THE EFFECT OF BLENDED LEARNING MODEL ON HIGH SCHOOL STUDENTS' BIOLOGY ACHIEVEMENT AND ON THEIR ATTITUDES TOWARDS THE INTERNET

İ.Ümit YAPICI
Dicle University
iuyapici@gmail.com

Hasan AKBAYIN
Dicle University
hakbayin@yahoo.com

ABSTRACT
The present study aims to determine the effect of the blended learning model on high school students' biology achievement and on their attitudes towards the Internet. Among the experimental models, the pretest-posttest control group model was used in the study. The study was carried out with 107 students (47 of whom were in the experimental group, and 60 of whom were in the control group) attending Nevzat Ayaz Anatolian High School in Diyarbakır in Spring Term of the academic year of 2009-2010. In the experimental group, the courses were taught based on the blended learning model via a website (www.e-biyoloji.net), while in the control group, the courses were taught based on traditional teaching methods. An Internet Attitude Scale ($\square$=0,97) and an achievement test of 40 questions (KR-20=0.88) were used as the data collection tools. For the analysis of the data, mean scores, independent t-test and paired samples t-test were used. The research results revealed that the blended learning model contributed more to the students' biology achievement than traditional teaching methods did and that the students' attitudes towards the Internet developed statistically significantly.

INTRODUCTION
In this information age, it is inevitable to witness technology use in educational settings. Teachers working in educational environments show great efforts to provide students with information by using effective technology-based methods. Parallel to these efforts, students become more qualified. In this way, students are supposed to be Internet literate or computer literate to obtain the information they need. Students can reach the necessary information not in traditional classrooms – used since Aristotle – but in their houses and even on holiday. In other words, with the use of educational technologies, learning becomes constant. Thus, most schools in developed or developing countries try to adapt their education systems to communication technologies. Therefore, educational technologies are used effectively by instructors in educational settings and will continue to be used in future as well (İşman, 2008).

Since the moment information and communication technologies were used for the first time, there have been great developments in this field. Education given via tools such as letters, videos, cassettes and television is called "distance education". In other words, distant education is defined as a type of education in which the distance between the learner and the instructor is emphasized and in which technology is intensely used (Kaya, 2002). In recent years, the spread of computer use, developing Internet technologies and faster Internet connections have all allowed a great deal of distance education to be given in educational settings via the Internet. Therefore, while naming such educational settings, instead of the concept of distant education that rather defines a larger area, the concept of "e-learning" that defines distant learning environments in which Internet and network technologies are used for the presenting and receiving the content is used (Horton, 2002). The development and spread of Internet technologies accelerated the process in education, and in recent years, with the increasing number of schools and institutions giving education via the Internet, the concept of e-learning has entered in our lives (Çallı, Torkul and Taşbaş, 2003).

Despite all these rapid developments, face-to-face instruction has never lost its popularity. In addition, distant education and e-learning methods have never taken the place of face-to-face instruction. One of the reasons for this the student-teacher interaction achieved in face-to-face instruction can not be achieved in distant education or in e-learning applications. Such an interaction seems to be a must for permanent learning and for the teacher's control over this activity (Şimşek, 2009). On the other hand, in face-to-face instruction, individualization has stayed in the background (Bonk and Graham, 2004). Similar to traditional face-to-face learning environments, there are several limitations of e-learning environments. This fact led to the idea of the blended learning approach, which brings two teaching approaches together correcting their deficiencies: one has been used for ages and the other has a history of quarter century long (Balcı, 2008).

There are a number of definitions of blended learning. These definitions were gathered by Graham, Allen and Ure (2003) under the following three headings:

1. Combining instructional modalities,
2. Combining instructional methods,
3. Combining online and face-to-face learning (cited by Graham 2006).

Because the first two of these definitions are tools quite comprehensive, they cover almost all the teaching systems. The third definition, which draws researchers' attention to blended learning, brings two such different learning models together as online learning and face-to-face learning (Graham 2006).

One of the widely-accepted definitions of blended learning was proved by Singh and Reed (2001). According to their definition, blended learning is the transfer of "right" skills to the "right" person at the "right" time by matching the "right" learning technologies with the "right" learning style for the purpose of achieving the learning objectives. According to another definition, blended learning means combining the strong and advantageous aspects of web-based learning with those of face-to-face learning (Horton, 2002; Osguthorpe and Graham, 2003).

Use of the blended learning approach is based on the following assumption: along with the benefits of face-to-face interaction between student-student and of face-to-face interaction between student-teacher, there are a number of benefits of online learning as well. In blended learning, the purpose is to establish a balance between online learning and face-to-face learning. The balance between face-to-face learning and online learning may change from one course to another. Due to the basic features of some courses, face-to-face learning is used more, while in other courses online learning is used more. Still in another course, both learning methods are equally used (Osguthorpe and Graham, 2003).

There is no simple formula for establishing a well-blended learning environment. The point to consider is to find a combination of the most effective and sufficient methods appropriate to the content and to the individual learning objectives. The important thing is not to choose the newest method according to the traditional method but to create a learning environment functioning as a whole (Neumeier, 2005).

Mc Campell (2001) emphasized that blended learning is a good approach for those who will include online applications in their current curriculum for the first time and that some parts of the course could be transferred into the online environment without executing the course fully on online basis. By avoiding complexity in online environment as much as possible, activities appropriate to students' computer skills should be included in the curriculum. Otherwise, students may get confused and demoralized (Silwerwood, 2007).

There should be a clear relationship between the methods used in blended learning. The course should not seem like different activities forced together. Different methods used should complement one another without ruining the whole. For instance, theoretical parts of a course could be presented on face-to-face basis, while visual elements could be presented on online basis (Silwerwood, 2007; Precel, Alakalai and Alberton, 2009).

Presenting the course content via the Internet could be effective in terms of the transfer of information, yet this can not assure that students will participate in the course and learn in this way. Therefore, importance should be given more to interaction than to the transfer of information in online environment. By assigning simple academic tasks (summary, analysis) to be carried out by students and by creating discussion forums via which they can discuss with each other and with their teachers, interaction can be achieved in online environment (Sands, 2002).

Researchers stated that blended learning has certain advantages such as flexibility and comfort in the learning environment, increase in the level of learning, increase in permanence in learning, increase in interest in learning, good-quality interaction and low cost (Garnham and Kaleta, 2002; Young, 2002; Collins, 2003).

The importance of blended learning has increased in recent years due to its advantages. The American Society for Education and Development defined blended learning as one of the top ten trends in the knowledge delivery industry (Rooney, 2003; cited by Graham, 2006). Young (2002) stated that the blended learning model has been the best and unique trend so far in higher education and that in near future, the number of blended courses executed in higher education will increase in a way to cover 80-90% of all the courses.

The ability of computers to present information visually is especially important for biology course. Well-developed pictures, three-dimensional models, animations and interactive environments allow easily understanding the learning objectives (Çömlekçioğlu and Bayraktaroğlu, 2001). The importance of using the Internet and computers is gradually increasing in terms of the course of biology. Activities carried out during the usual course hour are not sufficiently effective because of time constraints. With the blended learning model, students are able to carry out multimedia applications – which can not be sufficiently taught during lessons - via the Internet. In addition, ability to see the course content before coming to the class enables students to learn the research subjects and thus to come to the class as prepared for the lesson. Students can discuss important subjects in the Internet environment (in forums) and establish communication both with their teachers and with other students.

With the use of the blended learning model in a biology course, students' academic achievement levels and their attitudes are expected to develop. When related literature is reviewed, it is seen that there studies demonstrating that students trained in the blended learning environment are more successful than those trained in the traditional face-to-face teaching environment. In one study designed with the pretest and posttest control group model and carried out with a total of 312 teacher candidates from 3 different universities, Aladejena (2009) applied the blended learning model in teaching the subject of evolution. The results obtained revealed that there was no significant difference between pretest scores; on the other hand, the results also revealed that there was a significant difference between the posttest scores in favor of the experimental group. In another study conducted by EL-Deghaidy and Nouby (2008), a cooperative-based blended e-learning environment was used. In the study carried out with 26 teacher candidates, there was an experimental group and a control group. The findings obtained demonstrated that the post-test mean scores of the teacher candidates in the experimental group were higher than those of the teacher candidates in the control group. Another study carried out by Pereira et. al. (2007), the blended learning model was used for teaching the course of human anatomy. The study was carried out with 1st grade biology students from Pompeu Fabra University (Barcelona). There were 69 students in the experimental group and 65 students in the control group. In the experimental group, the blended learning model was used, while in the control group, the traditional teaching method was applied. At the end of the study, it was revealed that there was a significant difference (6.3 - 5.0; $p < 0.0001$) between the mean scores of the two groups in favor of the experimental group and that the rate of passing the course was higher in the experimental group (%87.9 - %71.4; $p < 0.02$). In another study conducted by Eşgi (2005), the students in the first group were provided only with the website designed, those in the second group with a printed material besides the website designed, and those in the third group with the printed material, the website designed and a face-to-face instructional support. At the end of the study, the third group covering the features of the blended learning model was the most successful group.

Researchers stated that in web-based applications, students' Internet attitudes and self-efficacies were important variables that are likely to effect the application process (Hill and Hannafin, 1997; Joo, Bong and Choi, 2000; Tsai and Tsai, 2003; Yi and Hwang, 2003). In one study, Şimşek (2009) examined the influence of the blended learning model on physics teacher candidates' attitudes towards web-based, computer-based and Internet-based instruction. The study was carried out within the scope of the course of Modern Physics Instruction. In order to determine students' attitudes towards web-based, computer-based and Internet-based instruction, a pretest was applied to the students before the application, while after the application, a posttest was applied to determine where there was a change in the students' attitudes. The study was conducted twice in the academic years of 2007–2008 and 2008–2009 by using the same scales. In the first application, the study group included 21 students, while the study group in the second application employed 29 students. The results of the study revealed that in both applications, the blended learning model significantly and positively influenced the physics teacher candidates' attitudes towards web-based, computer-based and Internet-based instruction.

In recent years, the number of blended learning applications has increased in America and Europe. In our country, there are only a few studies conducted in this field. It is seen that studies carried out were carried out mostly in higher education. This study is important since it tries to demonstrate that blended learning is effective in secondary education as well. As a result of the review of the related literature, no blended learning application carried out in the field of biology teaching in secondary education was seen. The present study is believed to be leading one in the field. In this respect, the study conducted tried to determine the effect of the blended learning model on students' biology achievement and on their attitudes towards the Internet.

METHOD
In the study, among the experimental models, the pretest-posttest control-group model was used. The study was carried out with 107 students attending Nevzat Ayaz Anatolian High School in different classrooms (9-A, 9-C, 9-D, 9-E) in the Spring Term of the academic year of 2009-2010. The classrooms constituting the study group

were determined on random basis. The classrooms to constitute the experimental group and those to constitute the control group were determined randomly as well. Thus, the classrooms of 9-A and 9-C constituted the experimental group, and the classrooms of 9-D and 9- E constituted the control group. In the experimental group, a total of 13 students who did not participate either in the data collection process or in the activities carried out via the Internet were not included in the data analysis process. As a result, there were 47 participants in the experimental group 60 participants in the control group. In the experimental group, the lessons were taught via the blended learning model, while in the control group, the lessons were given via the traditional method.

Data Collection
Biology Achievement Test
In order to measure the students' achievement in the lesson unit of "Classification of Living Things and Biodiversity" in the 9th grade biology course, an achievement test appropriate to the knowledge and comprehension steps in the cognitive domain was developed considering the gains within the Biology Course Curriculum prepared by the Ministry of National Education. For the purpose of developing the achievement test, a trial pretest including 50 questions was developed by referring to related studies in literature (Yıldırım, 2000; Çardak, 2002; Akaya et. al., 2009). This trial pretest was applied to 120 10th grade students attending Nevzat AYAZ Anatolian High School. Following this application, the items of the achievement test were analyzed. As a result of the analysis of the items, 4 items with the item discrimination index of 0,18 were used by make corrections within the question roots and choices, while those with the item discrimination index lower than 0,2 were excluded. Eventually, the achievement test included 40 items. The average difficulty of the test was calculated as 0.503. In addition, the achievement test was examined by 2 biology teachers and 2 faculty members in the department of biology education at a university. In line with the suggestions of the 2 biology teachers and 2 faculty members, the necessary corrections were made, and the achievement test was finalized. The KR-20 reliability coefficient of the achievement test was calculated as 0,88. For the evaluation of the multiple-choice questions prepared, no point was given to the wrong responses, while the correct responses received a point of 1.

Internet Attitude Scale
The Internet Use Attitude Scale (IUAS) developed by Tavşancıl and Keser (2002) was made up of six sub-dimensions. There were 7 items in the sub-dimension of Internet Use in Education ($\square$= 0.77), 7 items in the sub-dimension of Internet Use for Research ($\square$= 0.76), 4 items in the sub-dimension of Internet Use for Social Interactions ($\square$= 0.73), 4 items in the sub-dimension of Enjoying Internet Use in Education ($\square$= 0.77), 4 items in the sub-dimension of Internet Use for Communication ($\square$= 0.64) and 4 items in the sub-dimension of Internet Use for Information Sharing ($\square$= 0.70). The Cronbach-alpha value for the scale in general was found as 0.89. The scale included a total of 31 items. Among these 31 items, 6 of them were negative, and 25 of them were positive items. The scale was a 5-point likert-type scale. The responses to be given to the items regarding Internet Use Attitudes in the scale would receive scores as 5 points referring to 'I completely agree', 4 points referring to 'I agree', 3 points referring to 'I am not certain', 2 points referring to 'I disagree' and 1 point referring to 'I completely disagree'. In the present study, the Cronbach-alpha value calculated for the whole scale was found as 0,97. The Cronbach-alpha values for the sub-dimensions of the scale were calculated as follows: 0,95 for the sub-dimension of Internet Use in Education; 0,89 for the sub-dimension of Internet Use for Research; 0,85 for the sub-dimension of Internet Use for Social Interactions; 0,84 for the sub-dimension of Enjoying Internet Use in Education; 0,83 for the sub-dimension of Internet Use for Communication; and 0,87 for the sub-dimension of Internet Use for Information Sharing.

Application
The application was carried out in the biology course for the lesson unit of "Classification of Living Things and Biodiversity" in the Spring Term of the academic year of 2009-2010. The application process lasted 11 weeks. In order to create the online dimension of the blended learning environment, a web site was designed by using Moodle LMS (www.e-biyoloji.net). Before the applications started, the pretest was applied to both groups. Before the application, the students in the experimental group were trained in two-course hours. During this training, first, the students in the experimental group were informed about the blended learning model and about what they were expected to do. Secondly, the website was introduced to the experimental-group students via the Internet with the help of a computer connected to a projector in the classroom. They were demonstrated in practice how to sign up the website and what to pay attention to while following up the activities. In the experimental group, while teaching the lessons, a balance between the face-to-face and online environments was established as appropriate to the objectives of the lesson. Before coming to the classroom, the students prepared themselves for the lesson by examining the summary of the subject, the visual presentation (in video format), the videos and animations related to the subject, the dictionary and the other related links via the Internet. In addition, for each subject, they were given an assignment (homework) that they were supposed to search for before coming to the classroom. The students were asked to bring the research assignments to the classroom.

Also, they were allowed to send their homework online. It was announced to them that they were expected to allocate at least 1 hour a week to carry out the activities presented via the Internet. The research assignments were presented and the subject was taught in the face-to-face setting via the question and answer, discussion methods. The teacher evaluated the activities carried out via the Internet with the help of a computer in the classroom and clarified the points that were not understood by the students. Furthermore, at the end of each subject, a quiz to be responded to by the students regarding that subject was included, and a forum environment for discussing the points that the students did not understand was designed. Without first completing one subject, access to another one was not allowed.

In the control group, the lessons were taught via the face-to-face learning in the classroom environment. Following the application, posttests were applied to both groups.

Table 1. The Application Schedule

Week	Application	
	Experimental Group	**Control Group**
1	Training for introducing blended learning	-
2	Application of the Internet Attitude Scale and the Biology Achievement Test as a pretest	
3	Via the website designed as appropriate to the blended learning model, the subjects of Classification of Living Things – Classification Steps – Binominal Nomenclatur were taught.	With the help of the traditional teaching methods (presentation, question-answer, and discussion), the subjects of Classification of Living Things – Classification Steps – Binominal Nomenclatur were taught.
4	The subject of Bacteria and Archaea was taught via the blended learning model.	The subject of Bacteria and Archaea was taught via the traditional teaching method.
5	The subject of Protista was taught via the blended learning model.	The subject of Protista was taught via the traditional teaching method.
6	The subject of Fungi was taught via the blended learning model.	The subject of Fungi was taught via the traditional teaching method.
7	The subject of Plants was taught via the blended learning model.	The subject of Plants was taught via the traditional teaching method.
8	The subject of Animals-Invertebrates-Chordata was taught via the blended learning model.	The subject of Animals-Invertebrates-Chordata was taught via the traditional teaching method.
9	The subject of Animals-Vertebrates was taught via the blended learning model.	The subject of Animals-Vertebrates was taught via the traditional teaching method.
10	The subject of Biodiversity was taught via the blended learning model.	The subject of Biodiversity was taught via the traditional teaching method.
11	Application of the Internet Attitude Scale and the Biology Achievement Test as a posttest	

The features of the website used in the application were as follows:

1. All the students signed up the website by providing the necessary information and were given a user name and a password. They used their own user names and passwords to sign in the system. After they signed in the website, they saw the home page (Figure 1). The home page included the unit headings and the list of the active courses. On the right bottom side of the home page was a list of active online users. In addition, the home page also included a calendar and contact information about the researcher.

2. After the students started the course on the website, they met the course screen made up of a number of parts (Figure 2). The lesson page was designed as appropriate to the weekly outline. Thus, before coming to the classroom, in line with the curriculum of the course, the students were able to examine the content related to the subject to be taught that week. On the course screen, the students were given information about the attitudes they were expected to show during the application and the method used. In addition, the course screen included a forum for the announcements made about the lesson. The students were able to see these announcements on the right side of the course screen under the heading of latest news. In order to create a more permanent and effective learning environment while presenting the subjects, techniques appropriate to different learning styles were used. The students were able to follow up the subjects via the summary page, presentations in video format, animations and different websites related to the subjects (Tubitak, Wikipedia and so on). In addition, there were parts for image galleries, a dictionary, quizzes, research subjects and a forum.

3. The system allowed determining the students' sign in and sign out time for the website, the activities they carried out and the duration of the time the students spent on the activities. Such information provided the teacher with the opportunity to warn the students about applications that need to be made.
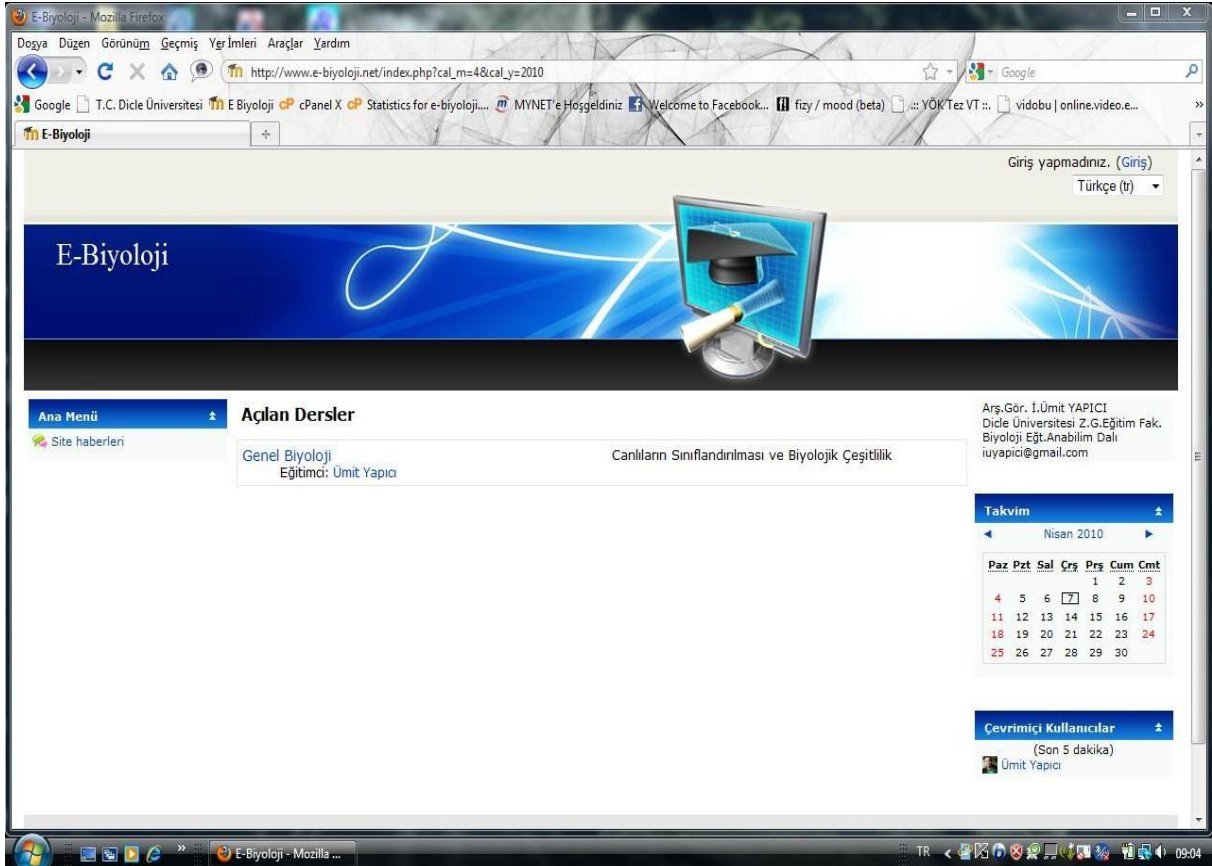

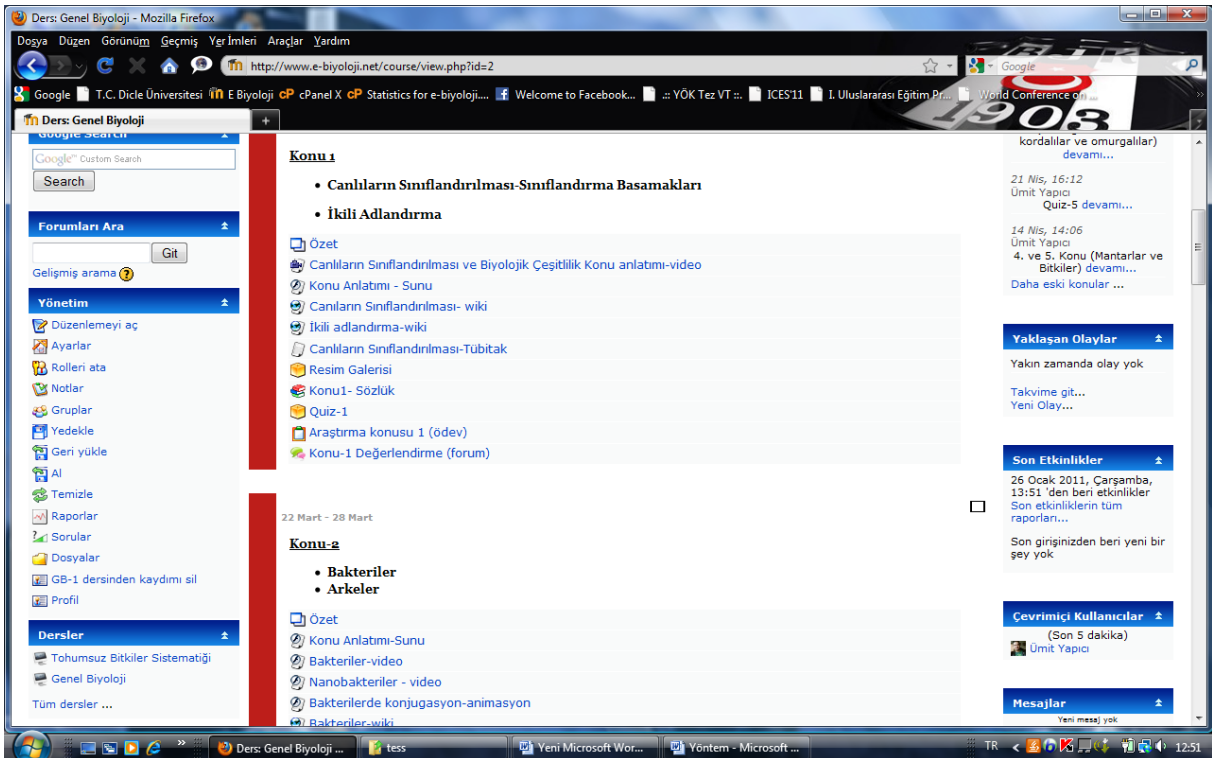**Figure 1.** Homepage Screen of Website

Figure 2. Course Screen

FINDINGS
1. Findings Regarding Biology Achievement
1.1. Findings Regarding the Achievement Test Pretest Scores of the Experimental and Control Groups
In order to find out whether there was a difference between the knowledge levels of both groups during the application, the pretest scores of the two groups were analyzed via the independent groups t-test. The findings obtained are presented in Table 2 below.

Table 2. Comparison of the Achievement Test Pretest Scores of the Students in the Experimental and Control Groups via the Independent Groups T-test

Groups	N	$\overline{X}$	sd	df	t	p
Experimental	47	11.77	3,957	105	0.445	0.657
Control	60	11.47	3,005			

When Table 2 is examined, it is seen that there was no significant difference ($t_{(105)}$ = 0.445, p >.05) between the achievement test pretest score of the experimental group ($\overline{X}$ = 11.77) and that of the control group ($\overline{X}$ = 11.47). Depending on this, it could be stated that the students in the experimental and control groups had similar levels of knowledge before the application was started.

1.2. Findings Regarding the Achievement Test Posttest Scores of the Experimental and Control Groups
At the end of the application, in order to find out whether there was a difference between the achievement levels of the two groups, the posttest scores of the groups were analyzed via the independent groups t-test. The findings obtained are presented in Table 3 below.

Table 3. Comparison of the Achievement Test Posttest Scores of the Students in the Experimental and Control Groups via the Independent Groups T-test

Groups	N	$\overline{X}$	sd	df	t	p
Experimental	47	25.11	5,040	105	7.958	**.000**
Control	60	19.08	2,657			

When Table 3 is examined, it is seen that there was a significant difference ($t_{(105)}$ = 7.958, p <.05) between the achievement test posttest score of the experimental group ($\overline{X}$ = 25.11) and that of the control group ($\overline{X}$ = 19.08) in favor of the experimental group. Depending on this result, it could be stated that the activities carried out on the basis of blended learning were more effective on students' achievement than the traditional teaching method.

2. Findings Regarding Students' Attitudes towards the Internet
2.1. Findings Regarding the Experimental Group Students' Pre-Application and Post-Application Scores in the Internet Attitude Scale
In order to determine whether there was a difference between the experimental group students' scores regarding their Internet attitudes before and after the application, paired samples t-test was applied to the pre-application and post-application scores of the Internet attitude scale. The findings obtained are presented in Table 4 below.

Table 4. Comparison of Experimental Group Students' Pre-application and Post-application Scores of the Internet Attitude Scale via the Paired Samples t-test

Experimental Group	N	$\overline{X}$	sd	df	t	p
Pre-application	47	3.60	1.054	46	-2.560	**0.014**
Post-application		3.97	0.929			

When Table 4 is examined, it is seen that there was a significant difference ($t_{(46)}$ = -2.560, p <.05) between the experimental group students' pre-application scores ($\overline{X}$ = 3.60) and their post-application scores ($\overline{X}$ = 3.97). Depending on this result, it could be stated that there was a positive change in the Internet use attitudes of the students in the experimental group.

In order to see whether there was a statistically significant difference between such sub-dimensions of the Internet Attitude Scale as "Internet Use in Education (D1), Internet Use for Research (D2), Internet Use for Social Interactions (D3), Enjoying Internet Use in Education (D4), Internet Use for Communication (D5) and

Internet Use for Information Sharing (D6)", paired samples t-test was applied to the experimental group students' pre-application and post-application scores. The findings obtained are presented in Table 5 below.

Table 5. Comparison of the Experimental Group Students' Pre-application and Post-application Scores Regarding the Sub-dimensions of the Internet Attitude Scale via the Paired Samples t-test

Dimensions	Experimental Group	N	$\overline{X}$	sd	df	t	p
D1	Pre-application	47	3.61	1.226	46	-3.061	**0.004**
	Post-application		4.16	1.078			
D2	Pre-application	47	3.71	1.113	46	-2.674	**0.010**
	Post-application		4.12	0.969			
D3	Pre-application	47	3.37	1.143	46	-0.470	0.640
	Post-application		3.47	1.163			
D4	Pre-application	47	3.54	1.111	46	-1.710	0.094
	Post-application		3.84	1.062			
D5	Pre-application	47	3.63	1.226	46	-1.789	0.080
	Post-application		3.91	1.098			
D6	Pre-application	47	3.61	1.220	46	-2.502	**0.016**
	Post-application		4.02	1.043			

When Table 5.20 is examined, it is seen that there was a significant difference ($t_{(46)}$ = -3.061, p <.05) between the experimental group students' pre-application scores regarding the sub-dimension of Internet Use in Education ($\overline{X}$ = 3.61) and their post-application scores ($\overline{X}$ = 4.16). It is also seen that there was a significant difference ($t_{(46)}$ = -2.674, p <.05) between the experimental group students' pre-application scores regarding the sub-dimension of Internet Use for Research ($\overline{X}$ = 3.71) and their pos-application scores ($\overline{X}$ = 4.12). On the other hand, no significant difference ($t_{(46)}$ = -0.470, p >.05) was found between the experimental group students' pre-application scores regarding the sub-dimension of Internet Use for Social Interactions ($\overline{X}$ = 3.37) and their post-application scores ($\overline{X}$ = 3.47). Furthermore, there was no significant difference ($t_{(46)}$ = -1.710, p >.05) between the experimental group students' pre-application scores regarding the sub-dimension of Enjoying Internet Use in Education ($\overline{X}$ = 3.54) and their post-application scores ($\overline{X}$ = 3.84). Similarly, the results revealed no significant difference ($t_{(46)}$ = -1.789, p >.05) between the experimental group students' pre-application scores regarding the sub-dimension of Internet Use in Communication ($\overline{X}$ = 3.63) and their post-application scores ($\overline{X}$ = 3.91). However, there was a significant difference ($t_{(46)}$ = -2.502, p <.05) between the experimental group students' pre-application scores regarding the sub-dimension of Internet Use for Information Sharing ($\overline{X}$ = 3.61) and their post-application scores ($\overline{X}$ = 4.02). Depending on these results, it could be stated that activities carried out on the basis of the blended learning method contributed positively to the experimental group students' attitudes towards the use of the Internet in for education, research and information sharing.

CONCLUSION AND DISCUSSION
The aim of this study was to determine the effect of the blended learning model on high school students' biology achievement and on their attitudes towards the Internet. To this end, the scores obtained from the "Biology Achievement Test" and "Intenet Attitude Scale" applied to the experimental and control groups were compared. The research results revealed that the blended learning model contributed more to the students' biology achievement than traditional teaching methods did and that the students' attitudes towards the Internet developed statistically significantly. Thanks to blended learning model;

- The students get prepared for the course before coming to the class.
- They found the opportunity to make revision at any time as much as they wanted and understood the subject better via such activities as videos and animations.
- They were allowed to test themselves and to determine the subjects they were inefficient in via the quizzes in the web site.
- They tried to overcome their inefficiencies by directing questions via the web site that they could not ask to the teacher during the lesson and by discussing with their friends.
- They found the opportunity to learn on their own pace.

It can be stated that all of these opportunities increased the achievements of the students. In a number of studies (Tuckman, 2002; Boyle et. al., 2003; Dowling, Godfrey and Gyles, 2003; O'Toole and Absalom, 2003; Garrison and Kanuka, 2004; Eşgi, 2005; Cüez, 2006; Usta, 2007; Pereira et. al., 2007; EL-Deghaidy and Nouby, 2008; Uluyol and Karadeniz, 2009; Aladejena, 2009) similar findings were obtained. It can also be stated that blended learning environment has positive effect on the students' attitudes towards the Internet; especially use of the Internet for education, research and information sharing. Şimşek (2009) emphasized that the blended learning model significantly and positively influenced the physics teacher candidates' attitudes towards the internet.

This study is important since it demonstrates that blended learning is effective in secondary education as well. An effective teaching can be achieved by blending the advantages of the web environment with face to face interaction in the courses which have more visual elements such as biology course. Also; the following suggestions could be put forward:

- The teachers who will use the blended learning model should develop their computer and internet literacy rate. For this, in-service training courses can be held on such web-supported applications.
- Web page content should include multimedia applications.
- Web page content should be made ready before the start of applications and the activities such as video, animation etc. should be controlled whether functioning properly.
- The present study was carried out within the biology course in the lesson unit of "Classification of Living Things and Biodiversity". In different subjects of the course of biology or in different other courses, the blended learning model could be applied.
- Qualitative studies reflecting the views and experiences of practitioners of blended learning can be applied.

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