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Impact of Blended Learning Environments Based on Algo-Heuristic Theory on Some Variables

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In this study, the effects of Algo–Heuristic Theory based blended learning environments on students' computer skills in their preparation of presentations, levels of attitudes towards computers, and levels of motivation regarding the information technology course were investigated. The research sample was composed of 71 students. A semi–empirical design with a pre-test–post-test, and control group was used. Research data was collected using an Academic Achievement Test, the Computer Attitude Scale for Primary School Students and the Motivation Scale for the Information Technology Course. A one way ANOVA was conducted on all the data collected and the results revealed that the achievements and motivation levels of the students who studied in an Algo–Heuristic Theory based blended learning environment in the information technology course increased significantly.

Introduction

It is an undeniable fact that technological developments in today's world have affected the field of education as, indeed, it has in all other fields. In line with the development of new technologies, there is a growing need for human resources that have the expertise to use these technologies, and fulfilling this need is only possible through education (Akıncı and Seferoğlu, 2010). Moreover, it is inevitable that benefits will be drawn while providing these improvements. In fact, throughout the world, and in particular the developed world, the impact of teaching and using these technologies in education is frequently questioned (Akıncı and Seferoğlu, 2010; Aksoy, 2003; Bayrakçı, 2005; EU, 2006; EU, 2008; Kozma, 2002; OECD, 2006). The studies conducted have revealed that students, teachers and parents are in agreement regarding the fact that IT has a positive impact on learning and that IT increased the academic success of students and contributed overall to the achievement of their educational goals. Furthermore, it was determined that IT has positive impacts on students' behaviors, motivation, communication and operational skills, and in providing a strong motivation (Çetin and Günay, 2010; Demirer and Şahin, 2008; EU, 2006; Para and Reis, 2009; Seferoğlu, Akbıyık and Bulut, 2008). Thus, it is frequently emphasized that IT has a strong motivational impact (Civelek, 2008; EU, 2006; Mercan et al., 2009).

Despite the importance of IT, there are various problems when faced with teaching these IT skills (Akbıyık and Seferoğlu, 2009). For instance, there are problems such as the current insufficiencies in the infrastructure, crowded classes, only having one computer per two children, the content

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being updated constantly, and the content being hard for some and easy for others as well as insufficient lecture hours (Karal, Reisoğlu and Günaydın, 2010).

In order to overcome these problems, the blended learning environment approach is seen as a solution. The aim of the blended learning approach is in providing the most effective learning environment by minimizing the weaknesses of different methods and benefiting as much as possible from their strengths (Osguthorpe and Graham, 2003). In the integrated education method, the idea is to combine e-learning with face to face training opportunities (Allan, 2007; Driscoll, 2002; Garnham and Kaleta, 2002; Horton, 2000; Morisson, 2003; Vaughan, 2003; Wilson and Smilanich, 2005). Blended learning environments supported by rich content may increase the satisfaction level of the students. Usta (2007) states that the blended learning environments increase student satisfaction. Students have the chance to access content outside classroom hours and, thus, this continued learning can help in overcoming the problem of insufficient lecture hours. In a study conducted by Kirişçioğlu (2009), students stated that they saved valuable time both before the lesson and after by learning the necessary theoretical information regarding the experiments they were to conduct in the Science Laboratory class beforehand thanks to the relevant websites and being able to do the work that needed to be done after the experiment, outside of the classroom. Together with the directives and supportive materials, web supported learning environments that can be used in blended learning may reduce the time required by the teacher to present the application and students may feel the joy of learning by discovering new things by themselves. Moreover, it is possible for the students to share their activities with their friends and teachers, and communicate with them when required.

There are some factors that need to be considered for the success of blended learning. One of these factors is correct content design. (Yalın, 2003). The Algo-Heuristic Theory is one theory that can be beneficial in teaching progressive skills in IT content. To illustrate, the Algo-Heuristic Theory suggests solving problems by converting them into operational steps and underlines the importance of teaching students not just the information, but also how to use this information (Landa, 1987). Students see the information that they will learn as operational steps and can learn these steps by themselves (Laurence, 2004). Moreover, while students perform one operation, they will discover the operational methods themselves (Landa ,1987). When we look at IT skills, it can be seen that many operations that need to be done on computers are performed as a result of carrying out a specific number of operational steps again in a specific order. The order of the operation is important in many of the processes and they are like a prerequisite for the next operation. From this perspective, it can be said that teaching IT skills by converting them into operational steps in line with Algo-Heuristic Theory is a more effective teaching method. In a blended learning environment, supporting these operational steps with valuable content can make learning more visual, more fun and more effective. Based on this premise, this study researched the impact of blended learning environments based on Algo-Heuristic Theory on skills for preparing presentations, attitudes towards computers, and motivation levels for information technology classes.

Sub-problems:

(1) Do the academic achievements of the students in the blended learning environment designed according to Algo-Heuristic Theory differentiate?

(2) Do the attitudes toward computers and motivation levels in information technology lessons differentiate in students learning in the blended learning environment designed according to Algo-Heuristic Theory?

Method

Research Model

This study was carried out with a quasi-experimental design with a pre-test post-test, and control group.

Study Group

This study group was composed of branches A and B, determined by simple random sampling from 5th grade students that studied IT skills at the Hüsnü M. Özyeğin Primary School in the central district of Kırşehir in the 2010-2011 academic year. In total, 71 students participated in the study. Among these, 36 students from the 5/B branch took part as the experiment group and 35 from 5/A as the control group.

Table 1: Distribution of students based on their genders

Groups	Female	Male	Total
Experimental Group	17	18	35
Control Group	16	20	36
Total	33	38	71

Data Collection Tools

The research data was collected using the Academic Achievement Test composed of multiple-choice questions as well as the Attitude towards Computer Scales for Primary School Students and the Computer Lesson Motivation Scale, both of which are 5-point Likert scale type questionnaires.

The Academic Achievement Test was developed by the researchers. The test, initially composed of 35 questions, was tested on 94 students and a total of nine questions with item discrimination powers less than 0.30 were removed and two questions with discrimination power between 0.20 and 0.30 were edited slightly to protect the content validity, and thus, a final test, composed of 26 questions, was obtained. The average difficulty index of the test is 0.487, and its KR-20 internal reliability coefficient is 0.817.

The Attitude towards the Computer Scale for Primary School Students was obtained by adapting the Uzunboylu (1995) translation of the Attitude towards Computer Scale for Secondary School Students prepared by Jones and Clarke (1994), to the level of primary school students. In the construct validity studies of the scale, Kaiser-Meyer-Oklin (KMO) and Bartlett test analyses were performed and it was realized that factor analysis could be carried out (KMO=0,820; p=0,000). The Principal Components Analysis and Varimax Perpendicular Rotation technique was applied in line with this, and several factors regarding the questionnaire were determined. Those with a factor load lower than 0.30 and items that were in multiple factors (a total of 22 items) were removed from the questionnaire and the same process was repeated. As a result of the factor analyses conducted on the remaining 18 items, it was determined that the scale be divided into three sub-factors within itself. The first factor loads varied between 0.556-0.726, the second factor loads between 0.562-0.742, and the third factor loads between 0.476-0.717, and these factors provide a contribution to the total variance of 45.533% respectively with the ratios of 26.30%, 9.96% and 9.28%. In the internal consistency studies of the questionnaire, the Cronbach Alpha coefficients were calculated. The internal consistency coefficient for the entire questionnaire, which was composed of 18 items, was 0.784.

The Computer Lesson Motivation Scale is the "Motivation Scale" originally developed by Christophel (1990) and adapted into Turkish by Kurt and Kurt (1999). No changes had been made

in the expression and narration of the scale items, and only the lecture name was changed to "Computer". This scale, which was composed of a single factor, included 9 items. In this study, the Cronbach-Alpha coefficient of the scale was found to be 0.862 as a result of the reliability study conducted on the scale.

Experimental Procedures

Before starting the real application, the data collection tools were applied to the experimental and control groups both as a pre-test and as a post-test after six weeks of application. In the experimental group, the subjects that were to be discussed and the goals to be obtained were mentioned at the beginning of each lesson. On the webpage designed for the blended learning environment, only the content to be discussed that day was accessible and the students were asked to research these topics from this website. It was enabled so as to allow the students to access the instructions on the website; analyze the images and then apply the operational steps of the related skills, designed according to Algo-Heuristic Theory, after watching them one by one. The support and assistance that the student needed during the interaction of the students with the content was provided instantly by the teacher and the information was shared with the entire class when deemed appropriate. Furthermore, after the targeted subjects were studied, the teacher opened up all the subjects that were studied up to that point and allowed the students to access them. Free time was also given in order for the students to revise these subjects. In the last week of the application, the students were asked to prepare a presentation using the skills they had learned.

In the control group, the training learning environment was used. A traditional learning environment is defined using the traditional learning environment definition mentioned in the Primary School Elective Computer Course Teaching Program (MEB, 2010a), and the lessons were to be conducted generally with the demonstration and narration method in line with the directives given in the information technologies teaching manual (MEB, 2009). The teacher presented the subjects to be discussed and the goals to be achieved that day at the beginning of each lecture. Following that, the teacher demonstrated the skills that will be learned by the students using the demonstration method. In the demonstration method, the teacher shows the screen of the main computer to the computers of the students using class management software. Afterwards, the teacher asked the students to repeat the skills they had just watched. The support and assistance that the students needed during this process were provided instantly by the teacher and information was shared with the entire class when deemed appropriate. After that day's lecture goals were achieved, the topics of the previous lectures were revised. In the last week of the application, the students were asked to prepare a presentation using the skills they had learned.

Teaching Material

Within the scope of the study, a Learning Management System (LMS) website was prepared to be used in the blended learning environment. In the preparation of the website, the server side programming language ASP (Active Server Pages) 3.0 and ISS was used. The prepared lecture content pages were added to the site, and the subject index and page information were entered into the site database. The prepared website was user sensitive, and stored the user information in a database.

Besides opportunities such as viewing and changing user information in the web medium, navigating between course subjects, marking relevant pages as important, taking notes on the subject and page basis, monitoring the time spent on a page, direct access to the last page viewed, locking of the subjects by teachers and sending files to the teacher; there was also an instant messaging section for communication between users.

In determining the content scope to be taught , the Information Technologies Student Study Book was reviwed for Steps 4, 5, 6 (MEB, 2010b) and the Information Technologies Teacher's Manual was reviewed for Steps 4, 5 and 6, 7, 8 (MEB, 2009).

According to the determined subject scope, lecture pages were created and operational steps based on Algo-Heuristic Theory were placed by referring to expert opinions on the skills that were to be taught. The animated screenshots showing how each operational step will look on the computer screen were recorded and added to the site. Students were then enabled to see the operational steps regarding a subject as an ordered list which allowed them to watch the operational step they wanted. The students had the chance to pause, replay and rewind the view of each operational step. Figures 1-4 show example views of the prepared website.

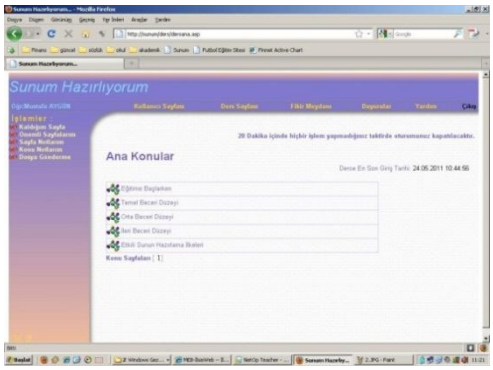

Figure 1: Web Media Course Home Page

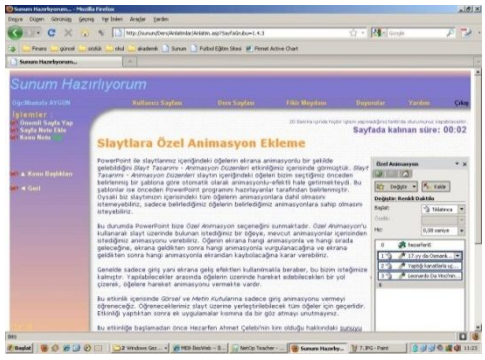

Figure 2: Web Media Sample Lesson Page

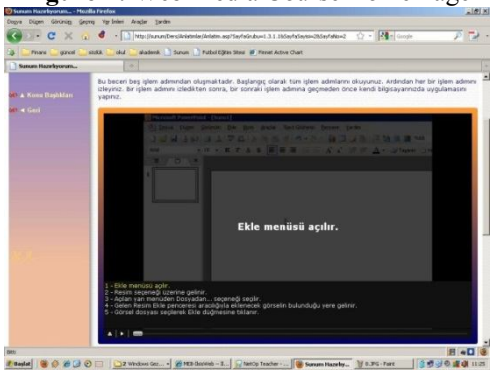

Figure 3: Listing And Monitoring Steps Of Process

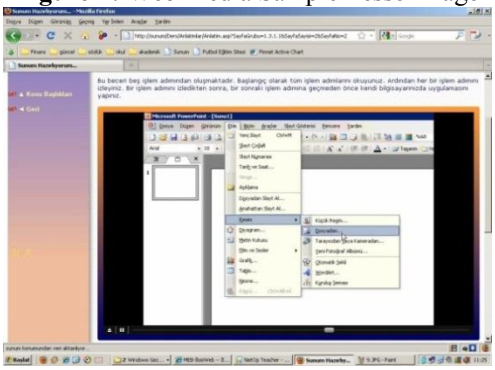

Figure 4: Monitoring a Process Step

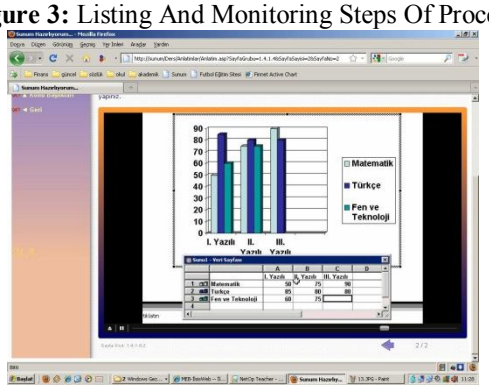

Figure 5: Monitoring a Process Step

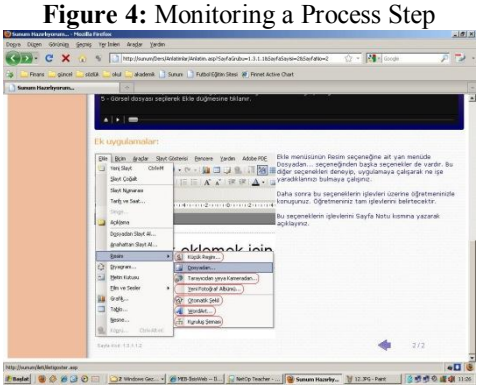

Figure 6: Discovering Similar Process Steps

Data Analysis

On the data that was obtained; frequency, percentage, arithmetic mean, t-test and ANOVA statistics were used. In the significance tests of differences and relations, the 0.5 significance level was taken as the basis.

Results and Discussion

Academic Achievement Levels of Students

Before starting the application phase of the study, academic achievement pre-tests were administered to both the experiment and control groups. Table 2 shows the total score averages of this academic achievement test and t-test findings.

Table 2: Academic achievement pre-test score averages of groups and t-test results

Groups	$\overline{X}$	sd	n	df	t	p
Experimental	13,94	3,421	35	69	1,312	0,194
Control	12,67	4,660	36			

Despite being only moderate, as can be seen in the results of the academic achievement pre-test shown in Table 2, there is difference between the experimental group ($\overline{X}$=13,94) and the control group ($\overline{X}$=12,67). In addition, according to the results of the t-test analysis conducted, this difference was found to be insignificant [$t_{(2-69)}$=1,312; P>0,05]. Therefore, it can be stated that both the experimental and control groups had similar qualities before the administration of the tests. After being applied for six weeks, the academic achievement post-tests were applied. To keep the effect of the insignificant difference between the experiment and control groups reflected in the academic achievement pre-tests under control, the academic achievement post-test and pre-test score differences were calculated for each student individually. Table 3 shows the academic achievement post-test and pre-test score difference averages for both the experimental and control groups.

Table 3: Group averages of post-test - pre-test score differences

Groups	$\overline{X}$	n	sd
Experimental	4,97	35	2,717
Control	2,56	36	4,003

By applying ANOVA to the academic achievement post-test - pre-test score differences, it was checked whether a significant difference was created between the experimental and control groups or not. These findings are given in Table 4.

Table 4: Variance analysis based on group averages of post-test - pre-test score differences

Source of Variance	Sum of Squares	df	Mean Square	F	p	η^2
Between Groups	103,576	1	103,576	8,803	0,004	0,113
Within Groups	811,860	69	11,766			
Total	915,437	70				

After Table 4 was reviewed, it was determined that there was a significant difference in favour of the experimental group between the experiment and the control group in respect of the academic achievement post-test – pre-test score differences [$F_{(1-69)}$=8.803, p<0.05]. Thus, it can be asserted that blended learning environments based on Algo-Heuristic Theory contribute more to acquiring the skill of preparing for presentations compared to that of traditional learning environments. The eta-square value calculated based on these results is η^2=0.113. In other words, approximately 11.3% of the variance observed on the score differences is caused by an independent variable. The Eta-square value is a correlation coefficient showing to what degree the independent variable is effective on the dependent variable (Büyüköztürk, 2009).

This finding is also in line with the literature. In a study conducted by Usta (2007), it was revealed that students whose instruction took place in an blended learning environment had higher academic success rates than those whose instruction was in an online learning environment. Similarly, in studies where online and blended learning environments were compared in terms of teaching conditions and learning outputs; Lim, Morris and Kupritz (2006) suggested that blended learning has a positive impact on student success. In another study, it was proven that blended learning is more advantageous than face-to-face learning and provides more lasting effects (Ekici and Karaman, 2011) Additionally, in a study conducted by Uluyol and Karadeniz (2009), it was shown that student success in blended learning environments is higher and that these students perceive this medium as beneficial. Moreover, when the subject is analyzed in terms of instructional design, the study of Landa on teaching geometry using Algo-Heuristic Theory showed that it is possible for student success to increase from 25% to 87%. Again in another study, this method allowed for the reduction of the length of a Russian language course from 4 years to 3 years. The use of Landamatics in education and industrial fields has created an increase in both production and quality. Furthermore, it was stated that those who received this training are considered to be as successful as the experts, and this has been reflected by customer satisfaction (Laurence, 2004).

Attitudes of Students towards Computer and Motivation Levels in Computer Lessons

Before starting the study application phase, the pre-test of attitudes towards computer scales for primary school students was applied to experimental and control groups. Table 5 shows the total score averages of the pre-test of attitudes towards the computer scale for primary school students and t-test findings.

Table 5: Attitude towards Computer Pre-test Scores of Groups

Attitude toward Computer	Groups	N	$\overline{X}$	sd.	df	t	p
Positive attitude towards using computers	Experimental	35	43,11	6,829	64	1,264	0,210
	Control	36	40,61	9,584			
Positive attitude towards learning how to use computers	Experimental	35	12,91	1,522	64	0,570	0,570
	Control	36	12,67	2,084			
Usefulness of being able to use computers	Experimental	35	13,09	2,513	64	0,719	0,474
	Control	36	12,61	3,017			
Total	Experimental	35	69,11	8,217	64	1,320	0,191
	Control	36	65,89	11,971			

As can be seen from Table 5, according to the results of the pre-test attitudes towards the computer scale for primary school students, there is a small difference between the experimental group ($\overline{X}$ =69,11) and the control group ($\overline{X}$=65,89) in general. Thus, according to the results of the t-test analysis conducted, this difference was found to be insignificant [$t_{(69)}$=1,320; p>0,05]. The attitude towards the computer scale for primary school students is composed of three sub-factors. And when the pre-test total score averages were examined in respect to these three factors, it was seen that there was a relatively small difference between the experimental and control group scores in favor of the experimental group. Therefore, to see if these differences were significant or not, the t-test was applied on the attitudes pre-test score averages for non-related samples in respect to these three factors. According to the findings in Table 5, it can be stated that the experimental and control groups have similar properties in respect to these three sub-factors [p>0,05].

Before starting the application phase of the study, a computer lesson motivation scale pre-test was applied to the experimental and control groups. Table 6 shows the total score averages of these computer lesson motivation scale pre-test and t-test findings.

Table 6: Computer Lesson Motivation Scale Pre-test Scores of Groups and T-Test Results

Groups	$\overline{X}$	sd	n	df	t	P
Experimental	32,63	5,568	35	69	-0,904	0,369
Control	34,14	8,216	36			

As can be seen in the results of the computer lesson motivation scale pre-test shown in Table 6, there is difference between the experimental group ($\overline{X}$=32,63) and the control group ($\overline{X}$=34,14) even though it is relatively small. According to the results of the t-test analysis conducted, this difference was found to be insignificant [t(69)=-0,904; p>0,05]. Thus, it can be said that experimental and control groups have similar properties in respect to the computer lesson motivation scale pre-test scores.

At the end of the six week long application period, the post-testing of the attitudes towards the computer scale for the primary school students was applied. To keep the effect of the insignificant differences between the experimental and the control groups as evidenced in the pre-tests of attitude towards the computer scale for primary school students, the score differences between the post-test and pre-test of the attitude towards the computer scale for the primary school students were calculated for each individual student. Table 7 shows the post-test – pre-test score difference averages regarding the attitude towards the computer scale for the primary school students both in respect to the general scale and the three sub-factors.

Table 7: Group Averages of Attitude towards Computer Scale Post-test – Pre-test Score Differences

Attitude toward Computer	Groups	n	$\overline{X}$	sd
Positive attitude towards using computers	Experimental	35	3,83	5,485
	Control	36	-0,50	6,601
Positive attitude towards learning how to use computers	Experimental	35	-0,34	1,999
	Control	36	-0,08	2,612
Usefulness of being able to use computers	Experimental	35	0,89	2,323
	Control	36	0,31	2,291
Total	Experimental	35	4,37	6,231
	Control	36	–0,28	8,568

When the post-test - pre-test score difference averages regarding the attitudes towards the computer scale for primary school students were analyzed in relation to the findings in Table 7, a difference in favor of the experimental group in general was found. And when it was analyzed in respect to the three sub-factors, differences in favor of the experiment group in respect of "positive attitude towards using computers", "usefulness of being able to use computers", and a difference in the favor of the control group in respect to "positive attitude towards learning how to use computers" were found. To establish whether or not these differences were significant, ANOVA was applied on the score differences in attitude towards the computer scale for primary school students both for the general scale and the three sub-factors, and these findings are presented in Table 8.

Table 8: Variance Analysis of Attitude towards Computer Scale Post-test – Pre-test Score Differences of Groups

Factors	Source of Variance	Sum of Squares	df	Mean Square	F	p	η^2
Positive attitude towards using computers	Between Groups	332,507	1	332,507	9,004	0,004	0,115
	Within Groups	2547,971	69	36,927			
	Total	2880,479	70				
Positive attitude towards learning how to use computers	Between Groups	1,195	1	1,195	0,220	0,640	–
	Within Groups	374,636	69	5,430			

Factors	Source of Variance	Sum of Squares	df	Mean Square	F	p	η^2
Positive attitude towards using computers	Between Groups	332,507	1	332,507	9,004	0,004	0,115
	Within Groups	2547,971	69	36,927			
	Total	375,831	70				
Usefulness of being able to use computers	Between Groups	5,973	1	5,973	1,122	0,293	–
	Within Groups	367,182	69	5,321			
	Total	373,155	70				
Total	Between Groups	383,592	1	383,592	6,805	0,011	0,090
	Within Groups	3889,394	69	56,368			
	Total	4272,986	70				

According to the findings in Table 8, it was observed that the difference, which was obtained in favor of the experimental group when the averages score differences between attitudes towards the computer scale post-test and pre-test were compared, is in fact significant [$F_{(1-69)}$=6,805; p<0,05]. Based on this finding, it can be said that blended learning environments based on Algo-Heuristic Theory have a more positive impact on the attitudes of students towards computers more than do traditional learning environments. The calculated degree of impact is η^2=0.090. In other words, approximately 9% of the variance observed on the score differences is caused by the independent variable. Since η^2>0.06, it can be said that the degree of impact is at a moderate level (Büyüköztürk, 2009).

In addition, based on Table 8, a significant difference in favor of the experimental group was seen between both the experimental and control groups in respect to the post-test and pre-test score differences for the sub-factor “positive attitude towards using computers” in the attitudes towards the computer scale for primary school students [$F_{(1-69)}$=9,004; p<0,05]. When it was analyzed in terms of the sub-factor “positive attitude towards learning how to use computers”, it was seen that there was no significant difference between the experimental and the control groups [$F_{(1-69)}$=0,220; p>0,05]. In addition, when it is finally analyzed in terms of the sub-factor “usefulness of being able to use computers”, it was seen that there was no significant difference between the experimental and the control groups [$F_{(1-69)}$=1,122; p>0,05]. The eta-square value was calculated based on the variance analysis of the score differences in the sub-factor "positive attitude towards using computers" is η^2=0.115. In other words, approximately 11.5% of the variance observed on the score differences was caused by the independent variable. Since η^2>0.06, it can be said that the degree of impact is medium (Büyüköztürk, 2009). At the same time, based on the results of the variance analysis, it can be said that a blended learning environment based on Algo-Heuristic Theory and traditional learning environments have similar impacts on the attitude levels of "positive attitude towards learning how to use computers" and "usefulness of being able to use computers".

Since the difference regarding the sub-factor “positive attitudes towards using computers” is found to be significant, and even though the differences regarding the sub-factors “positive attitudes towards learning how to use computers” and “usefulness of being able to use computers" were found to be insignificant based on the analysis results, the general difference was found to be significant. This may be caused by the fact that the variance with regard to the sub-factor “positive attitudes towards using computers” held more weight in the total variance of 45.533% with 26.30% compared to the other two sub-factors.

Table 9 shows the computer lesson motivation scale post-test and pre-test score difference averages for the experimental and control groups.

Table 9: Group Averages of Computer Lesson Motivation Scale Post-test – Pre-test Score Differences

Groups	$\overline{X}$	n	sd
Experimental	3,00	35	4,073
Control	-0,75	36	4,930

By applying ANOVA to the computer lesson motivation scale post-test - pre-test score differences, it was possible to investigate whether or not a significant difference was created between the experiment and control groups. These findings are presented in Table 10.

Table 10: Variance Analysis of Computer Lesson Motivation Scale Post-test – Pre-test Score Differences

Source of Variance	Sum of Squares	df	Mean Square	F	p	η^2
Between Groups	249,560	1	249,560	12,172	0,001	0,14
Within Groups	1414,750	69	20,504			
Total	1664,310	70				

When Table 10 was examined, it was seen that the difference in favor of the experiment group found in respect to the computer lesson motivation scale post-test and pre-test score differences was significant [$F_{(1-69)}$=12,172; p<0,05]. Therefore, Algo-Heuristic Theory based blended learning environments have a greater impact on the motivation of students regarding computer lessons than traditional learning environments. The eta-square value calculated according to the variance analysis of the computer lesson motivation scale post-test and pre-test score differences is η^2=0.15. In other words, approximately 15% of the variance observed on the score differences is caused by the independent variable. Since η^2>0.14, it can be said that the degree of impact is high (Büyüköztürk, 2009).

These findings are also in line with the literature. According to the results of the study conducted by Usta (2007), students educated in a blended learning environment were more satisfied than those in the online learning environment in terms of student-teacher interaction, teacher support, lecture content, lecture goals and corporate support. Moreover, it was seen that the students in the blended learning environment are more satisfied with the applied approach than the students in the online learning environment. A study by Akkoyunlu and Soylu (2006) also supports these results. According to the findings of their study, it was determined that students in blended learning environments have higher rates of satisfaction. In another study, students who did not attend classes regularly stated that they learned more and had more fun studying when online and traditional learning models are used together (Lehman, 2004). At the end of the study they conducted, Edwards and Fritz (1997) stated that a harmonized learning environment that combines online training activities with face-to-face training activities may be one of the best methods for the distribution of training materials and for providing student satisfaction. In the studies where online and blended learning environments were compared in terms of teaching conditions and learning outputs; Lim, Morris and Kupritz (2006) suggested that blended learning has a positive impact on student satisfaction. In another study, where the goal was to develop a course where the blended learning model could be applied to the teaching course for trainee teachers on the English Language Teaching Program at Anadolu University, 100% of the participants stated that blended learning activities and their use in teaching processes are very effective (Caner, 2009). Moreover, in a study by Balcı (2008), it was stated that the students enjoyed a blended learning environment and adapted to the environment very easily. In a study by Şimsek (2009) that aimed to analyze the impact of blended learning on the attitudes of trainee physics teachers towards computers, the

internet and web-based teaching, it was determined that blended learning had a positive impact on the attitudes towards computers, the internet and web-based teaching.

Conclusion

- Algo-Heuristic Theory based blended learning environments have a significantly higher contribution than traditional learning environments to primary school students for acquiring skills for preparing presentations on computers.
- Compared to traditional learning environments, Algo-Heuristic Theory based blended learning environments provide a significantly higher contribution to the positive attitudes of students towards computers. Also, in terms of the sub-dimensions of attitudes towards the computer, while Algo-Heuristic Theory based blended learning environments increase the level of "positive attitude towards using computers", they did not have a significant impact on "positive attitude towards learning how to use computers" and "usefulness of being able to use computers."
- The computer lesson motivation levels of students in an Algo-Heuristic Theory based blended learning environment are higher than the level of those in a traditional learning environment. This indicates that Algo-Heuristic Theory based blended learning environments increase the motivation levels of students towards computer lessons.

Recommendations

- It can be recommended that Algo-Heuristic Theory based blended learning environments be used in teaching skills for preparing presentations on computers, improving attitudes towards computers and increasing the motivation levels towards computer classes.
- This study examined the learning skills of students in preparing presentations on computers. It is recommended for the research to be repeated in a way that it will also analyze how lasting the learned knowledge will be.
- Similarly, it may be recommended that similar studies be repeated in different educational phases, branches and groups, in order to improve the generalizability of the study findings.

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