

## Effects of Web-supported Learning on the Students' Academic Achievement and Self-esteem

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**ABSTRACT** The aim of this research is to determine the effect of a web-based learning atmosphere on the students' academic achievements and the level of self-esteem. The research was planned according to an experimental design with an initial-final test controlled group. Fifty-two students who have physical education in A and B classes of the 7<sup>th</sup> grade in Kirsehir M. Hüsnü Ozyegin Primary School formed this research's study group. The data of the research was collected by using a volleyball academic achievement test, which was improved by the researcher and the Cooper Smith self-esteem inventory. The results show that web-supported teaching provide benefits to the students' cognitive academic achievement in the field of volleyball according to traditional teaching, but it was seen that there is no meaningful difference in their self-esteem as statistics.

### INTRODUCTION

Rapidly increasing knowledge and improving technology have increased the educational needs of individuals. The occurrence of technological innovation has increased, and technology in manufacturing and service sectors has developed in short time intervals. Rapid advances in science and technology have led to revolutionary changes in social, cultural, political and economic fields. Looking at the period from the past to present the concepts of education and training seem to have changed in parallel with changes in technology (Gulbahar 2009).

The teaching environment and materials' importance is great in terms of increasing the effectiveness and permanence of the teaching-learning process. The presentation made by a teacher has great importance in the process of transferring the knowledge to the learner better, easier and also being permanent. The active participation of students in the learning and teaching process, how the presentation of information appeals to so many senses, and achieving success will also be high in the same proportion (Turkcapar 2011).

The expectation from the education institutions, which has the responsibility of educating individuals according to the needs of society, is to educate individuals that can reach, use, transfer and produce the knowledge, use the technology and learn on their own, and briefly learned how to learn (Akkoyunlu and Kurbanoglu 2003). The way of teaching skills, which people need

not only in school but also in other places or time, is through web-based education, one of the first that comes to mind when one thinks of the concept of distance education and the fastest growing type of education (Imel 1997; Perraton 1998; Singh and Reed 2001). The web is a teaching environment that can be reached easily and quickly, allows different applications to develop and deliver and is easy to update (Mutlu and Öztürk 1999; Kocoglu and Sezgin 2000; Caliskan 2002).

It is possible to find lots of researches about the effects of web-based teaching to reach cognitive success (Overbaugh and Lin 2006; Bell 2007; Johnson 2007; Lee and Rha 2009). But there are not enough researches in this field about whether this model contributes to the level of self-esteem or not. It is considered that determination of whether the web-based learning contributes to the students' academic success and self-esteem or not, will contribute to this field. In this context, the general aim of this research is to determine the effect of the web-based learning environments on the students' academic success and self-esteem. For the purpose of the study, it was studied to determine how the level of academic success and self-esteem of the groups were shaped according to some variables.

### METHODOLOGY

#### The Research Model

The research was formed using the experimental design of initial-final test controlled group.

The design of the initial-final test controlled group is called split-plot design or complicated design, one is determined via repeated measurement (initial-final test) and the other is determined with two factors in experimental design with the students in different categories (Buyukozturk 2001).

### Study Group

Fifty-two students, who have Physical Education in A and B classes of the 7<sup>th</sup> grade in Kirsehir M. Husnu Ozyegin Primary School, have formed this research's study group. There are 25 students in the experimental group and 27 students in the control group. A special effort has not been taken for matching the students by the way of neutral designation and a matching controlled group model has been used. It is determined by the way of neutral designation, which group could be experimental or control.

The students' disperse by the groups and gender is summarized in Table 1.

**Table 1: The disperse of study groups to gender**

<i>Groups</i>	<i>Girls</i>	<i>Boys</i>	<i>Total</i>
Experimental group	14	11	25
Control group	14	13	27
Total	28	24	52

### Data Collection Tools

The research data is collected using the scale of volleyball academic achievement test and self-confidence, and self-perception.

#### *Volleyball Academic Achievement Test*

During the preparation of a test different processes can be followed. These processes are summarized into planning, preparation and arrangement. The first thing for preparing a test is the planning of for attaining the measurement purpose (Ozcelik 1998; Isman and Eskicumali 2001).

The first thing in a test plan is to determine the test measurement for the aim and behaviors. The aim and behaviors of a test are prepared to gradual classification in three fields. In this classification, which is called the Bloom's Taxonomy, the aim and behaviors are classified as cognitive, perception and psychomotor field learning (Demirel 1997).

Improving Taxonomy, by the reason of focus secondary education and after secondary education, cognitive field is the most remarkable. Taksonomi has also been in use commonly and is also criticized (Bereiter and Scardamalia 1998; Moore 1989; Chyung and Stepich 2003). It is the idea of being analytical of Taxonomy in the criticism.

The second level in a test plan consists of the signify table. It is required to inspect the aims and behaviors or all the critical behaviors for attaining the aim of the preparation test (Ozcelik 1998). Pointed aim and behaviors are classified according to Taxonomy and the topics of unit with aims are showed in the same table (Isman and Eskicumali 2001).

Achievement tests in this study are prepared according to the signify table, which is improved using the Bloom's Cognitive Field Taxonomy and the students who are presented education according to both traditional and mixed education atmosphere, become adapted. The third step in the test plan is where the number of questions is determined. The number of questions is determined according to the aim and behaviors in the Signify Table. The number of substances in the test must be planned in such a way to ascertain the test's scale prevalence. So, the test consists of all the critical aim and behaviors as the Signify Table. The fourth step is to determine the test time. It must be long since answers are expected from students. The students are given 40 minutes in this research. Then the writing of test substances is practiced. A test with four alternatives, which consist of 35 questions, is prepared for the purpose of determining the students' achievement level in this research. Five field experts, three of whom are field experts, one is a measurement and assessment expert and the other is a linguistic expert, look at its scale prevalence before the experimental process of prepared multi-choice test. Required arrangements are made as per the experts' suggestions. The initial test and substance analysis are done using the following step of the test plan. An achievement test, which consists of 42 substances, is prepared according to Bloom's Cognitive Taxonomy and his expert ideas. The initial practice is done by 100 students. In the results for this practice, 12 questions are omitted due to distinctive degree is under 0.2 (very bad), and new questions are not written for the omitted questions as per the experts' opinion.

Reliability coefficient for the volleyball academic achievement test is calculated. The equiv-

alence halves approach is used for calculating inner coherence in the ways of unique practicing. To determine confidence with unique practice, there are many techniques and forms, the most used being the Kuder Richardson-20 (KR-20), 21(KR-21) and Cronbach's Alpha (Erkus 2006, Atilgan et al. 2006). The alpha coefficient technique is an approximation way of inner coherence to be used, and substances are calculated as 1-3, 1-4, 1-5, as developed by Cronbach (1951), and Ercan and Kan (2004).

KR-20 can be used if the substance points are transitory (as 1-0). If the answer is correct, one point is given for this analysis; if the answer is wrong or empty, it is considered a practiced pointed test without giving a point. The substances' difficulty degree must not be different from each other when using KR-21 (Atilgan et al. 2006).

These are forms for calculating coefficient of Kuder Richardson-20 (KR-20), Kuder Richardson-21 (KR-21) and Cronbach's Alpha:

$$1. KR-20 = \frac{K}{K-1} \left[ 1 - \frac{\sum p.q}{S_x^2} \right]$$

$$2. KR-21 = \frac{K}{K-1} \left[ 1 - \frac{K.\bar{X} - (\bar{X}^2)}{K.S^2(x)} \right]$$

$$3. Cronbach \hat{\alpha} = \frac{K}{K-1} \left[ 1 - \frac{\sum S_i^2}{S_x^2} \right]$$

Where,

K: The number of substances in the test

P: Substance difficulty index

q: 1-p

S<sup>2</sup>x: Variation of test the points' dispersion

In this study, correct answers are given one point, wrong answers or empty one in used tests are not given one point. The KR-20 form is used in the calculation of the inner coherence coefficient for inequality in the test substances' difficulty degree.

It is defined as below of used contractions in the substance analysis according to Tekin (1996):

P<sub>art</sub> = Average difficulty of the test.

$P_{art} = \frac{\sum X_{art}}{K}$

X<sub>art</sub> = Arithmetic average of the test

K: Highest point to be taken from the test.

P: Difficulty degree for substance (It is accepted easy if it is 1.00, but it is difficult to accept if it is 0.00)

D: Substance distinguishing strengths. For point D, the substance distinguish strength is as follows:

0.40 and higher	A very good substance
0.30-0.39	A very quiet substance
0.20-0.29	Improved substance
0.19 and smaller	A very low substance

According to this, the calculated substances difficulty degree:

$$P = \frac{(D_{\bar{U}} + D_A)}{2n}$$

D<sub>U</sub> = Number of correct answers on the top group to substance.

D<sub>A</sub> = Number of correct answers on the low group to substance.

n = Number of one in low or top group with twenty-seven percent (n<sub>U</sub> = n<sub>A</sub>)

The calculation of substance distinguish strength is,

$$D = \frac{(D_{\bar{U}} - D_A)}{n}$$

### *Self-Confidence - Self-Perception Scale (Coopersmith Self-Esteem)*

Coopersmith's self-esteem inventory was improved by Stanley Coopersmith (1967) and it can be practiced for all the ages. There are three peculiarities of the description of self-esteem used in this scale:

- ♦ Self-esteem is a decision, which reflects a general evaluation related to a person.
- ♦ This decision is continual relatively but it has not changed immediately.
- ♦ This decision can be different according to a person's age, gender and the field of social situation.

Coopersmith's self-esteem scale is a paper-pencil test consisting of 25 substances, which are marked in the question form, "It is suitable for me" and "It is not suitable for me". There are some expressions about a person's point of view in life, family relationships, social relationships and tolerate harnessing in these substances. The points given for each answer maybe 1 or 4. Different and empty answers or substances, which are marked with two alternatives receive a 0 point.

The points change by 0-25 or 0-100, and a higher point is evaluated to mean a high self-esteem. Self-esteem is one of the basic determinants of providing to be active in the psychological field, self-admission, self-value, self-confidence and self-respect (Toruncu 1992).

The concept of self-confidence can be used instead of self-respect (Akagunduz 2006). Individuals with high self-respect are initiative, more active and more confident in their social relationships and school academics. If the students have a low self-respect level they are less confi-

dent and they think that they are not successful (Aydin 2006).

### Data Analysis

The average for unrelated measurements via data collected in the study was analyzed by using the standard deviation and t-test. A  $p < 0.05$  level of significance was enough according to the analysis and the difference.

## RESULTS

### Findings on the Equivalence of Groups Before Treatment

The scores of the initial test of academic achievement and self-esteem of the experimental and control group are presented in Table 2.

In Table 2, when the average scores of the initial test relating to academic achievement of the groups were examined, it was observed that the experimental group average is = 19.00, while the control group average is = 18.44, but it is observed that this difference was not significant ( $t_{(2-50)} = -5.69$ ;  $p > 0.05$ ). Analyzing the self-esteem scores, it was observed the experimental group average is = 61.11, while the control group average is = 61.72 and it was seen that this difference was not significant ( $t_{(2-50)} = -0.232$ ;  $p > 0.5$ ). In this case the groups can be interpreted as equivalent before treatment in terms of cognitive academic achievement and self-esteem.

### The Contribution of Web-Supported Learning to the Students' Academic Achievement Levels Compared to Traditional Learning

No significant difference between the initial test scores of the experimental and control

groups, before the application, initial test-final test scores are found in order to control small differences between the groups and to determine the contribution of experimental applications to the academic success of the students' cognitive academic achievement. This is summarized in Table 3.

In Table 3, when the average scores of the initial test-final test relating to academic achievement of the groups was examined, it was observed that the experimental group average is = 3.24, while the control group average is = 1.59, but it is observed that this difference was not significant ( $t_{(2-50)} = 1.386$ ;  $p > 0.05$ ). Accordingly, it can be said that the web-assisted teaching contributes to the students' academic achievement in terms of volleyball compared to traditional teaching but it can also be said that this contribution is not big enough to cause a significant differentiation.

### The Contribution to Self-esteem of Students of Web-assisted Teaching than Traditional Teaching

No significant difference between the initial test scores of the experimental and control groups, before the application, initial test-final test scores are used in order to control small differences between the groups and to determine the contribution of experimental applications to self-esteem of the students. This is summarized in Table 4.

In Table 4, when the average scores of initial test-final test relating to self-esteem of the groups was examined, it was observed that the experimental group average is = -1.56 while the control group average is = 0.56, but it is observed that this difference was not significant ( $t_{(2-50)} = -0.624$ ,  $p > 0.05$ ). Accordingly, it can be said that the web-

**Table 2: Initial test ratings related to academic achievement and self-esteem groups**

	Variables	n	Mean	SD	t	p
Academic Achievement	Control group	25	18.44	4.36	-5.69	0.572
	Experimental group	27	19.00	2.57		
Self-esteem	Control group	25	61.72	6.32	0.232	0.817
	Experimental group	27	61.11	11.60		

**Table 3: The contribution of web-assisted teaching to academic achievement**

	Variables	n	Mean	SD	t	p
Academic achievement	Control group	25	1.59	5.03	1.386	0.172
Difference scores	Experimental group	27	3.24	3.46		

**Table 4: The contribution of web-assisted teaching to self-esteem**

<i>Variables</i>		<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Academic achievement	Control group	25	0.56	13.21	-0.624	0.535
Difference scores	Experimental group	27	-1.56	11.03		

assisted teaching does not contribute significantly to the students in terms of self-esteem compared to traditional teaching but rather it can be interpreted to be having a negative impact.

### DISCUSSION

In this case the groups can be interpreted as equivalent before treatment in terms of cognitive academic achievement and self-esteem.

The achievement of the students in blended and traditional courses, information retention, attitude towards the course content, examination of course satisfaction were compared in a research by Delialioglu (2004) to examine the effectiveness of web-based teaching, achievement of the students, information retention, attitude towards the course content, and examination of course satisfaction with 50 students. It has been concluded that there is no significant difference in terms of student achievement, information retention, and attitude towards the course content, and examination of course satisfaction. This case shows consistency of this study. In the study conducted on 64 students by Akkoyunlu and Soyly (2006), the satisfaction and success of the students' online learning were examined. It has been found that the students' face-to-face interaction is high and they get high academic success in web-supported learning environments. Similarly, Garrison and Kanuka (2004) put forth that web-supported learning environments increase student achievement in their research about web-supported learning environments. Also, Doo et al. (2006) emphasized the positive effects of web-supported learning on the students' success in their study comparing the web-supported learning environments in terms of teaching conditions and learning outcomes. Horton (2000) expressed that online and traditional face-to-face education would be an integral whole and so it would provide a powerful learning environment for individuals. Edwards and Fritz (1997) emphasized, as a result of their work, that the educational environment in which online and traditional face-to-face education were used together, would be one of the most appro-

priate methods to provide distribution of educational materials and student satisfaction.

In Chen's study conducted in 2008, a compliance of genetic-based e-learning systems to personalized learning methods was investigated. Inappropriate guidance may usually lead to overload in cognitive learning and the disappearance of the learning process. Thus, the learning performance is also reduced. Free browsing and learning are mostly used in web-supported learning systems. In the research of the meta-analysis conducted on 60 students by Valentine et al. (2004), the relation between academic success and self-beliefs, used for self-concept and self-esteem as common, was examined. As a result of the meta-analysis, it is concluded that there is a low level positive relation between the academic self-beliefs and academic success. This case shows consistency with the present study. In the research, conducted on 674 students by Dickhauser (2005), the academic success and internal/external academic self-perception and structural equation model were reviewed, the model between the numerical-verbal academic success and internal/external academic self-perception was tested. The research results show that there is a positive relation between academic success and academic self-perception. It was emphasized that academic success in terms of a numerical-verbal field and both internal and external self-perception were affected positively. Gurbuz (2009) examined the academic success and the level of self-esteem, participation of the 5<sup>th</sup> grade students to the cultural and sporting activities after school. 300 students participated in the research wherein the "Coopersmith Self-Esteem Inventory" was used. It was observed that the level of academic success and self-esteem of students who participated in cultural and sporting activities after school was higher than the level of students that did not participate. It was seen that the level of academic success of the students whose level of self-esteem was high, was also high or the level of self-esteem of the students whose level of academic success was low, is also low. It emerged that the web-based train-

ing group performance was better than the non-web-based training group performance in a research, done by Kelly and Moran (2010) conducted on 72 students in order to evaluate especially, the motor skills oriented web-based interactive video programs in primary school PE classes. In this context, it is emphasized that web-based learning can be used for physical education as a research result. Tirri and Nokelainen (2011) researched the effects of self-perception in academic choices on the education of highly gifted students. They aimed to put forth how important self-perception was in developing academic success with their research. The findings of the research are based on the mathematical skills in Finnish or Pre-Olympics. A positive correlation between the identified ability and achievement was found in the study.

### CONCLUSION

According to the research's conclusion, it is observed that web-assisted teaching contributes to students' cognitive academic achievement in terms of volleyball compared to traditional teaching, but also it can be said that this contribution is not big enough to claim a significant differentiation. In this case, the computing environment can be effective on learning the relevant rules of volleyball, but this situation may cause students to get bored in a certain time.

It is observed that the web-supported teaching does not create significant differences to the students' self-esteem as statistically than traditional teaching. This condition may be caused by the students doing the movement learned on web, incorrectly during the practice.

### RECOMMENDATIONS

In a web-based learning class, to achieve greater efficiency and increase the students' satisfaction, it would be useful for educational institutions to make arrangements for Internet and computer access. It would be useful to provide computer and Internet access facilities for participants' outside educational institutions before the application is done. In the web-based online learning environment, real time (synchronous) courses can be done.

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