Views Of The Teaching Staff On Web Based Mathematics Teaching Prepared On High School-1 Functions

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Abstract

A Web Based Mathematics Teaching site including the subject of functions was designed with regard to constructivist approach for this study. The site was introduced 10 teaching staff from KTU, Fatih Faculty of Education and 17 teaching staff from Rize University, Rize Faculty of Education. Teaching staff filled in the evaluation forms prepared for website and the place now and in the future of Web Based Mathematics Teaching within the educational system was discussed with them. though the teaching staff was all displated positive attitude towards Web Based Mathematics Teaching and obtimistic about future. As a consequence of their comments and the answers they gave in the material evaluation form, the effectiveness of sample Web Based Mathematics Teaching material prepared on the subject of functions may be found at acceptable range.

1. Introduction

Today, in our educational institutions, there are many topics where students have difficulty in comprehension and move onto other topics without understanding and fall into misconceptions. The topic of functions is one of them [1], [2], [3], [4], [5], [6], [7].

In fact, upon completion of High School, students should be able to use functions easily, increase their repertoir and learn new function types in order to define relationships.

Computer technologies today are capable of drawing function graphs, process operations with symbols and do calculations on columns of data-bases momentarily. As far as the appropriate usage of the technology is concerned, the students may learn mathematics in more depth.

Information technologies, especially in teaching science and mathematics constitute a potential support over a broad perspective. Information technologies, if used wisely in teaching and if integrated very well with the curriculum, learning can be achieved faster, much deeper, and more understandable results can be obtained [8].

Web is a service which facilitates transmission of the information to the required location via internet which is a network system. An educational material prepared with this service may be used with audio and action effects not only in the education centres but also at home, at work, wherever and whenever required. Computer Assisted Mathematics Teaching (CAMT) using these features of the Web is called Web Based Mathematics Teaching (WBMT) [9]. WBMT has many advantages when compared to the traditional teaching method.

Web applications have many benefits in education. The web, with its ease of use, is the best place to store knowledge for the lessons offered traditionally. For example, various sources like the notes of the students to be used within the scope of the lesson, practical exams, the things the students need to do, and projects may be used. However, the basic benefit of the web technology is that it offers new capabilities to re-structure learning and knowledge, it improves communication and cooperation between the students and the instructor and as a natural consequence it contributes to the improvement of the quality of teaching [10], [11].

It is said that the web supported education, which contributes immensely to the development of new resources in the universities, is the most widely used teaching approaches in the world [12].

Instructors have important duties and responsibilities in training teachers who can accurately and effective use the developing technologies. In order for the instructors to fulfill these responsibilities they need to have the necessary skills, attitudes and behavior in respect to the technology. The question on what the reactions would be to the teaching of

functions with web based education with holistic approach which is another aspect of the computer assisted learning has not yet been clarified. Moving on from this requirement, the question "How would the holistic web based mathematics teaching material on functions be accepted which has been brought about by the technological advances and which is used almost anywhere on the computers for the purpose of secondary school education and through the assistance of appropriate computer software?" has been chosen as the problem question of this study.

Sub-problems:

Teaching staff:

1.How did they exploit the web based mathematics teaching material prepared on high school-1 functions?
2.How were their attitude and approach towards web based teaching and its future?

2. Aim Of The Study

The aim of this study is to determine the approach and attitude of the teaching staff towards WBMT and its future.

3. Data Compilation Tools

The site[1] was piloted at Beşikdüzü Anadolu Öğretmen Lisesi. As a result of this pilot study the site was revised as a final form. The evaluation form prepared for site were used by 44 students and 2 teachers. The opinions of the experts were taken into consideration and the form was completed(r=0,98). The frequencies of the options marked for every item in the participants evaluation form were determined, and points awarded and average points were found for each item. (I do not agree at all 1,00 – 1,79, I do not agree 1,80 – 2,59, I am undecided 2,60 – 3,39, I agree 3,40 – 4,19, I definitely agree 4,20 – 5,00). In this study which aims to bring forth the opinions of the mathematics teaching staff towards WBMT, semi-structured interviews were held. The interview questions had to do with the applicability of the WBMT today and in the future of the instructors at schools. The data compiled for this study were analysed by using triangulation method. Shared, similar and contradictory opinions compared with the opinions of the teaching staff by using this method.
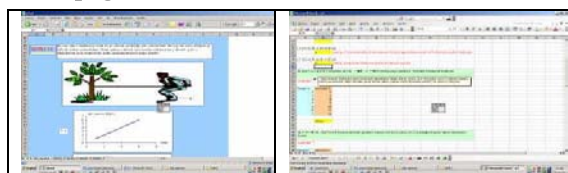
Some pages of website

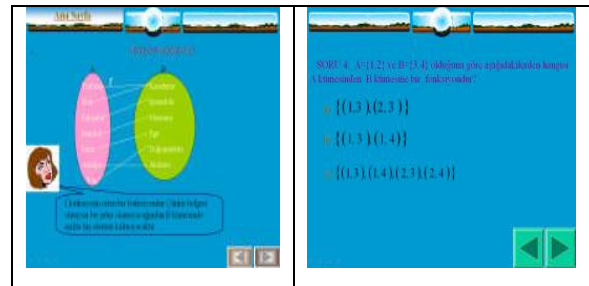Figure 1. The pages of excel in the website
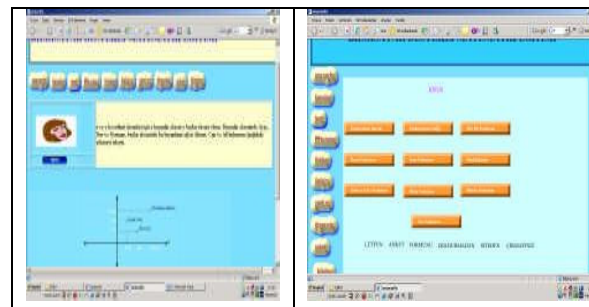

Figure 2. The pages of power point in the website

Figure 3. The pages of asp in the website

4. The Results Obtained From The Teaching Staff

Studies were carried out in the Fatih Faculty of Education and Rize Faculty of Education computer laboratory by 27 teaching staff on duty at these faculties. Initially, the site was introduced to the teaching staff. The teaching staff examining the site were observed. The place now and in the future of WBMT within the educational system was discussed with them. Later, they filled in the evaluation forms. According to interviews were held with teaching staff: The view of one of the instructors was as follows: TS1,

-If not today, it will definitely be implemented in schools in the future. The infrastucture preparations for this have already begun. However, I feel that mathematics should not be taught all in WBMT and that it is suitable for certain lessons and for some lessons it is insufficient. Therefore, for some lessons WBMT should be selected and for certain lessons other teaching methods should be selected. These could be study leafs. But I do not think that computers should be used in teaching all mathermatics lessons. For example, I do not think than WBMT individual learning for this subject is suitable. The teacher's guidance is

mandatory. The student cannot learn the lesson gtrained well and if this method is supported with other teaching methos the anticipated success rate in mathematics will increase.

The views of another instructor:
TS2,

-After a while WBMT will become a necessity. Every home will have a computer. The student, in preparing his/her homework, will look for sources and will be obliged to use the web in learning a given subject.

Discussion between two instructors.
TS3,

-The teacher should explain the subject matter and should find solutions immediately to the question asked by the student. The web could reduce the communication between the student and the teacher.
TS4,

-The teachers should use every means possible in order to teach the student the subject that is being taught. The teacher will be able to answer the question asked by the student in class, as a matter of fact, the teachers will be able to answer the question which the student could not remember at that time outside of class via the internet. In short, communication will be much better.
TS3,

-Very well, doesn't the teacher have to have a computer also in order to answer the question that comes to the mind of the student and if he does not?
TS4,

-The teacher may make arrangements to hold discussions at certain times and answer the questions then.

TS3 is negative from this discussion. However, we found the answer given by TS4 to be noteworthy, and gave us the idea to constitute a system using appointments for the WBMT.

Table 1. The results of evaluation technically

Technically evaluated of the site	I definitely agree	I agree	I am undecided	I dont agree	I dont agree at all	average
It was fun to use the program.	8	12	2	5		3,8
The site eneables mututal discussion.	4	10	2	11		3,3
The regulations and helps were clear and understandable	4	12	2	8	1	3,3
The links inside the site work infinitely.	5	14	3	5		3,7
The material is easy to use.	6	14	4	3		3,8
The students find the opportunity to evaluate themselseves, and also find the opportunity for testing and getting feedback	3	13	4	7		3,4
Explanations, clues and regulations are clear and understandable	6	12	2	6	1	3,6
All the writing, diagrams and graphics can be read easily.	9	12	2	3	1	3,9

Table 2. The results of evaluation contentwise

Contentwise evaluated of the site	I definitely agree	I agree	I am undecided	I dont agree	I dont agree at all	average
The material enables the establishment of the information by the individual himself	4	15	4	3	1	3,7
Information is logically presented.	4	14	2	5	2	3,5
Sufficient examples are given to the students in connection with the new knowledge they have acquired.	5	10	3	9		3,4
This material in respect to "functions" is instructive.	7	6	4	8	2	3,3
Advance information necessary for the subjects contained in the material is given.	5	14	3	4	1	3,7
This material will make the lesson to be learned more interesting.	5	16	3	3		3,8
The scenarios of the activiities were prepared by taking into consideration individual and/or group studies.	3	16	4	4		3,7
It enables the use of mathematical expression, reach logical solutions and to make abstractions.	8	8	3	8		3,6
It enables the students to compare the newly acquired knowledge with the information they knew beforehand.	9	13	2	3		4

Table 3. The results of evaluation visually

Visually evaluated of the site	I definitely agree	I agree	I am undecided	I dont agree	I dont agree at all	average
Symbols, writings, colors and animations are well selected.	9	11	3	4		3,9
The features to be learned are hidden inside the activities in a planned manner with a systematic approach in an interesting way.	6	18	1	2		4
New information, concepts and rules are presented with appropriate similarities, demostrations,graphics or animations	6	12	2	7		3,6

You can see briefly results of evaluation form and interviews on Table 4.

Table 4. The resume of the evaluations and interviews

WBMT	Teaching staff (N=27)
What were their attitudes and approaches towards WBMT?	The attitude and the approach of the teaching staff were generally positive. One of the teaching staff stated that the computer may be employed as the cement if used together with the traditional method.
How did they evaluate the material?	Technically positive (3,62) Contentwise positive (3,63) Visually positive (3,86) In open ended questions: They found the material more effective on the graph of the function. While some of them found the animations necessary and sufficient, others found them exaggerated and unnecessary.
What were the counter views they developed?	*May be applied today. There are preparations. However, due to problems of the infra-structure, software, hardware , there will be certain problems encountered at the initial application. * They are hopeful about the future. They believe that in the future, these problems will be overcome and WBMT will be applied successfully.

5. Results And Recommendations

Generally, the teaching staff displayed positive attitude and stated that WBMT would become widespread in the future. As a consequence of their comments and the answers they gave in the material evaluation form, the effectiveness of sample WBMT material prepared on the subject of functions may be found at acceptable range. A study showing that the teaching staff attitude is positive towards technology was found in the study of Bakioğlu and Hacıfazlıoğlu (2004), [13]. A study by Özkütük ve Orgun (2004) showed that about 50 teaching staffs' views about computers were positive [14]. Kısa ve Kaya (2005), found out that the attitudes of 162 teaching staff towards it was also positive in behaviour scale for technology [15]. Furthermore, in a survey conducted at Cumhuriyet University and İstanbul University, Faculty of Business Administration, on 55 teaching staff actively working, the fact emerged that 76,4% of the teaching staff believed in the advantages of the modern technological teaching methods [16]. Our study, a teaching member stated that employing WBMT in the teaching of mathematics alone would be insufficient, and he believed that if supported by other teaching methods, more positive results would be achieved in teaching mathematics. If it is placed among the subjects to be researched, the results may be enlightening for us. They recommendated "**appointment system**" in web-based mathematics learning envorenment to meet for students. İnteractive web tools such as notice board, e-mail and internet relay chat can be used in mathematics teaching supported with web in order to solve a special problem met with teacher quidance or to answer a question in lesson contents. However, "**appointment system**" is necessary to use them. Baki ve Şensoy (2004) determined in a study that university students expected academicians to communicate with them about homework projects or other lesson subjects via the internet and also to do student counseling [17].

A study done on 114 teachers working in primary schools in Turkey, showed that nearly all teachers used information communication technologies, some teachers (%42,5) sometimes encourage students to have communication and solve a problem som teachers (%80,7) never participated in online projects with students [18].
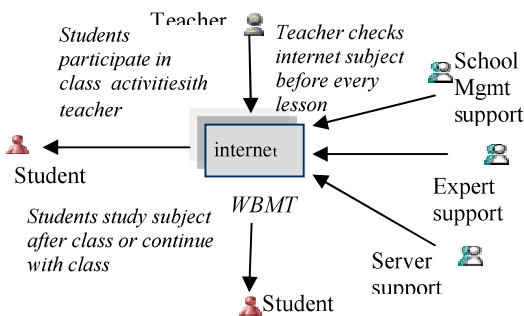
The WBMT should be the product of a mixture with synchronized education under the guidance of a teacher at schools, with the study the student can do at home individually. While the students build their knowledge through discussions with other students in class at school, and by getting the support of the teacher(s), they should be able to conduct studies at home where they digest what they have learned and adapt this knowledge to attain broaders sources and to reinformce what they have learned. The support of the school administration, server and expert support are important for quality WBMT. The synchronized and other WBMT material prepared based on the recommendation received from the instructors are given below as example models.
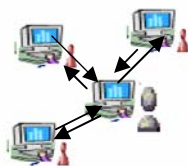
163

Preparing for Class (Lessons)

> The teacher prepared the material and readies it for lessons. The teacher can obtain expert support in doing this or he/she may use ready mjaterials.
> The teachers enter information such as name, surname, access data.
> The name of the lessons, definition and the purpose are given.r.
> Study, presentation, practice/applications questions are identified.
> ·Projects and tasks to be given under the scope of the lesson are presented.

In-class application

Students participate in class activitiesith teacher

Teacher

Teacher checks internet subject before every lesson

School Mgmt support

Student

internet

WBMT

Expert support

Students study subject after class or continue with class

Student

Server support

Meeting with the student(s)

> teachers sets up a time outside of class to meet with students to answer the questions of students and to obtain their views.
> In this program the teacher will try to obtain the views of the students through chat and try to answer their questions.

Evaluations of the stduent's homework and projects

> The teachers will evaluate the students homework and project via the nternet on his/her own time. This evaluation is more objective than in is the other.

Internet supported Distant Education method which is defined as a system compatible with the education understaing of information society brings with some reservations/problems [19].

Socialization of the students in a positive manner is delayed.

It is difficult to prevent the student from learning a subject in the wrong way because errors cannot be corrected in timely manner.

Because individual education comes to forefront an education enviroment involving competition cannot be prepared.

In-class interface education cannot be accomplished.

Because the student does not have anbody to as questions they cannot be led in the right direction to learn correctly.

Johnson (2001) says that lack of communitation among the participants in web based education poses a problem [20].

Web based education with this model may overcome all its problems. The student, with an appointment, may refer his/her questions to the teacher. Socialization will not be delayed as education will continue both in class and extra-class, the problem of communicaion may be overcome. Information management prelicence program(BYOP), which was opened in Open Education Faculty of Anadolu University in 2001-2002 education year, is the first prelicence program with a diploma in Turkey whose education is totally via the internet.One of the services for the students from BYOP is Course Break Website (http://dersarasi.bilgi.aof.edu.tr). The students who want to breathe easily again can socialize and exchange ideas and information at break times by means of this website. Teacher-student interaction can be possible at breaks or any moment in high schools with an appoinment system, even after graduation.

Teachers access to computers should be increased, and they should be encouraged to have their lessons in the internet medium, video-conference system and to employ other techniques; and the teachers should be provided with opportunities to make use of the internet facilities for communication with their students after the lessons. Faculty managements should also be more

sensitive on this issue and should be enthusiastic to spend their available financial resources so that the teachers may benefit from the internet during and after their lessons for learning purposes.

The instuructor should be able to achieve everything he/she wants to do in connection with his/her lessons via the internet program without the help of an expert of a software program. As a matter of fact, the instructor should be able to conduct his/her works in connection with his/her lesson with a standart internet program even when he/she is abroad. Likewise, a guest teacher residing in a foreing country should be able to place his notes and materials in connection with his/her lessons without requiring any specific tools.

6. References

[1] Thomas, H. L., *The Concept Of Function, Children's Mathematical Concepts*, New York, Teacher College, Columbia University, 1975.

[2]Dorofeev, G. V., "The Concept Of Function in Mathematics and in School", *Journal Of Mathematics in School*, 2, 1978, 10-27.

[3] Dreyfus, T. and Eisenberg, T., "Intuitive Functional Concepts:A Base-Line Study On Intuitions", *Journal For Research In Mathematics Education* , 6, 1982, 18-24.

[4] Markovits, Z., Eylon, B. and Bruckheimer, M., "Difficulties Students Have With The Function Concept , The Ideas Of Algebra", K-12: *Yearbook Of The National Council Of Teachers Of Mathematics*, 1986, 43-60.

[5] Janvier, C., Representations and Understanding: *The Notion Of Function As An Example. Problems Of Representation in Mathematics Learning and Problem Solving*, Hillsdale, Lawrence Erlbaum, 1987.

[6] Barnes, M., "Understanding The Function Concept: Some Result Of Interviews With Secondary and Tertiary Students", *Research On Mathematics Education in Australia*, 1988, 24-33.

[7] Dreyfus, T. and Vinner, S., "Images and Definitions For The Concept Of Function", *Journal For Research in Mathematics Education*, 20, 1989, 356-366.

[8] Tinker, R., *Information Technologies in Science and Mathematics Education Reform in Math and Science Education*: Issues for Classroom. Colombus, OH: Eisenhower National Clearinghouse, 1997.

[9] Güveli E., Lise-1 Fonksiyonlar Konusunun Web Tabanlı Öğretim Tasarımı Uygulaması Ve Değerlendirilmesi, KTU Fen Bilimleri Enstitüsü, Doktora tezi, Trabzon, 2004.

[10] Casey, D., *Retaining Human Contact in Web Based Education: Implementing a Model*, The Peninsula School of Computing and Information Technology, Monash University, 1998. http://www.monash.edu.au/groups/flt/1998/papers/retainhc.pdf.

[11] Barnes, G., and Macedo, J., *E-learning: Experience with web-aided and web-based education at the university of Florida*, Proceedings of URISA Conference, Orlando, 2000.

[12] Zhang, W., Niu, J., and Jiang, G., "Web-Based Education At Conventional Universities İn China: A Case Study", *International Review Of Research In Open And Distance Learning*, 2002, Vol 2. No.2 Http://www.Irrodl.Org/Content/V2.2/Zhang.Pdf

[13] Bakioğlu, A. ve Hacıfazlıoğlu, Ö., "Öğretimde Teknolojinin Kullanımı Konusunda Üniversite Yönetiminden Beklentiler: Öğretim Elemanlarının ve Öğrencilerin Görüşleri", Gazi Üniversitesi XII. Eğitim Bilimleri Kongresi, Ankara, 2004, Cilt II, 971-1002.

[14] Özkütük N. and Orgun F., "Öğretim Elemanlarının internet Kullanma Düzeyleri ve Bilgisayara Yönelik Düşünceleri", *IV.International Educational Technology Symposium*,Turkey. 2004, (2), 831-837.

[15] Kısa B. And Kaya H., "Hemşire Öğretim Elemanlarının Teknolojiye İlişkin Tutumları", *IV.International Educational Technology Symposium*,Turkey. 2005, (1), 392-398.

[16] Alakoç, Z., Teknoloji Hakkında Öğretim Elemanlarının Görüşleri, 2004. http://www.ef.sakarya.edu.tr./sayfa/bildiri/sayı 3/61.doc 04 Nisan 2004.

[17] Baki A. And Şensoy S., "Üniversite Öğrencilerinin ve Akademisyenlerin Beklenti ve Önerileri Doğrultusunda Bir Web Tabanlı Eğitim Yönetim Sistemi Tasarımı: KTU, BÖTEB Örneği. *IV.International Educational Technology Symposium*,Turkey, 2004, (2), 1229-1238.

[18] Usluel Y. And Demiraslan Y., "Bilgi ve İletişim Teknolojilerinin Öğrenme Öğretme Sürecine Entegrasyonunda Öğretmenlerin Durumu", *IV.International Educational Technology Symposium*,Turkey, 2004, (1), 119-124.

[19] Merter F., "Bilgi Toplumuna Uygun Yeni Bir Öğretim Modeli", *İnönü Üniversitesi Eğitim Bilimleri Dergisi*, 2002, 3 (3), 51-61.

[20] Johnson, C. M., A Survey of current research on online communities of practice.The Internet and Higher Education, 4 (1), 2001, 45-60.

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