subjects through the distance learning program, can ask their questions during the face-to-face lessons, repeat the parts they couldn't understand, and the applications are carried out face-to-face.

Data Collection Tool

Learning approaches questionnaire and the scale of TD in the blended learning environments have been used in the study. The learning approaches questionnaire has been used in order to specify the learning approaches the students of blended learning program. The questionnaire consists of 20 questions in total, (10 for the measurement of deep learning approach and 10 for the measurement of surface learning approach) in the structure of 5 point Likert. The students indicate to what extent they agree with the items in the deep and surface learning approaches and acquire a score between 10 and 50. The original scale was created by Biggs, Kember and Leung (2001) and translated into Turkish by Önder and Beşoluk (2010). When the parameters of consistence of the scale are examined, Cronbach-Alpha value has been stated as 0.78 for deep learning and 0.74 for surface learning.

The scale of TD in the blended learning environments that is used in the research has been created by Horzum (2011). Exploratory and confirmatory factor analyses have been used in the works of the scale. As a result of the exploratory factor analysis, the scale consists of 38 items and 5 factors. The five factors are named as dialog, structure flexibility, content organization, control and autonomy. Weight values of the 38 items in the scale vary between 0.59-0.87. Eigenvalue of the scale is 22.47 and the total variance amount it explains is 59.11. The fit indexes as a result of the confirmatory factor analysis are found to be χ^2= 907.01 (df= 653, p.= .000), χ^2/df= 1.39, RMR= .07, SRMR= .05, RMSEA= .045, CFI= .98, NFI= .93 and NNFI= .98. Cronbach-alpha has been used for the consistency of the scale. The parameter of consistence is .92 for the total of 38 items on the scale; .91 for the dialog factor, .91 for structure flexibility, .91 for content organization, .87 for control and .82 for autonomy.

Analysis of Data

The data have been collected by the distribution of the scales to the students of the blended learning program in the classrooms with the permission of the instructors, at the times they had come to the campus in order to have their face-to-face classes. In the analysis period of the collected data, repeated measures ANOVA test for the longitudinal survey model and one way ANOVA analysis for the cross-sectional survey model. A packaged software has been used for the data analysis in the study and the base for the level of relevance has been taken as .05.

Results

The findings in the study have been taken into consideration separately in the sub-dimensions the TD scales and learning approaches present. Whether the scores of the students in the sub-dimensions of the learning approaches and TD scales throughout the period of 3 years show any difference has been investigated.

Findings for the Learning Approaches

The deep and surface learning sub-dimensions of the scale have been examined respectively. Whether the deep learning approaches sub-dimension of the students in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 1.

Table 1. The ANOVA Table for the Change of the Deep Learning Scores of Students in the Blended Learning Program over the Period of Three Years.

Grade	N	$\bar{x}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	30.24	6.42	Between Groups	2746.87	33	83.24		
2	34	27.35	6.05	Factor	525.55	2	262.78	28.23	.00
3	34	24.68	4.90	Error	614.45	66	9.31		
				Total	3986.87	101			

When Table 1 is examined, it is seen that there is a statistically significant difference in the deep learning approaches of the students in the blended learning program over the period of 3 years (Wilk's

Λ= 0.42, $F_{(2, 66)}$= 28.23, p<.05, multivariate η^2= 0.58). The statistical difference is at medium level when the η^2 multivariate is considered. In the Boferronni test results, the deep learning approaches of the students in the 1st year ($\bar{X}$ = 30.24) were found to be higher than the students in the 2nd year ($\bar{X}$ = 27.35) and 3rd year ($\bar{X}$ = 24.68). In addition, the deep learning approaches of the students in the 2nd year ($\bar{X}$ = 27.35) have been found to be higher than the students in the 3rd year ($\bar{X}$ = 24.68). In the following polynomial contrast analysis ($F_{(1, 33)}$= 37.59, p<.05, multivariate η^2= 0.53) statistically significant difference has been found. This finding shows that the effect of linearity is significant and presents that the difference decreases throughout the years. On the contrary, the high level polynomial contrast analysis shows no significant difference. All of these findings point out that the deep learning approaches of the students of the blended learning program decrease over the years.

Whether the surface learning approaches of the students in the blended learning program change over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 2.

Table 2. The ANOVA Test Table for Whether the Surface Learning Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{X}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	29.18	6.06	Between Groups	2576.52	33	78.08		
2	34	32.44	6.08	Factor	613.59	2	306.79	23.12	.00
3	34	35.18	5.57	Error	875.75	66	13.27		
				Total	4065.86	101			

When Table 2 is examined, it is seen that there is a statistically significant difference in the surface learning approaches of the students in the blended learning program over the period of 3 years (Wilk's Λ= 0.26, $F_{(2, 66)}$= 23.12, p<.05, multivariate η^2= 0.74). The statistical difference is at high level when the η^2 multivariate is considered. In the Boferronni test results, the surface learning approaches of the students in the 3rd year ($\bar{X}$ = 35.18) were found to be higher than the students in the 2nd year ($\bar{X}$ = 32.44) and 1st year ($\bar{X}$ = 29.18). In addition, the surface learning approaches of the students in the 2nd year ($\bar{X}$ = 32.44) have been found to be higher than the students in the 1st year ($\bar{X}$ = 29.18). Also in the following polynomial contrast analysis ($F_{(1, 33)}$= 32.11, p<.05, multivariate η^2= 0.49) statistically significant difference has been found. This finding shows that the effect of linearity is significant and presents that the difference increases throughout the years. On the contrary, the high level polynomial contrast analysis shows no significant difference. All of these findings point out that the surface learning approaches of the students of the blended learning programme increase over the years.

Findings for TD Sub Factors

The dialog, structure flexibility, content organization, control and autonomy sub-dimensions of the TD Scale have been examined respectively. Whether the sub-dimension of dialog perception of the students in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 3.

Table 3. The ANOVA Test Table for Whether the Dialog Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{X}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	33.41	6.04	Between Groups	1795.54	33	54.41		
2	34	29.82	6.29	Factor	370.73	2	185.36	7.14	.00
3	34	29.03	5.51	Error	1714.61	66	25.98		
				Total	3880.88	101			

When Table 3 is examined, it is seen that there is a statistically significant difference in the dialog of the students in blended learning program over the period of 3 years (Wilk's Λ= 0.71, $F_{(2, 66)}$= 7.14, p<.05, multivariate η^2= 0.29). The statistical difference is at low level when the η^2 multivariate is considered. In the Boferronni test results, the dialog the students in the 1st year ($\bar{X}$ = 33.41) were found to be higher than the students in the 2nd year ($\bar{X}$ = 29.82) and 3rd year ($\bar{X}$ = 29.03). In addition, the dialog the students' showed no significant difference in the 2nd and 3rd years. Also in the following polynomial contrast analysis ($F_{(1, 33)}$= 11.07, p<.05, multivariate η^2= 0.25) statistically significant difference has been found. This finding shows that the effect of linearity is significant and presents that the difference decreases throughout the years. On the contrary, the high level polynomial contrast analysis shows no significant difference. All of these findings point out that the dialog the students of the blended learning program is high in the first year, and low in the other years. Whether the sub-dimension of structure flexibility in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 4.

Table 4. The ANOVA Test Table for Whether the Structure Flexibility Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{X}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	22.09	6.03	Between Groups	1444.75	33	43.78		
2	34	22.18	4.30	Factor	22.14	2	11.07	0.66	.52
3	34	21.15	4.55	Error	1714.61	66	25.98		
				Total	3181.50	101			

When Table 4 is examined, it is seen that there is no statistically significant difference in the structure flexibility the students of the blended learning program over the period of 3 years (Wilk's Λ= 0.93, $F_{(2, 66)}$= 0.66, p>.05, multivariate η^2= 0.07). This finding indicates that the structure flexibility the students of the blended learning program shows no difference throughout the years. Whether the sub-dimension of content organization in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 5.

Table 5. The ANOVA Test Table for Whether the Content Organization Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{X}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	21.56	7.11	Between Groups	3828.08	33	116.00		
2	34	21.32	6.43	Factor	1.12	2	0.56	0.06	.94
3	34	21.53	6.55	Error	620.22	66	9.40		
				Total	4449.42	101			

When Table 5 is examined, it is seen that there is no statistically significant difference in the content organization the students of the blended learning program over the period of 3 years (Wilk's Λ= 0.98, $F_{(2, 66)}$= 0.06, p>.05, multivariate η^2= 0.02). This finding indicates that the content organization the students of the blended learning program shows no difference throughout the years. Whether the sub-dimension of control in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 6.

Table 6. The ANOVA Test Table for Whether the Control Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{x}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	14.35	4.70	Between Groups	639.58	33	19.38		
2	34	14.79	7.31	Factor	1233.71	2	616.85	16.95	.00
3	34	21.94	4.08	Error	620.22	66	9.40		
				Total	2493.51	101			

When Table 6 is examined, it is seen that there is a statistically significant difference in the control the students of the blended learning programme over the period of 3 years (Wilk's Λ= 0.33, $F_{(2, 66)}$= 16.95, p<.05, multivariate η^2= 0.67). The statistical difference is at high level when the η^2 multivariate is considered. In the Boferronni test results, the control perception the students in the 3rd year ($\bar{x}$ = 21.94) were found to be higher than the students in the 2nd year ($\bar{x}$ = 14.79) and 1st year ($\bar{x}$ = 14.35). In addition, the control perception of the students' showed no significant difference in the 1st and 2nd years. Also in the following polynomial contrast analysis ($F_{(1, 33)}$= 48.21, p<.05, multivariate η^2= 0.59) statistically significant difference has been found. This finding shows that the effect of linearity is significant and presents that the difference increases throughout the years. On the contrary, the high level polynomial contrast analysis shows no significant difference.

Whether the sub-dimension of autonomy in the blended learning program changes over the period of 3 years has been analyzed via the repeated measures ANOVA and the results are presented in the Table 7.

Table 7. The ANOVA Test Table for Whether the Autonomy Scores of Students in the Blended Learning Program Change over the Period of Three Years.

Grade	N	$\bar{x}$	SD		Sum of Squares	df	Mean of Squares	F	p
1	34	22.94	6.59	Between Groups	3207.85	33	97.21		
2	34	22.32	6.11	Factor	17.31	2	8.66	0.89	.42
3	34	21.94	5.99	Error	643.35	66	9.75		
				Total	3868.51	101			

When Table 7 is examined, it is seen that there is no statistically significant difference in the autonomy the students of the blended learning program over the period of 3 years (Wilk's Λ= 0.85, $F_{(2, 66)}$= 0.89, p>.05, multivariate η^2= 0.15). This finding indicates that the autonomy of the students in blended learning program shows no difference throughout the years.

Throughout the study the relation between the sense of TD and learning approaches of the students was also investigated. As a result of the correlation analysis, a medium positively significant correlation between the deep learning approach with dialog and structure flexibility (r_{dialog}= .43, $r_{structure}$= .40) has been found. In addition to this, a medium negatively significant correlation between the surface learning approach with dialog and structure flexibility (r_{dialog}= .32, $r_{structure}$= .36) has been found.

In the study, whether a difference in the learning approaches and TD dimensions occurs depending on the grade of the students in the blended learning program has been investigated via the one way ANOVA and the results are presented in the Table 8.

Table 8. The One Way ANOVA Test Table Regarding the Difference in the Dimensions of Learning Approaches and TD of the Students Depending on Their Grade.

Factors	Grade	N	$\bar{x}$	SD		Sum of Squares	df	Mean of Squares	F	p
Deep Learning	1	33	33.39	4.88	Between Groups	1280.73	2	640.37	16.61	.00
	2	44	29.52	7.79						
	3	34	24.68	4.90	Within groups	4164.30	108	38.56		
	Total	111	29.19	7.03	Total	5445.03	110			
Surface Learning	1	33	27.73	3.87	Between Groups	941.88	2	470.94	17.09	.00
	2	44	30.82	5.86						
	3	34	35.18	5.57	Within groups	2976.03	108	27.56		
	Total	111	31.23	5.97	Total	3917.91	110			
Dialog	1	33	29.09	5.34	Between Groups	6.33	2	3.17	0.12	.89
	2	44	29.55	4.82						
	3	34	29.03	5.51	Within groups	2912.61	108	26.97		
	Total	111	29.25	5.15	Total	2918.94	110			
Flexibility of Structure	1	33	20.85	4.91	Between Groups	8.75	2	4.38	0.24	.79
	2	44	21.52	3.31						
	3	34	21.15	4.75	Within groups	1985.49	108	18.38		
	Total	111	21.21	4.26	Total	1994.23	110			
Content Organization	1	33	20.42	4.96	Between Groups	114.18	2	57.09	1.91	.15
	2	44	22.86	4.88						
	3	34	21.53	6.55	Within groups	3225.71	108	29.87		
	Total	111	21.73	5.51	Total	3339.89	110			
Control	1	33	16.49	2.55	Between Groups	498.76	2	249.38	21.11	.00
	2	44	19.34	3.47						
	3	34	21.94	4.08	Within groups	1276.01	108	11.82		
	Total	111	19.29	4.01	Total	1774.78	110			
Autonomy	1	33	23.30	6.60	Between Groups	123.47	2	61.73	1.55	.22
	2	44	24.48	6.35						
	3	34	21.94	5.99	Within groups	4313.83	108	39.94		
	Total	111	23.35	6.35	Total	4437.30	110			

When the results of the analysis are examined, it is seen that there is a statistically significant difference (p.<.05) in the deep learning ($F_{(2, 108)}$= 16.61), surface learning ($F_{(2, 108)}$= 17.09) and control ($F_{(2, 108)}$= 21.11) dimensions in the blended learning program depending on the students' grade. In addition, there is no statistically significant difference found (p.>.05) in the dialog ($F_{(2, 108)}$= 0.12), structure flexibility ($F_{(2, 108)}$= 0.24), content organization ($F_{(2, 108)}$= 1.91) and autonomy ($F_{(2, 108)}$= 1.55) dimensions in the blended learning program, depending on the grade.

As the result of the Boferronni test of the deep learning approach, it has been found that the 1st year students ($\bar{x}$ = 33.39), learn more deeply than the 2nd ($\bar{x}$ = 29.52) and 3rd year students ($\bar{x}$ = 24.68). In addition it is seen that the 2nd year students learn more deeply than the 3rd year students. This

findings show that as the students go further in their studies in the blended learning program, their approach of deep learning decreases. Also as a result of the Boferronni test of the surface learning approach, it is seen that the learning of the 3rd year students ($\bar{X}$ = 35.18) is more superficial than the 2nd ($\bar{X}$ = 30.82) and 1st year ($\bar{X}$ = 27.73) students. It is also seen that the 2nd year students learn more superficially than the 1st year students. This finding shows that as the students go further in their studies in the blended learning program, their approach of surface learning increases. As the result of the control Boferronni test, it can be stated that the 3rd year students ($\bar{X}$ = 21.94) more control than the 2nd ($\bar{X}$ = 19.34) and 1st year ($\bar{X}$ = 16.49) students. In addition, it can be seen that the 2nd year students more control compared to the 1st year students. This finding indicates that as the students go further in their studies in the blended learning program, their control increases. Again, it can be stated that, as the students get used to the blended learning environments, their control in their learning increases.

Discussion, Conclusion and Suggestions

Blended learning is an application that is being used more often nowadays. The reason behind it being frequently used may be the fact that it unifies the face-to-face and distance learning programs. Not only does it accomplish this task, it also blends different tools, methods, techniques and interactions together, and with this aspect, it becomes advantageous. Blended learning has the ability to support the individual differences of the students by blending many different applications together (Diseth, 2007; Yılmaz & Orhan, 2010). One of them is the learning approaches. When the studies regarding the learning approaches are examined, limited studies investigating the learning approaches in the blended learning and whether it changes over time, have been found. In this study, whether the deep and surface learning approaches of the students in the blended learning program change over time has been investigated.

As a result of the study, a meaningful decrease has been found in the deep learning approaches of the students in the blended learning program throughout their period of education and an increase in their surface learning approaches every year. In the cross-sectional data of the study when the learning approaches and the years of the students are compared, it is seen that while the deep learning decreases over the period of education, the surface learning increases. These two findings indicate that the learning approaches in blended learning become superficial over time. This evidence is also consistent with the statement of Yılmaz and Orhan (2010) that; using the surface learning approach in the blended learning environments will benefit the success of the students. These findings are in the shape of support of the evidence Papinzak, Young, Graves and Haynes (2008) state that the students of the medical faculty lose their self-efficacy and become superficial learners over time. The preference of the deep learning approach of the students in the blended learning program decreases over time is a negative circumstance in regards of the permanent and transferrable knowledge. With this aspect, investigating whether the circumstances are similar in the students of the face-to-face programme in the future studies is considered to be important in regards of finding the root of the problem. In addition, interviewing the students in order to find the main cause of this problem can be recommended. The findings of the study also indicate a negative relation between the deep and surface learning. These findings are consistent with the basic hypotheses of the learning approaches (Biggs, Kember & Leung, 2001; Horzum, 2013; Marton & Saljö, 1976; Önder & Beşoluk, 2010).

Whether the TD perception of the students in blended learning changes over time has also been investigated in the study. It is seen that dialog decreases throughout the period of education. It is also seen that the deep learning approaches of the students in the blended learning program have a positive relation with the dialog, while the surface learning approaches have a negative one. Besides that, the finding stating that the students of the blended learning program learn more superficially over time presents that the research generates consistent data in itself. These findings can be explained with the statement of Cleveland-Innes and Emes (2004) that; the learning approach changes over time with the increase of interaction. The fact that the dialog of the students in the blended learning decreases in the course of time can be seen as the underlying reason of them changing their learning approaches into a more superficial one. Again the deep learning approaches focusing on learning products of better

quality and the necessity of using more internal and external dialog in order to maintain this (Greener, 2008), is in the shape to explain the relation between dialog and deep learning.

In the study, the structure flexibility, content organization and autonomy the students in blended learning program has shown no significant difference throughout the period of three years. Also no difference has been found in the cross-sectional survey sample. The fact that no changes were applied to the presentation of the content in the blended learning program over the period of three years, may be the cause of no visible change in the perception of the students. Simply due to the fact that structure flexibility and content organization are related factors and shaped as the student gets familiar with the program (Demir Kaymak & Horzum, Horzum, In press; Huang, 2000), they are not expected to change over time. Whether the control the students in the blended learning changes has been investigated in the research. The control has been found to change towards the student throughout the education period. Again in the cross-sectional survey sample, similar results have been achieved. These findings prove that the student control increases in the process of blended learning. This situation may be connected to the fact that the students adopt to the blended learning (Dron, 2006, 2007). In addition when the curriculum of the Computer Education and Instructional Technologies is examined, it is seen that with the advancement of the year of study, the subjects for the field of study and subjects that will ensure the application of the teacher knowledge increase (YÖK, 2007). The applications in these subjects may have caused the control increase.

It is recommended that the individuals who design and execute blended learning applications take this change into consideration and plan accordingly. It is also important to design environments that suit the individual differences of the students and also adopt to changes, while creating the blended learning environments and the distance dimension of the blended learning. In this study, the learning approaches of the students have been considered from their individual differences. The learning approaches related to the perception and comments on the blended learning (Akkoyunlu & Yılmaz-Soylu, 2006, Akkoyunlu & Yılmaz-Soylu, 2008, Uğur, Akkoyunlu & Kurbanoğlu, 2011) along with the TD may be investigated in future studies. The 3 year period of the undergraduate students in the blended learning have been taken into consideration in this study. Conducting a research to capture the difference in the period of 4 years is very important in order to see the whole process. The study has been carried out only with a limited amount of pre-service teachers. Students of different faculties may be a part of the future studies. In addition, the limitation of participant number in the study has failed the use of advanced statistical techniques. The future studies may be carried out by involving more people, thus enabling the use of advanced statistical techniques. Moreover, quantitative research models were used to collect data. In order to support these data and collect data thoroughly in the future, qualitative research models may be used in the studies to conduct researches fit for blended learning.

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