USABILITY OF A WEB-BASED SCHOOL EXPERIENCE SYSTEM: OPINIONS OF IT TEACHERS AND TEACHER CANDIDATES

Zülfü Genç

Firat University
Faculty of Education, Department of Computer Education and Instructional Technology, 23119, Elazig, Turkey

ABSTRACT

With advances in information and communication technologies, the classical nature of educational institutions has changed. One innovative effort within teacher training is the Web-Based School Experience System (WBSES) developed by the researcher. In this study, the usability of an existing WBSES is evaluated from both teachers' (n = 13) and students' (n = 96) perspectives. A non-experimental survey method was applied to collect participant opinions. A usability questionnaire was designed, and analysis yielded five significant factors for the system: usefulness, helpfulness, visual effectiveness, customizability, and smoothness. To obtain more in-depth information, participants were asked to delineate their responses to five open-ended questions. Generally, students and teachers liked the tool in terms of its usability, but they also provided recommendations for design issues.

1. INTRODUCTION

Qualified human resources are imperative for modern societies to function and keep pace with the changing age. Teachers have a leading role in educating these human resources, socializing and preparing future generations by transferring culture and values to them (Özden, 2005). The future of any country depends on the competence and success of its teachers (Ataünal, 1997). Teachers shape human behaviors, making this profession both important and challenging. They are expected to be proficient in subject knowledge and content, teaching plans, general and specific teaching methods, and technology, requiring substantial education. Teacher training has been described as "a systematic program arranged for improving knowledge, skills and attitudes of teachers related to teaching and classroom activities" (Rıza, 1996). In Turkey, important decisions have been made about teacher training, especially at the National Education Council, and the coordination of teacher training has been assigned to the education faculties of universities.

Teacher training has two components in Turkey: theory and practice. School Experience and Teaching Practice are two essential courses that allow teacher candidates to develop knowledge, skills, and attitudes related to their profession. Fourth year education students gain their first teaching experience with these courses. The School Experience course takes place in the seventh semester and consists of one hour of theory and four hours of practice each week. In practice hours, teacher candidates observe at schools, learning about the environment and teaching. They also create lesson plans, notes, and other materials.

In order for teacher training to be effective, the most important factor is cooperation between the faculty and the practice school. Effectively putting the theoretical and occupational knowledge of teacher candidates into practice is the fundamental objective of this course (Ağaoğlu and Şimşek, 2006). Therefore, cooperation between faculties, school administrators, course instructors, and teachers is quite important to its success. Known cooperation problems include an insufficient number of faculty members to mentor teacher candidates, weak communication between the faculty and practice school, a lack of meeting hours between teacher candidates and course instructors, lack of cooperation between department coordinators and practice school coordinators, and lack of program compliance (Şahin, 2004; Turgut, Yılmaz, & Firuzan, 2008). In a

study conducted in the Department of Computer Education and Instructional Technologies at Anadolu University, Dursun and Kuzu (2008) grouped such problems and their solutions under four sub-sections: consultation, communication, evaluation, and program. In order to eliminate these problems, close and effective cooperation between the faculty and practice schools should occur. A web-based learning model may be a possible solution for improving cooperation in School Experience and Teaching Practice courses, as all processes could be easily conducted and monitored.

A web-based learning environment supports and develops rich, flexible, and interactive activities by using the Internet, an intranet, or other technology components linked to a local network (Şendağ, 2008). Few studies have investigated the use of online or web-based systems in teacher training. In one experimental study, Liu (2005) concluded that a web-based cognitive apprenticeship model was more effective than a traditional teacher training course in terms of pre-service teacher performances and attitudes related to instructional planning. According to Barnett, Keating, Harwood, and Saam (2002), when pre-service teachers learn how to be good teachers in university-based courses, web-based conferencing provides further opportunities to interact and reflect with in-service teachers. In a study where a web-based learning model was used with teacher candidates from the English Language Teaching department of Anadolu University, Caner (2009) found that the model increased meeting hours between teacher candidates and instructors and formed a more productive learning environment by increasing peer feedback quality. The usability of web-based learning environments is very important to their acceptance by teachers and students. A central requirement is ease-of-use with minimal training. Usability refers to user interfaces and has five quality elements: learnability, efficiency, memorability, errors, and satisfaction (Nielsen, 2012). The ultimate goal of computer-based systems is tied closely to their usability and usefulness (Harms & Adams, 2008).

The aim of the current study is to offer recommendations for developing better web-based learning environments in higher education institutions by analyzing the usability of the WBSES, which is already in use at Fırat University. The study seeks to increase the effectiveness of the School Experience and Teaching Practice courses included in the curriculum of the education faculties by using a Web-Based School Experience System (WBSES) developed by the researcher. To this end, the system was tested with 96 fourth year students of the Computer and Instructional Technologies department of the Education Faculty of Fırat University and 13 Information Technologies teachers in Elazığ. The opinions of the teacher candidates and practice school teachers on the use of the WBSES were collected through a non-experimental survey method. The following research questions will be investigated in the current study:

1.   What are the opinions of the teacher candidates on the use of the Web-Based School Experience System for the Teaching Practice course?

2.   What are the opinions of the practice school teachers on the use of the Web-Based School Experience System for the Teaching Practice course?

3.   What are the satisfaction levels of the teacher candidates with the Teaching Practice course that applied the Web-Based School Experience System?

2.   WEB-BASED SCHOOL EXPERIENCE SYSTEM (WBSES)

The general objective of the developed system is to provide an environment where all stages of the School Experience and Teaching Practice courses can be conducted through the Internet. The most important users of the system are the course instructors, practice school teachers, and teacher candidates. Access for these users is under the control of a program manager. This user assigns and connects schools, teacher candidates, school practice teachers, and course instructors. Course instructors conduct operations for their assigned teacher candidates, practice schools, and practice school teachers; practice school teachers conduct operations related to their teacher candidates. The program manager is the highest level user and has the following permissions: checking information related to faculty and department, matching teacher candidates to practice schools, assigning roles to users, authorizing user information, and creating questionnaires. The course instructor has the following permissions: updating personal information, arranging groups, accessing the videos and documents of teacher candidates, administering end-of-semester questionnaires, and monitoring attendance. Practice school teachers have similar permissions to the course instructor. Finally, teacher candidates use the program to share documents and videos and fill out forms and questionnaires.

3. METHOD

The study aimed to determine the opinions of teacher candidates and practice school teachers about the use of the Web-Based School Experience System (WBSES) in the School Experience and Teaching Practice courses and was conducted via non-experimental survey. Qualitative and quantitative data collection were completed concurrently. Fraenkel and Wallen (2000) have identified three important problems related to such studies: (a) clarity of study questions, (b) honesty of self-reported answers, and (c) sufficient sample size. The first issue was resolved with factor analysis and a content validity check by field experts and linguists, and an assumption was made that participants would be honest in their answers, addressing the second problem. Elimination of the third problem was verified through statistical analysis of the data.

3.1 Participants

The participants included all teacher candidates attending the School Experience course offered by the education faculties of Turkey and their practice school teachers. According to Fraenkel and Wallen (2000), in situations where randomized or systematic sampling is not possible, researchers should use accessible sampling. Therefore, the researcher formed the sample with teachers and students in Elazığ to which he had ready access.

Table 1. Types of education and gender

Education Type	Gender		
	Male	Female	Total
First Program	20	28	48
Second Program	12	36	48
Total	32	64	96

As seen in Table 2, the majority of participants had their own Internet-connected computers. Most of the participants reported logging in to the system at least 15 times.

Table 2. Computer ownership and use of WBSES

Have computer	WBSES Use				
	5–10	10–15	15–20	More than 20	Total
Yes–with Internet connection	1	13	15	32	61
Yes–without Internet connection	1	4	17	9	31
No computer	0	3	1	0	4
Total	2	20	33	41	96

The opinions of IT teachers in the practice schools (n = 13) were also collected. Among these teachers, eight were female and five were male. Except one, they all had their own computers with Internet connections. The WBSES was accessed more than 20 times by five teachers, 15–20 times by two, 10–15 times by five, and 5–10 times by one.

3.2 Data Collection Tools and Analysis

The first draft of the WBSES attitude scale was compiled based on studies investigated during the literature review. Since no appropriate scales were found, the researcher developed a new attitude scale for the WBSES. The item pool of the scale consisted of 57 items. After a language check, content validity was conducted based on the opinions of field experts. Participants were asked to complete a five-point Likert scale ("strongly agree" to "strongly disagree"). Four demographic questions were also added to the scale about participant education type, gender, computer ownership, and system-use frequency. In addition, the following five open-ended questions were asked to collect detailed data:
   1.   What are your opinions (visual design, navigation, etc.) of the WBSES?
   2.   What are your three most liked features of the WBSES?
   3.   What are your three most disliked features of the WBSES?

4. Did any functions cause trouble while using the WBSES? If so, which ones, and why did you have trouble?
5. Which features do you believe aid ease of use of the WBSES? Why?

In order to determine satisfaction levels of teacher candidates, the 11-item Web Based Teaching Practice Course Satisfaction Survey was adapted from Chejlyk (2006).

Required permissions to implement the questionnaires were taken from the education faculty of Fırat University and the Ministry of Education. All participants were informed about the developed system and process. At the end of the semester, the questionnaire was distributed on a voluntary basis to practice school teachers and teacher candidates using an online survey system (www.questionpro.com). Results were transferred to SPSS, and the frequency distribution of demographic information was calculated. Moreover, factor and validity analysis (Cronbach's alpha) were conducted on the 57-item questionnaire. After the modification of the scale, average and standard deviation calculations were completed.

Tests related to the demographic features were also conducted. Education type (first or second education) and gender were tested by an independent sample t-test to reveal differences. In addition, gender was tested with an independent sample non-parametric Mann-Whitney U test, since no normal distribution existed due to the number of participants. An independent sample single factor analysis of variance (ANOVA), a parametric test, was used to determine possible differences between teacher candidates in terms of having a computer (with Internet connection, without Internet connection, or no computer); teachers were tested with an independent sample Kruskal-Wallis H test, a non-parametric test. To determine where possible differences occurred, necessary post-hoc tests were conducted. An ANOVA was also used to determine possible frequency differences between teacher candidates in terms of WBSES use (5–10 times, 10–15 times, 15–20 times, more than 20 times); results were tested with an independent sample Kruskal-Wallis H test, a non-parametric test. To determine where possible differences occurred, necessary post-hoc tests were conducted. The five open-ended questions were investigated by qualitative techniques, and frequency distributions were calculated.

4. FINDINGS

4.1 Factor Analysis of the Attitude Scale of WBSES Use

The student questionnaire had 57 five-point Likert questions ("strongly disagree" to "strongly agree") answered via an online survey after finishing their exams. After the final data set, the questionnaire was checked by factor analysis. First, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted. According to George and Mallery (2001), the KMO measure tests whether the distribution of values is sufficient for conducting factor analysis, and the coefficient should be greater than 0.60. Moreover, George and Mallery clarified that Bartlett's test of sphericity must be statistically significant as a measure of the multivariate normality of distribution. The KMO coefficient was found to be 0.87, and the approximate $X2$ (595, n = 95) was equal to 2525.350, p < .00. Since the tests were positive, factor analysis continued.

The dimensionality of the 57 questions from the usability evaluation was analyzed using principal component exploratory factor analysis. Four criteria were used to determine the number of factors to rotate: the a priori hypothesis that the measure was unidimensional, the Cattell scree test, the variance explanation, and the interpretability of the factor solution. The scree pilot indicated that the initial hypothesis of unidimensionality was incorrect; there were five breaking points. After fifteen items were reduced by factor loadings and eigenvalues and when the interpretability criteria and total variance explained criteria were taken into consideration, five factors were rotated using a Varimax rotation. The rotated solution yielded five interpretable factors: usefulness, helpfulness, visual effectiveness, customizability, and smoothness. At the end of the factor analysis, the inter-reliability of each factor was calculated. Table 3 shows the coefficient alpha values for each factor, as well as all items in the questionnaire.

Table 3. Coefficient alpha values for each factor and all items

Factor	Number of items	Coefficient alpha
Usefulness	12	0.94
Helpfulness	6	0.90
Visual effectiveness	4	0.90
Customizability	6	0.85
Smoothness	4	0.78
Total	32	0.96

4.2 Student Usability Concerns about the WBSES

fter factor analysis, a WBSES questionnaire was created with five dimensions; usefulness, helpfulness, visual effectiveness, customizability, and smoothness. Researchers checked each item to calculate minimum and maximum scores, means, and standard deviations. Afterwards, to determine whether the number of times using the tool made a significant difference on usability perceptions of students, a one-way ANOVA test was conducted on the data set.

When the first dimension, usefulness, was statistically analyzed, mean scores varied from 3.57 to 4.08; in other words, students were satisfied with the usefulness of the system. The lowest score (M = 3.57) belonged to the item, "The video panel in WBSES (the video showing me while lecturing to be watched by my friends and teachers) made me active in the lesson." For helpfulness, the mean scores ranged from 4.12 to 4.35, which confirmed that students were satisfied. Visual effectiveness scores ranged from 4.14 (the background color and text color were consistent) to 4.27 (overall visual attractiveness). Font, background color, and font color (M = 3.62) were acceptable to students, and the font color and background color were considered harmonious. Customizability mean scores ranged from 3.94 to 4.40, also indicating satisfaction. Students felt that their existing computer knowledge was sufficient to use the system (M = 4.40). Smoothness scores ranged from 3.40 to 4.36, and login and logout (M = 4.36) processes were easily managed.

To gather more in-depth information, students were asked five open-ended questions. The first question involved overall ideas about the system (see Table 4). The majority of students (n = 59) described the system as visually good. Moreover, they felt the WBSES was useful (n = 18), easy to navigate (n = 12), and simple in design (n = 11). One male student offered his impressions of the system: "I think it is a good system. Although we set up mail groups, which were unsuccessful, this system was successful. The system having a good visual design and easy navigation was especially effective in assignment uploading and filling out questionnaires." The students also expressed complaints about the system (see Table 5). Negative comments were made about site navigation (n = 12) and the design of the system (n = 7). A female student observed, "Visual design of the system is good, but links not working when navigating through the system is a problem which can be solved easily. Moreover, the plug-ins needed to upload a document can be bothersome." WBSES, though liked very much in terms of visual design by some, was not liked by others (n = 5). A male student expressed: "WBSES has a good design and appearance in general. However, I think the system is not useful because one time I forgot my password, but the feature for resetting the password was not working. I solved the password problem with the support of the system manager."

The second open-ended item asked for the three points that students liked most about the system (see Table 6). Answers included visual design, user-friendliness, the questionnaire, video and assignment upload capabilities, and online support. In the third question, students were asked what they did not like about the system (see Table 7). Six students expressed that there were no features that they disliked, while others complained about the uploading features, especially in terms of videos. Complaints were also made about accessing and staying connected to the system, as well as experiencing failure with different browsers. In addition, broken links were a problem. One male student explained, "The system does not allow uploading videos directly but through the YouTube links. The other thing I disliked is the requirement to log into the system frequently. The last problem with the system is that uploading long videos into the system was not possible." In the fourth open-ended question, students identified processes they felt hard to manage (see Table 8). Many students (n = 23) experienced no difficulty with the tool. On the other hand, nearly half of the students had trouble uploading videos. In addition, students reported trouble with forgotten passwords, and three students had trouble accessing the system. The fifth question asked about processes students completed easily in the system (see Table 9). Generally, students mentioned navigation, uploading assignments, and filling out questionnaires.

Table 4. Positive opinions of teacher candidates about the use of WBSES

Qualitative code	Frequency
A visually good system	59
Useful system	18
Easy navigation	12
A simple design	11
Color harmony	5
Good content	2
Assignment upload	2
Site manager	2
Videos	2
Interesting	1
Easy to search	1
Questionnaires	1
Menu structure	1
Similar to Web 2.0 tools	1

Table 5. Negative opinions of teacher candidates about the use of WBSES

Qualitative code	Frequency
Problematic navigation	11
A need for improving the design	7
Not useful	5
Decreases in performance	4
Problematic color matching	3
Complex system	3
Assignment upload	3
Needs for installation of some plug-ins	2
Turkish character problem	1

Table 6. Most liked features of WBSES according to teacher candidates

Liked features	Frequency
Visual design	35
User friendliness	25
In-site navigation	16
Questionnaire property	16
Video upload	14
Assignment upload	14
Online support	13
Simplicity	12
Video watching	10
Colors	10
Quick work	7
Attendance	6
Support for teaching practice	6
Easy access to the system	5
Peer evaluation	2
Effective searching	2

Table 7. Most disliked features of WBSES according to teacher candidates

Disliked features	Frequency
Video upload	30
Logging out from the system	21
Assignment upload	17
Access to the system	14
System errors	13
Broken links	12
Password problems	10
Visual design	8
Filling out questionnaire	7
Color matching	4
Font size	3
Problems with different browsers	2
Photograph upload	1
Lecture content	1
Lacking of chat feature	1

Table 8. Problems experienced with the WBSES by teacher candidates

Problems experienced	Frequency
Video upload	41
Assignment upload	21
Getting user password	9
Filling out questionnaire	7
Access to the system	3
Navigation through the links	2
Working with different browsers	1

Table 9. Ease of using WBSES features

Ease of use	Frequency
Navigation	17
Assignment upload	13
Questionnaire use	12
Video upload	8
Membership system	5
Visual design	5
Fast working	4
Contact with the system manager	3
Attendance check	2
Access to the system	2
Video watching	1
Simplicity of the interface	1

4.3 Practice School Teachers' Usability Concerns about the WBSES

The teacher questionnaire included 32 questions, but because only 13 teachers responded, it could not be factor analyzed. On the other hand, since it asked the same questions (except student-oriented questions), it was still used. The 13 teachers who responded used the system approximately one hundred times. In general, all instructors had positive ideas about the login and logout processes and noted that the tool was easy to learn. They were moderately satisfied with the visual screen design. Mostly, they reported no problems using the system.

The teacher questionnaire also included five open-ended questions:
1. What is your overall opinion about the tool?
2. List the three features of the tool that you liked most.
3. List the three features of the tool that you liked least.
4. When you used the tool, were any processes difficult? How so?
5. When you used the tool, were any processes completed easily? How so?

Five teachers expressed that the system was useful, and six teachers considered the system good in terms of visual design. Moreover, six teachers expressed that the system was successful in terms of color harmony. Four teachers felt the system had easy navigational features. Only one teacher had negative opinions about the design. One female teacher expressed, "The design and color matching in the system are really nice. The web-site was useful and I can do all the operations easily." The most liked feature by the teachers was the attendance panel. Three teachers liked the video features best, including uploading capabilities and watching student contributions. One teacher expressed that the system was very useful in that it allowed students to realize their mistakes by watching videos. The other most liked feature was the ability to create questionnaires (n = 7). Another teacher liked the visual design, response time, web mapping, and access to the faculty instructor in the system.

Among 13 practice school teachers, 9 expressed that there were no features that they disliked. One teacher did mention early problems that were resolved over time. One teacher expressed a complaint about broken links, while another did not like the content arrangement. In the fourth open-ended question, nine teachers noted that they experienced no problems. One teacher said that after accessing the system, he did not see the expected screen. Another teacher described problems with the attendance feature, since there was no grouping according to date. In addition, one teacher complained about a failure sending messages. Two teachers did not answer the last question, while five said that all features of the system were user friendly. One teacher said that he liked working without paper, and another expressed that he easily completed all operations without the need to refresh the page. One teacher commented, "In general, there are features that make the system user-friendly. Especially, I found the access panel and design of the system successful. In addition, navigation between the pages was very fast and stable."

4.4 Teacher Candidate Satisfaction Levels with the WBSES

The averages and standard deviations of answers given by teacher candidates about the WBSES course conducted through the web are shown in Table 10. The satisfaction levels are grouped under four headings: overall satisfaction, contribution to professional development satisfaction, feedback satisfaction, and online communication and interaction satisfaction.

Based on these results, teacher candidates were generally satisfied with the course. The responses of teacher candidates to item 6 showed that 75% were satisfied and 14.29% were strongly satisfied with the web-based school experience course, and 85.72% of participants strongly agreed that they would recommend the course to others. Analysis revealed that 82.14% of participants considered this course as effective as face-to-face courses. According to results, teacher candidates were satisfied with the contribution of this course to their professional development. They also expressed that course documents, lesson plans, and lesson practice videos facilitated their learning and that this web-based course was as useful as a face-to-face course. The teacher candidates' responses to the satisfaction survey showed that they were satisfied with the timely feedback from their teachers and the system manager. In terms of satisfaction with online communication and interaction, participants believed that this course provided a sense of community among the students.

Table 10. Satisfaction levels of teacher candidates with the WBSES

Question Item	N	Average	S.D.
Overall Satisfaction			
6. I am very satisfied with this web based school experience course.	96	4.04	0.50
9. I would recommend this course to others.	96	3.79	1.13
11. I feel the web-based school experience course is as effective as face-to-face courses.	96	3.68	0.81
Contribution to Professional Development Satisfaction			
1. The course documents, lesson plans, and lesson-practice video files used in this class facilitated my learning.	96	3.71	1.01
3. The materials that were linked to this course facilitated my learning.	96	3.82	0.54
7. I feel this web-based school experience course improved my teaching skills.	96	3.86	0.50
10. I learned at least as much as I would have in a face-to-face course.	96	3.86	0.80
Feedback Satisfaction			
2. I received timely feedback from my teacher and system administrator.	96	3.75	0.84
Online Communication and Interaction Satisfaction			
4. This course created a sense of community among students.	96	3.79	0.68
5. In this class, I was able to share my viewpoint with other students.	96	3.86	0.75
8. This web-based teaching experience course encouraged students to discuss ideas and concepts with other students.	96	3.68	0.86

5. DISCUSSION AND SUGGESTIONS

Literature related to teaching practices reveals that teacher candidates often encounter problems with sufficient feedback and meetings with course instructors. Lack of cooperation between the faculty and practice school and inadequate duration of implementation are other known problems. A solution should be found to eliminate these problems in order for teaching practice courses to be effective. To this end, a web-based system to be used in teaching practice and school experience courses was developed in the first stage of this study. In the second stage, usability analysis of the system was conducted by collecting the opinions of practice school teachers and teacher candidates. Moreover, satisfaction levels of teacher candidates related to web-based learning were investigated in order to determine whether the system met learning needs. The study primarily focused on the design, development, usability, and formative evaluation of a teaching practice course conducted through a web-based system.

The majority of the users defined the system as having high usability. Moreover, the teacher candidates expressed that system managers having an active role in the system increased usability. They expressed that the system contributed to the course and met their learning needs. The opinions of the teacher candidates towards the WBSES was positive. They believed that having taken the course with this model contributed to their professional growth. In summary, the web-based teaching training model increased course effectiveness, enhancing the performance and experience of the teacher candidates.

The web-based system in the current study was tested with students from the Computer and Instruction Technologies department and IT teachers with high computer knowledge. Therefore, this study should be repeated with students from other departments in order to investigate the attitudes of teachers and teacher candidates with less computer experience.

REFERENCES

Ağaoğlu, E., & Şimsek, Y. (2006, October). *The collaboration between education faculty and schools in Turkey.* Paper presented at the 31st Annual Conference of Association for Teacher Education in Europe, Portoroz, Slovenia.

Ataünal, A. (1997). *Türkiye'de ilkokul öğretmeni yetiştirme sorunu (1923-1994) ve ABD, İngiltere, Fransa ve Almanya'daki çağdaş uygulama ve eğilimler* [*Primary school teacher training problems in Turkey (1923-1994) and contemporary practices and trends in USA, UK, France, and Germany*]. Ankara, Turkey: MEB.

Barnett, M., Keating, T., Harwood, W., & Saam, J. (2002). Using emerging technologies to help bridge the gap between university theory and classroom practice: Challenges and successes. *School Science and Mathematics*, *102*(6), 299–313.

Caner, M. (2009). *A study of blended learning model for teaching practice course in pre-service English language teacher training program* (Unpublished doctoral dissertation). Anadolu University, Eskisehir, Turkey.

Chejlyk, Sheri. (2006). *The effects of online course format and three components of student perceived interactions on overall course satisfaction* (Unpublished doctoral dissertation). Capella University, Minneapolis, MN.

Dursun, Ö., & Kuzu, A. (2008). Öğretmenlik uygulaması dersinde yaşanan sorunlara yönelik öğretmen adayı ve öğretim elemanı görüşleri [Opinions of teacher candidates and supervisors regarding problems experienced in teaching practice]. *Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi* [*Selçuk University Ahmet Keleşoğlu Education Faculty Journal*], *25*, 159–178.

Fraenkel, J. R., & Wallen, N. E. (2000). *How to design and evaluate research in education* (4th ed.). New York, NY: McGraw-Hill.

George, D., & Mallery, P. (2001). *SPSS for Windows step by step: A simple guide and reference, 10.0 update* (3rd ed.). Boston, MA: Allyn and Bacon.

Harms, M., & Adams, J. (2008, March). *Usability and design considerations for computer-based learning and assessment*. Paper presented at the Annual Meeting of the American Educational Research Association, New York, NY.

Liu, T.-C. (2005). Web-based cognitive apprenticeship model for improving pre-service teachers' performances and attitudes towards instructional planning: Design and field experiment. *Educational Technology & Society*, *8*(2), 136–149.

Nielsen, J. (2012). *Usability 101: Introduction to usability*. Retrieved from http://www.nngroup.com/articles/usability-101-introduction-to-usability/

Özçelik, D. A. (1989). *Eğitim programları ve öğretim* [*Curriculum and instruction*]. Ankara, Turkey: ÖSYM Eğitim Yayınları.

Özden, Y. (2005). *Eğitimde yeni değerler* [*New values in education*]. Ankara, Turkey: Pegem.

Rıza, E. (1996). *Teacher characteristics and training: Teacher training for the twenty first century*. İzmir, Turkey: Dokuz Eylül University Press.

Sahin, Ç. (2004). Okul deneyimi-ii isbirliğinde tarafların karşılıklı beklentileri [Education faculty and practicum school expectations at school experience course-II]. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* [*Atatürk University Social Sciences Journal*], *1*, 13–27.

Şendağ, S. (2008). *Çevrimiçi probleme dayalı öğrenmenin öğretmen adaylarının eleştirel düşünme becerilerine ve akademik başarılarına etkisi* [*The effect of online problem based learning on the pre-service teachers' critical thinking skills and academic achievement*] (Unpublished doctoral dissertation). Anadolu University, Eskisehir, Turkey

Turgut, M., Yılmaz, S., & Firuzan, A. (2008). Okul deneyimi uygulama sürecinin değerlendirilmesi üzerine bir araştırma [A research on evaluation of school experience process]. *Üniversite ve Toplum* [*English Translation*], *8*(2).