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Creating Interactive Student Workbook for Primary Education Social Studies Class and Researching Its Efficiency

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Abstract
Student workbook is an education material including components that support learning, help ensuring knowledge and ability to students in line with the acquisitions stated in teaching programs. Students have different learning styles and necessities. Their needs should be satisfied by benefiting from some additional materials in order to make their learning permanent. The chance to find an environment proper for individual learning necessities increases in parallel with the abundance of materials used in education. As known, there is only one way communication in printed materials and they are limited in terms of addressing different learning styles. Using technological products such as computer and internet in learning environments can remove these limits. Turning student workbook into electronic documents extends the limits of written books and eases learning by addressing more than one sense. In this study, preparing Social Studies workbook of 4th grade primary school interactively, the process of practicing it and its effects on students' academic success, student attitudes towards the lesson, computer and internet are researched. The software used in this study is multimedia supported and web based. Software is prepared by exemplifying "Power, Management and Society" learning domain. Pre test last test non-equalized control group model, which is one of the semi trial models, is used. At the end of the study, it is determined that there are significant differences in terms of pretest and last test of experiment group and control group students' attitude scale towards computer, attitude scale towards social studies and success test. There isn't a meaningful difference in attitude scale towards internet.
Keywords: Social Studies, web based teaching, workbook.

1. Introductıon

Preparing individuals for the next educational institution, for life and for the economic practices which a state needs are some of the goals of education system. Schools are one of the few places which form the basis and the practices of educational processes.

Education of young generations is the most significant factor in guaranteeing the future of states. Education starts in the family, but the systematic and programmed education starts in school. Work books are the most common education instruments used in schools in order to ensure students reach their educational and individual goals.

Textbooks, which can be defined as printed lesson materials have various benefits as it is easy to reach and carry them. On the other hand, they are inexpensive and prepared specifically for the goals of different lessons. But besides these benefits, these materials have some disadvantages; for instance, it is impossible to transfer knowledge through these materials to individuals who have no prerequisite knowledge about a topic, they may cause rote learning, they have too much cognitive load as they include many words and concepts, students may get used to obtain information without making research and there is one way presentation in them (Kaya, 2005; Gülbahar, 2008; İşman, 2008).

Textbooks in Turkey are developed and controlled by the government. Book sets are distributed all around the country at the same time (textbook and student workbook). The goal of this is to enable all of the students use a reachable and useful resource under same circumstances and to increase the quality of education. But the researches on the issue show that student workbooks aren't used efficiently as the curriculum of teachers is too intense and there is usually a limited time for topics (Ulu Kalın, 2007).

Student workbook is an education material which helps ensuring knowledge and ability to students in line with the acquisitions stated in education programs (MEB, 2004). Students should benefit from various additional materials in order to have a permanent learning. These materials should meet the demands of a good learning. Students have different learning styles and needs. Variety of materials will increase the chance to create a learning that meets the needs of different learning styles (Yalın, 2004).

When education materials meet the reading and visual requirements, students will remember 30% maximum (Yalın, 2004). Based on this fact, it can be said that, printed materials have some limits in terms of meeting the needs of students who have different learning styles such as listening, experiencing, enjoying or watching. These limits can be prevented through technologies such as computer and internet. Computers create different learning environments according to the different abilities of students (Rıza, 2001).

Transforming student workbook into electronic book through computer will broaden the limits and serve to more than one sense; in this way, learning will be more fruitful. Individual needs will be satisfied and

student workbook will become more enjoyable as it is combined with technology (Demirci, 2003).

Efficiency of learning will increase as teaching through internet is made through written, audible and visual ways. As a result of this, it can be said that web based education and applications extend learning. This change and development can meet the demands of students who have different learning styles and individual needs (Odabaşı et al., 2005; Erdoğan, 2008).

A web based education content that has sufficient and valid content and prepared by using multimedia devices ensures active participation of students in learning process; students learn permanently through experience, hearing, seeing and reading (Orhun, 2004; Azeta, 2008).

It is believed that reviewing the topics sufficiently is a significant factor in ensuring permanent learning. On the other hand, it is significant to prevent the reasons that cause incorrect and deficient learning. All of the questions answered by students should be checked; their mistakes should be corrected and explained. Resources on the internet should be searched and used; student workbook should be checked by teachers apart from the class hours.

Interactive workbook will evaluate multiple choice, correct-incorrect, fill-in-the-blanks questions and will give necessary feedback. So, it can be said that teacher will only evaluate open ended questions. Students can connect to the system and make necessary studies; related data will be recorded and used when necessary. When students want to look back at the same topic, they will be able to change the answer and teachers will be able to check the process. Teachers can see the results and follow development of student on the internet. It expected that, this interactive workbook will ensure teachers save time.

The concept of Social Studies, which is generally used as a singular term, aims at raising individuals who feel responsible for environment, society and humanity. Social studies include topics that are suitable for primary and secondary education. These topics are chosen among the disciplines such as sociology, economy, politics, psychology, anthropology, law and education. In general terms, Social Studies, which is an interdisciplinary field, aims at including conceptual and scientific realities in education process and raising individuals who are efficient in terms of social and scientific developments (Koçoğlu, 2013).

Beyond complete behavioral approaches, Social Studies Teaching Program is based on an approach that supports problem solving and developing processes by taking experiences and values of individuals into consideration (MEB, 2017). The program is prepared as a total of 108 weekly course hours in one school year; 3 hours per week for 4th, 5th, 6th and 7th classes.

Studies in the field of web and development of web technology helped internet based applications become an alternative to in-class training. Enriching the content by using multimedia technologies, being able to give instant feedback, making assessments and evaluations prove the significance of internet based applications. Students don't have to be at school in order to participate in web based teaching process. Namely, internet based applications can be used in order to end being time and space dependent. Students can repeat the lesson in school or read the full content in web environment (Yavuz and Karaman, 2004; Özdemir and Yalın, 2007; Özüsağlam, 2007).

Computer supported education increases the success of students (Cüez, 2006; Kenanoğlu, 2008; Karakuş, Karakuş and Kösa, 2008) and has a positive effect on the behavior of students towards class (Berigel, 2007; Can, 2008; Uygun, 2008; ; Akpınar, Ergin, Tatar and Yıldız, 2010; Çetin and Günay, 2010; Özkan, 2010; Yeşiltaş, 2010; Yen, Tuan and Liao, 2010). But in the literature, it is mentioned that computer supported education doesn't increase success; it only increases the positive behavior of students (Zobar, 2010). Most of the post graduate theses in the field of computer and education technologies in Turkey focus on computer supported education (Akça Üstündağ, 2009).

In Social Studies education, software prepared for this purpose help increasing problem solving and decision making abilities and ease reaching and processing information. But there is a limited number of studies on computer software, the field of its use and its significance in Social Studies Education (Yeşiltaş, 2010). Only 2, 2% of post graduate theses on Social Studies are about computer based education; there is no doctorate thesis study in this field (Tarman, Acun and Yüksel, 2010).

Not being able to complete education activities and not having sufficient feedback are significant problems of traditional education understanding. Technology can be used in order to overcome these problems (Alkan, 2005). According to Bülbül, Batmaz, Şahin, Küçükali, Balta and Balta (2006) supporting in-class education, repeating the topics and evaluating learning require additional methods that can be used apart from the school. In this respect, advantages of computer and internet can be used. Topic taught in traditional teaching environment can be supported by the opportunities of internet, supported with the resources in it (Kaya, 2002).

When individuals interact through web, their communication skills increase and learning process is positively affected through these interactions besides web based education (Chen, Wu and Yang, 2006).

Thanks to the opportunities of information technologies, some structural changes in education systems can be carried out. Turkey should benefit from information technologies in education system (İşman, 2008). Web based multimedia material that is produced with this technology have many advantages as it is similar to

real life, permanent, attractive and it creates a flexible learning environment (Akkoyunlu and Yılmaz, 2005). When the studies on different student learning styles are analyzed, it can be seen that multimedia materials should be used more widely (Veenema & Gardner, 1996; Slater, 1996). It is understood that sharing multimedia applications and evaluation of students through web have positive effect on learning (Kaifi, Mujtaba & Williams, 2009). In the light of these information when student workbook, which can be classified as printed material, is transferred to web environment, its interaction will be maximized and opportunities it presents to students will significantly increase.

It is suggested that some additional methods should be used in order to ensure a student centered education. This study is significant as students will be able to reach teachers outside schools. Student workbooks used in Turkey don't have sufficient number of visual elements, which is determined as a result of literature analysis. Because of this deficiency, Ministry of National education, Head Council of Education and Morality approved preparing of a workbook that is supported by multimedia. Primary Education 4th grade Social Studies Class Student Workbook, which appeals to the senses of seeing and hearing, ensures active participation, helps learning through experience is prepared.

2. Materıal and Method

In this study, the goal is to research the processes of preparing and improving the efficiency of interactive workbook about the learning domain of "Power, Management and Society", which is about the discipline of democracy. In line with this goal, experiment and control groups are prepared from 4th grade students. Experiment group used interactive workbook while control group used student workbook which is approved by the Ministry of National education, Head Council of Education and Morality.

Model, environment and sampling, process, design of the experiment, writing of interactive student workbook and data collection tools are shortly mentioned.

2.1. Research Model

Pretest last test non-equalized control group, which is a semi trial model is used in the study. This model is used as the researcher has no chance to recreate the classes; when the research started, classes in schools that are directed by the Ministry of Education had already been formed.

2.2. Environment and Sapling

2.2.1.Environment

Reachable environment of the research is 4th grade students in Artvin, central district.

2.2.2. Sampling

The practice process of the research is carried out in 2014-2015 academic years, in Artvin, central district. The sampling group, made of 4th grade students, is determined through purposeful sampling, which is one of the methods of improbable sampling is used besides this convenient sampling is used whic is one of the non-random sampling procedures; criteria such as presence of computer laboratories in schools, having sufficient number of computers are taken into consideration.

2.3. Data Collection Tool

Data collected by the researcher is used in order to prepare success test for "Power, Management and Society" learning domain, attitude scales for Social Studies class and computer. Attitude scale towards computer, developed by Karadeniz (2011), is used as data collection tool.

2.4. Process Method

Firstly, success test of "Power, Management and Society" learning field is conducted to the sampling group. Then, 5 weeks long application period is carried out with the experiment group. At the end of the process, success test is conducted to the experiment and control sampling groups.

Opinions of different specialists were received while creating web based teaching material that is used in the application and a coordinative work is carried out with the software group. The aim of this process is to create an original model that fits to teaching-learning principles, design models and constructive theory. In this way, an education software which is well programmed and pedagogically sufficient is developed. In this respect, an interactive workbook is created by using programs such as Flash CS4, Photoshop CS4, Dreamweaver CS4, AppServ in software group's program and programming approaches such as ActionScript 3.0, AmfPHP, PHP, MySql, AJAX.

This material, used on web, is formed according to three user types. User, who has the authority of manager can design and upload new lessons, unit or activity to the system and add user who has the authority of teacher. User, with teacher authority can sign up students for his/her class and determine active or passive activities and the unit that will be learnt. Answers to the activities that should be completed by students can be

seen online and related feedback can be given. User, who also has the authority of teacher, can send private message through activities or make announcements to all of the students. Third level users are students. When they open the material in their computers, they can reach the active activities, complete them and change the answers. At the same time, they can see the feedbacks of teachers in notice screen and make necessary changes in line with the feedbacks.

The prepared software is planned in a way that it can be controlled by anybody who has a simple level of computer literacy. The general use of the material is as such: All of the files are uploaded to the computers of students before the application process. When user opens the material, internet connection is set in the background. There is no need for an extra scanner in order to use the system. When teacher enters the system through internet, he/she follows the participation of students and sends feedbacks which can be seen on screen.

3. Fındıngs and Dıscussıon

It is necessary to determine if there is a meaningful difference between the averages obtained from academic success measurement before carrying out the experimental process of subjects in the experiment and control groups. In order to do this, normalcy analysis should be carried out. As the number of students in experiment and control groups is less than 50, Shapiro-Wilk test, one of the normalcy tests, is carried out in order to determine the normalcy of data distribution. Analysis results are presented in Table-1.

Table 1. Normality test results of points obtained from Experimental and Control Groups academic success surveys

Measurements	Group	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	sd	p	Statistics	sd	p
Success pre test	Experiment	0,14	21	0,20	0,95	21	0,35
	Control	0,12	18	0,20	0,95	18	0,35
Success last test	Experiment	0,17	21	0,12	0,93	21	0,12
	Control	0,17	18	0,20	0,93	18	0,21

At the end of normalcy analysis, it is determined that the distribution of individuals in the experiment and control groups is normal.

In the process of comparing pre test measurements of students in two groups, as the number of data is less than 30 in academic success group (small sampling), Mann Whitney U test, a nonparametric test, is used instead of independent sampling t-test. Results are summarized in Table 2.

Table 2. Mann Whitney U Test about Experiment and Control Groups Academic Success Pretest Measurements

	Group	N	Average	Standard deviation	Order of Average	Sum of rank	U	Z	p
Success pretest	Experiment	21	10,29	4,23	19,1	401	170	-0,537	0,591
	Control	18	11,06	2,88	21,06	379			

At the end of the analysis, it is determined that there is not a significant difference between the academic success scores of individuals in experiment and control groups (U=170, 0; p>0,05). It can be said that success scores of individuals in experiment and control groups before the experimental process are equal.

As the number of data in each sub group is less than 30 before comparing the pretest measurements of experiment and control group students, Mann Whitney U test is used. Results are summarized in Table 3.

Table 3. Mann Whitney U Test about Experiment and Control Groups Computer Internet and Social Attitude scores and Academic Success Last test Measurements

	Group	N	Average	Standard Deviation	Order of Average	Sum of rank	U	Z	p
Success pretest	Experiment	21	17,62	3,20	27,79	583,5	25,5	-4,625	0,000
	Control	18	11,67	2,38	10,92	196,5			

At the end of the analysis, it is determined that there is a meaningful difference between scores about attitude towards computer (U=104,0; p<0,05), attitude towards social studies (U=50,5; p<0,05) and academic success scores (U=25,5; p<0,05). But there isn't a meaningful difference between experiment and control group scores about the attitude towards internet (U=134,0; p>0,05). In this respect, it can be said that experimental process is useful except the factor about the attitude towards internet.

Wilcoxon signed rank test analysis, which is a nonparametric test, is used in order to determine if there is a meaningful difference among experiment group members in terms of computer, internet and social studies attitude scores and academic success pretest and last test scores. Analysis results are presented in Table 4.

Table 4. Wilcoxon signed rank test results about the difference among experiment group individuals in terms of computer, internet and social studies attitude scores and academic success pretest and last test scores

		N	Order	Sum of rank	Z	p
Success pretest_ success last test	Negative rank	1	1,0	1,0	-2,05	0,04
	positive rank	5	4,0	20,0		
	Equal	12				
	Total	18				

When the analysis results are analyzed, it is determined that there is a meaningful difference among the individuals in experiment group in terms of attitude towards computer pretest last test scores (Z=-3,07;p<0,05), attitude towards internet pretest last test scores (Z=-2,57 ;p<0,05), social attitude pretest last test scores (Z=-3,11;p<0,05) and academic success pretest last test scores (Z=-2,05;p<0,05). In this respect, first and last measurements in experiment group are different in favor of the last test.

In order to determine if there is a meaningful difference between Control group computer, internet, social studies attitude scores and academic success pretest and last test scores. As N<30, Wilcoxon signed rank test analysis, one of the non parametric tests, is used instead of sampling t-test. Analysis results are presented in Table 5.

Table 5. Wilcoxon signed rank test results about the difference among Control group members in terms of computer, internet and social studies attitude scores and academic success pretest and last test scores

		N	Rank average	Sum of rank	Z	p
Computer pretest – Computer last test	Negative rank	10	8,1	80,5	-0,65	0,52
	Positive rank	6	9,3	55,5		
	Equal	5				
	Total	21				
internet_pretest - internet_last test	Negative rank	14	8,6	121	-2,12	0,03
	Positive rank	3	10,7	32		
	Equal	4				
	Total	21				
social_pretest - social_lasttest	Negative rank	15	11,2	168	-1,83	0,07
	Positive rank	6	10,5	63		
	Equal	0				
	Total	21				
success_pretest - success_lasttest	Negative rank	11	8,8	96,5	-1,48	0,14
	Positive rank	5	7,9	39,5		
	Equal	5				
	Total	21				

When the analysis results are analyzed, it is determined that there is a meaningful difference between control group's attitude towards internet pretest and last test scores (Z=-2,12; p<0,05). There isn't a meaningful difference between other variables' pretest and last test scores (p>0, 05). In this respect, it can be said that first measurements and last measurements in control group are equal.

4. Results and Suggestıons

When success test and attitude scales are taken into consideration, it can be said that there isn't a meaningful difference between pretests and between experiment and control groups. But when groups are compared in itself, it is seen that practices of experiment and control groups have a meaningful effect on student success, attitude towards computer and attitude towards social studies. When experiment and control groups' last test results are compared, it is seen that there is a meaningful difference in academic success scores, attitude towards computer and attitude towards social studies, and this difference is in favor of the experiment group. As a result, in contrast to the findings of Katz and Yablon (2003), Linn et al. (1998) and Ünlü (2007), web based teaching positively supports academic success (compared to normal teaching) as mentioned in the study findings of Akpınar et al.(2010), Baki et al.(2008), Baturay et al. (2009), Berigel (2007), Can (2008), Cüez (2006), Çetin and Günay (2010), González et al. (2010), Karakuş et al. (2008), Keleş (2007), Özkan (2010), Khalifa and Lam (2002), Wang (2008) and Yen et al.(2010). Only in the attitude towards internet factor, there isn't found to be a significant difference between experiment and control group. Based on these findings, it can be said that "multimedia supported web based workbook", used in this study, had a more positive effect than the other student workbook on students' academic success, attitude towards computer and attitude towards social studies class.

The use of material increases the quality of education in educational environments besides turning learning into a joyful process. Materials that serve to more senses ease the formation of permanent behavioral

change.

As the software used in the study is made of activities including visual and audial elements besides animations, it is enjoyed by the students in general. Additionally, as there are colorful drawings and multimedia supported activities it is easier to learn and remember the topic.

Throughout the study, it was seen that experiment group students had fun and learnt at the same time and they were willing to study. This finding supports the study of Ünel and Gündoğdu (2007).

When the results obtained on the basis of research findings are evaluated, it can be said that primary school 4th grade students' academic success is generally meaningfully higher than control group students. According to the scores obtained from the attitude scales, experiment group students' attitude towards computer and social studies are meaningfully more positive than the attitudes of control group students.

Based on the findings obtained from this study, these below mentioned suggestions can be added to the literature:

- Multimedia supported web based workbook developed in this study is for 4th grade social studies class "Humanity and Management" learning domain. It is necessary to prepare this kind of studies for different classes and learning domains.
- The Web based teaching material is dynamic. Education contents for other classes can also be prepared through the software.
- It is necessary to meet computer and internet necessities in schools in order to be able to practice the activities in schools.
- In service trainings should be prepared for teachers in order to use such materials efficiently.
- This study is limited as it only includes practices in Artvin, central district. The same software can be used in different cities and schools and its efficiency can be evaluated more generally.
- There isn't an analysis on the changes in student answers according to teacher comments entered to the database. A comparison between workbooks of control group students and answers of experiment group students in database can be made in future studies.
- Future studies can focus on determining if the practice has a permanent effect on the success and attitudes of students.
- The ideas and suggestions of teachers about the software can be taken into consideration.

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