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Learning Objects and Their Applications

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1. Introduction

Education and technology are two important factors that have an important role in human life. Education helps reveal the cognitive, affective and psychomotor potential that human owns from birth. Thanks to education, people have survived against nature and become more powerful, more constructive and more creative beings. This change and development caused by education both made people's lives easier and helped technology emerge. Technology can be defined as activities to develop tools that will facilitate people's lives with the help of their knowledge and skills. While developments in the field of education caused more advanced technologies to emerge, technological developments caused new information and scientific fields to emerge. Educational technology is a community of academic systems that help design learning and teaching environments effectively and solve problems experienced in the learning and teaching process as well as increase the permanence and quality of learning.

The development of the Internet and multimedia technologies and their use in distance education programs resulted in the educational model defined as "web-based learning" or "e-learning". This educational model occurred as a result of the synthesis of the Internet, distance education and computer-supported education. The most important feature of the e-learning model is that it provides individuals with the opportunity for education in any place at any time with the help of Internet support. In addition, web-based distance education allows establishing synchronous and asynchronous communication among students and teachers with the help of interactive web pages, e-mail and file transfer. Students who visit various web pages with different contents, who are members of various clubs, who participate in e-mail groups, who enter web sites from different parts of the world to obtain information (such as virtual libraries, news services and so on) and who are in constant communication/interaction with the trainer in the Internet environment can reach a great amount of information requiring the use of various tools. Since students face new information in this process, incidental learning occurs as well (Atack & Rankin, 2002; Hawatson, 2004; All & Madran, 2005). In order to carry out an effective learning activity, an e-learning material should have such components as texts, audios, simple graphical presentations, video presentations, animations, simulations, games, testing systems and interactions supported with feedback (Friesen, Fisher & Roberts, 2001). Among the tools that allow effective presentation of learning contents developed in these environments are learning objects. Learning objects are small software applications which are similar to such real-world physical objects as books, notebooks and pencils and which have their own

unique features. In order to use learning objects for various purposes and in different environments, these learning objects should be defined and should include explanatory information. This process is carried out with "metadata" meaning "defining information". According to Wiley (2000), a learning object is any digital source that can be used to support learning. This part first introduces learning objects and their features and then presents applications of these objects in physics education.

2. Learning objects

Learning objects can be defined as "information pieces which are structured independent of one another, which can be updated and used again for different purposes and needs, which can be combined to create a whole content, which are labeled with defining information and which can be accessed via a network and used for educational purposes." Learning objects have great importance in distant education applications.

In recent years, learning objects have been widely mentioned as a new concept in the areas of e-learning, design and development. There are studies to define this new concept to develop related standards, and there are great efforts to transfer these standards into practice.

According to Learning Technology Standards Committee, or LTSC, an organization that aims at developing and spreading standards regarding instructional technologies (Kelly, 2002; Learnet, 2003):

"It is defined as a digital or non-digital thing that can be used, reused re referred to during technology-supported instruction." Multimedia contents that can be used as a source during technology-supported instruction are objects that include instructional content, learning goals, instructional software and software tools, people, organizations or events."

This is quite a general or comprehensive definition and even covers non-digital environments. Therefore, learning objects can be said to include various things ranging from a simple piece of music or a text to a whole lesson and even to more complex structures such as a pool of lessons given in an institution. However, mostly, there are digital objects in practice. Thus, David Wiley (2000) suggests a more simplified definition: "A learning object is any digital source used to support learning." This can be considered as a definition good enough to use and comprehensive enough to cover terabytes of data on the web. A learning object is any object that has the potential to be used in educational activities, and in order to explain this subject, it should have at least a special educational purpose or an educational meaning (Slater, 2002). Learning objects are pieces which can be included within the scope of a lesson, which are used as an educational material, which are labeled with defining information, which can be used again and which can be accessed via the Web for educational purposes (Sharples,2002). Learning objects are information units that can be used in a number of applications to teach a special concept or a technique.

2.1 Features of learning objects

Learning objects provide a learning and/or educational vision that is automatized, directed and computer-guided. In other words, learning objects provide such opportunities as "taking just what is enough", "reaching quickly in time" and "giving education specific to

the person". If one wants to learn only the piece of a lesson not the lesson as a whole, the necessary learning objects can be used to meet this demand. Since they have defining information, learning objects can easily be found. In this way, there will be an opportunity to access the instructional content on time. As learning objects are separate and independent objects, they provide opportunities for specialized learning by helping create lessons appropriate to each individual's own learning method or style.

The advantages and benefits provided by learning objects are primarily as follows (Karaman, 2005):

- **Reusability** – Learning objects are objects that can be reused for different purposes in a number of environments. Once created, they can be used for various purposes in different settings. Reusability provides the advantage and potential to decrease the cost, efforts and the time spent for their development.
- **Producibility** – Learning objects can be automatically combined in a way to perfectly meet the learning needs of a certain student. At the same time, this means that the student can take the control and determine his or her own way of learning.

Competency-based learning is an approach that focuses on the intersection of skills, knowledge and attitudes within core competency models rather than the lesson model. Regarding the application of this approach favored by educators and workers, the problem experienced up to now has been the lack of content modular enough and appropriate to the purpose. Labeling learning objects provides an appropriate competency-based approach by matching the object-defining information with individual competency differences.

- **Adaptability:** Learning objects can be adapted to different environments and different student needs.
    - **Customization:** For institutions or individuals in need of the customization of the content, the learning object approach facilitates customization. Modular learning objects maximize the software potential via recombination and material supply together with separation into units as desired.
    - **Interoperability:** The object approach maintains interoperability between institutions and other learning systems as well as other learning platforms. Also, the approach helps design, develop and present learning objects specific to institutional needs.
- **Salability**: Developing small pieces with less cost and fewer mistakes is easier than developing bigger pieces. When an object created is used again and again, the gains will be doubled each time. For an institution, the value of a content increases when used. This helps make saving from the cost of the redesign and development process and provides the opportunity to sell content objects and to transfer a certain subject to sharers in pieces.
- **Flexibility:** If the material is designed in a way to be used for multi purposes, the material can be reused more easily without being rewritten for each of the new subjects or purposes. Excluding an object from the scope of the lesson is more difficult than dealing with it as a piece of the design and development.
- **Convenience of content management, search and update:** Meta-data labels facilitate content management via choosing and filtering the related content for a specific purpose and rapid update and search.

2.2 Examples for learning objects

- A digital video showing a surgery,
- A web page describing the symptoms of diabetes,
- A "flash" animation explaining the derivative of function in mathematics,
- A "realmedia" audio recorded in a face-to-face lesson,
- A web-page including "html, flash and realmedia audio records" and explaining normal distribution in the course statistics.

The examples given above are appropriate to all educational grades and include instructional materials that can be used in a number of disciplines ranging from medicine to physics and engineering education. One of the most important standards of these instructional materials includes the SCORM objects.

3. Sharable Content Object Reference Model (SCORM)

SCORM is a reference model created based on adaptation via the standards developed to make e-learning software durable, reusable, accessible and interoperable with other software. This model was established by the American Ministry of Defense in 1997. The ADL(Advanced Distributed Learning) organization was asked to develop standards regarding technology-based education to be used for the purpose of leading the federal and private institutions and to support the educational needs. Besides a number of international organizations especially in England and Canada, universities provide academic support as well. In line with the studies by ADL, many standards and specifications in the field of e-learning have been gathered under a single reference model. The first version of this model, called SCORM 1.0, was made available for use in January in 2000, and its following versions 1.1 and 1.2 were available in January and October in 2001. The latest version was made available by ADL in January in 2004 with a new name as SCORM 2004.

The SCORM lessons can be restructured as reusable learning objects that make the lessons highly effective and beneficial. This new content is also compatible with the criteria called R.A.I.D.

- **Reusable**: It can easily be adjusted and used when compared to other development tools.
- **Accessible**: Educational objects in a distant place can be presented in an easily accessible way.
- **Interoperable**: It can work well with a wide range of hardware, operating systems and web browsers.
- **Durable**: It does not require important changes with new versions.

Learning Management Systems (LMS) have an important role in SCORM.

4. Learning Management Systems (LMS)

As can be understood from its name, Learning Management Systems (LMS) is a management tool as integrated system that provides opportunities to manage the educational contents, monitor the learners and the teachers and individualize the learning-teaching processes (http://www.knowledgebank.irri.org/elearningfordev). The purpose of

LMS is to facilitate and carry out e-learning activities in a more systematic and planned way. It allows presenting the learning material, sharing and discussing the learning material presented, managing the lessons, taking homework, taking exams, providing feedback regarding these exams and homework, organizing the learning material, keeping records of the students, teachers and the system and taking reports (Morten, 2002) .

According to Weller (2007), these learning areas, known as Virtual Learning Environment (VLE), were called software systems designed to support learning and teaching. A VLE typically provides a tool via the Internet for wikis, blogs, chats and forums, for the management of student groups, for responding to and transforming students' works, for uploading the content and for communication, monitoring, questionnaires and evaluation.

A VLE is a computer program that facilitates electronic learning. Such e-learning systems are called LMS, Course Management System (CMS), Learning Content Management System ((LCMS), Managed Learning Environment (MLE), Learning Support System (LSS) or Learning Platform (LP). Instruction in this way is considered as computer-supported or online education. In USA, Web-Based Learning (WBL), Learning Management System (LMS) and Course Management system (CMS) are widely-used terms. In England and in a number of European countries, Virtual Learning Environment (VLE) and Managed Learning Environment (MLE) are commonly used. In addition, since VLE is considered to be a sub-system of ML, these two systems are interrelated.

There are various LMSs. Among these, the most well-known LMSs are as follows: 1-ATutor (www.atutor.ca), 2- DrupalEd (www.funnymonkey.com/come-and-get-it), 3-Interact (www.interactlms.org), 4-SiteAtSchool (siteatschool.sourceforge.net), 5-SyndeoCMS (www.syndeocms.org), 6-Sakai (http://sakaiproject.org/portal), 7-eFront (http://www.efrontlearning.net/), 8-Claroline (www.claroline.net), 9-Decobe Suite (http://www.docebo.org), 10-ANGEL_Learning (http://angellearning.com/), 11-Blackboard (http://www.blackboard.com/), 12-Desire2Learn (http://www.desire2learn.com/), 13-ILIAS(http://www.ilias.de/docu/),eCollege (http://www.ecollege.com/index.learn), 14-Webct (purchased by Blackboard), and 15-Dokeos (www.dokeos.com).

While some of these softwares are commercial, some are open-source software (OSS). All these programs have a number of common features. Among these applications, the most striking one is Moodle.

5. MOODLE

Moodle is a course management system. The Moodle was developed by commercial and non-commercial users from all over the world and has globally spread out via the Internet. Although Moodle was originally designed by Martin Dougiamas (http://dougiamas.com), today, it is directed by the Moodle Company in Pert in Western Australia. The most important feature of this design adopted by Moodle is its ease and elegance in the development of course materials (Berggren et. al., 2005).

5.1 General features of Moodle

The most important feature of Moodle is that everybody (teachers, students and so on) can use it quite easily.

- Moodle is totally free.
- The software can run under both operating systems: Windows and Linux.
- The system includes 50,000 students and thousands of courses.
- It competes with commercial packages alone and has a big share in the educational industry.
- It has quite a big thematic community and a large population of end-user trainers (100,000 registered users in its website alone).
- It has a language support in 150 countries in 70 different languages. In this system, you can choose any language you want. If you want, you can choose all the languages at the same time (Moodle); you can choose three languages at the same time (Distant Education); and you can choose one language (for questions).
- It has a large population of developers.
- Thanks to its large population of developers, the product life cycle is fast. That is, in quite a short time, its new versions are developed.
- Since it is free, it has a large population of testers.
- Most end-users use Moodle without having any experience in programming and databases. When a problem occurs, the problem is solved faster than it is in commercial systems.
- Since it is an open-source system, its security deficits is covered faster than it is in commercial systems.
- A number of new features are constantly added and distributed freely (block or module)

5.2 Some features in Moodle concerning the system administrator

There are some basic features in Moodle LMS concerning the system administrator. These features are as follows:

- Moodle can run on Unix, Linux, Windows, Mac OS X, Netware and on any other system with PHP support (it covers almost all companies that give hosting service).
- Moodle is designed in a modular way and has a number of functions at different levels.
- Moodle can easily be updated from one version to another. Moodle can update itself thanks to its own mechanism of recognition of new versions. In addition, it allows fixing itself and its related database files by recognizing the compatible databases.
- Moodle needs only one database (and if necessary, it can share this database with other applications).
- Moodle support a number of database management systems thanks to its developed database abstraction ability (For example, Moodle can run under Oracle).
- Moodle is a system focused on strong security in all its versions. All the forms are controlled; data validity is provided; and cookies are managed by encoding them.
- Moodle adopts social constructionist pedagogy and supports such instructional methods as activity-based education, critical reflection and target-based education.
- Moodle is appropriate to 100% online classrooms and can be used to support face-to-face education (synchronous education).
- Moodle needs a simple, effective and compatible Internet browser that requires low level of technology. Internet Explorer, Firefox or any other browser can help.

- Course lists can serve all the courses on the server via guest or another developed access methods on the Internet. You can index your courses via the Google research engine as a guest.
- A Moodle site can manage thousands of courses.
- Most text areas (sources, forum messages, written entries and so on) can be arranged with the WYSIWYG HTML editor found in Moodle.
- Multimedia sources (for example YouTube videos, Flash documents and so on) can easily be managed within the system.

Use of Moodle in physics lessons has an important place among educational applications.

5.3 Use of Moodle in physics education

Teachers can develop the Moodle platform by applying web-based peer assessment. These studies also allow developing students' perceptional schemes and structuring their knowledge as well as help them improve their abilities to make discussions and establish connections between similar things.

Computer use in physics education started in 1970s. Since then, a number of studies have been carried out investigating the effectiveness of technologies on physics education. In addition, there are comprehensive discussions regarding the use of WBLs in physics education (Kenny et. al., 2006). Giving physics education as a paradigm of solving a scientific problem is claimed to be more effective and efficient than using traditional approaches (Landau, 2006).

5.3.1 Quizzes

Quizzes are useful tools for measuring the levels of students' knowledge. Moodle provide comprehensive quiz samples. In Moodle, while answering the quiz questions prepared, students have more than one opportunity to test themselves.

5.3.2 Problems and exercises

One of the vital aspects of physics education is that students develop their ability to solve problems that represent different physical situations. Generally, students experience difficulty in applying the rules and equations they have learnt in lessons. Therefore, while doing this, it is important to provide them with exercises that will be beneficial for them.

5.3.3 Java applets

Presentation of standard formats (texts, Java applets, films, flash animations) is a perfect tool in terms of understanding simultaneous dynamic physical rules. Undoubtedly, applets are among the most successful sources used in physics education. Since applets are simultaneous computer experiments, they allow students to recognize the current relationships by giving values to the subject-related variables in a way different from animations.

Although Java applets are not specific to Moodle (these applets can run with any Java-supported web-browser), they can be used in related activities. Watching an animation is not a passive activity. With animation, students can learn real and dynamic information about the physical systems that they experience difficulty understanding.

Moodle is an important way for teachers to organize their course materials. When considered from the point of instructional view, use of multimedia tools to organize more attractive activities makes the instructional process more interesting. Consequently, these activities increase students' interest in the course of physics. Here, due to lack of time in the classroom, teachers can provide their students with a comprehensive source of information. In addition, Moodle facilitate the interactions between teachers and students in the virtual environment, and this provides the opportunity to take their views and suggestions as a learning committee. Moodle allows students to share their knowledge and difficulties. In this way, students can help each other via forums and chats. Thus, teachers can understand in which courses their students experience difficulty.

6. Whiteboard Movies (WBM)

Whiteboard Movies (WBM) are screen images which can be distributed via CDs and the Internet and which include texts and/or audios that can be transformed into various formats such as flash movies explaining mathematical concepts and solutions to problems. WBMs could be a one-minute long record without any sound and could be complex like a fully interactive educational video, which allows learners to understand the answers of questions or the solutions to their own similar problems. It is the latest form of asynchronous learning that opportunities for simple and inexpensive interactive education.

In 1997, WBMs were pioneered by Tim Fahlberg (Fahlberg, 2004; Fahlberg and Nonis, 2005). After this method was proved and favored, it started to be used in education from elementary schools to higher education institutions. The current state of Whiteboard Movies initiated as a big project has resulted from long-term studies.

6.1 WBM applications

WBMs actually have a simple logic of use. Within the frame of this logic,

- Seeing and listening to the subject being taught,
- Listening to and rehearsing the subject anytime you want,
- Seeing and listening to each step,
- Carrying out activities for understanding the method used.

6.2 Short story of WBMs

WBMs were originally considered as a supportive and effective way of out-of-class instruction method different from the educational support of private teachers, the family or other sources. Initially, Tim Fahlberg applied this method by creating a mathematical multimedia website that provided visual and aural instructions. Later, between 2000 and 2003, using TechSmith's Camtasia Studio, Tim Fahlberg created a number of high-quality WBMs with Corel Grafio with the help of a graphics tablet or a tablet PC and distributed them via the Web or CDs.

The WBM is a technique for learning in numerical instruction. Generally, there are two questions directed regarding WBMs:

1.   How easy is it to create WBMs?

2. What is the cost of WBMs?

It is quite important that instructors should be knowledgeable about how to integrate WBMs into the educational process in order to obtain the desired learning gains in visual and aural dimensions. In physics education, because mathematics and geometry have a very important place in both experimental and theoretical basis, WBMs used in mathematics education can also be used in physics education. Figure 1 presents how WBMs are integrated into the education process.
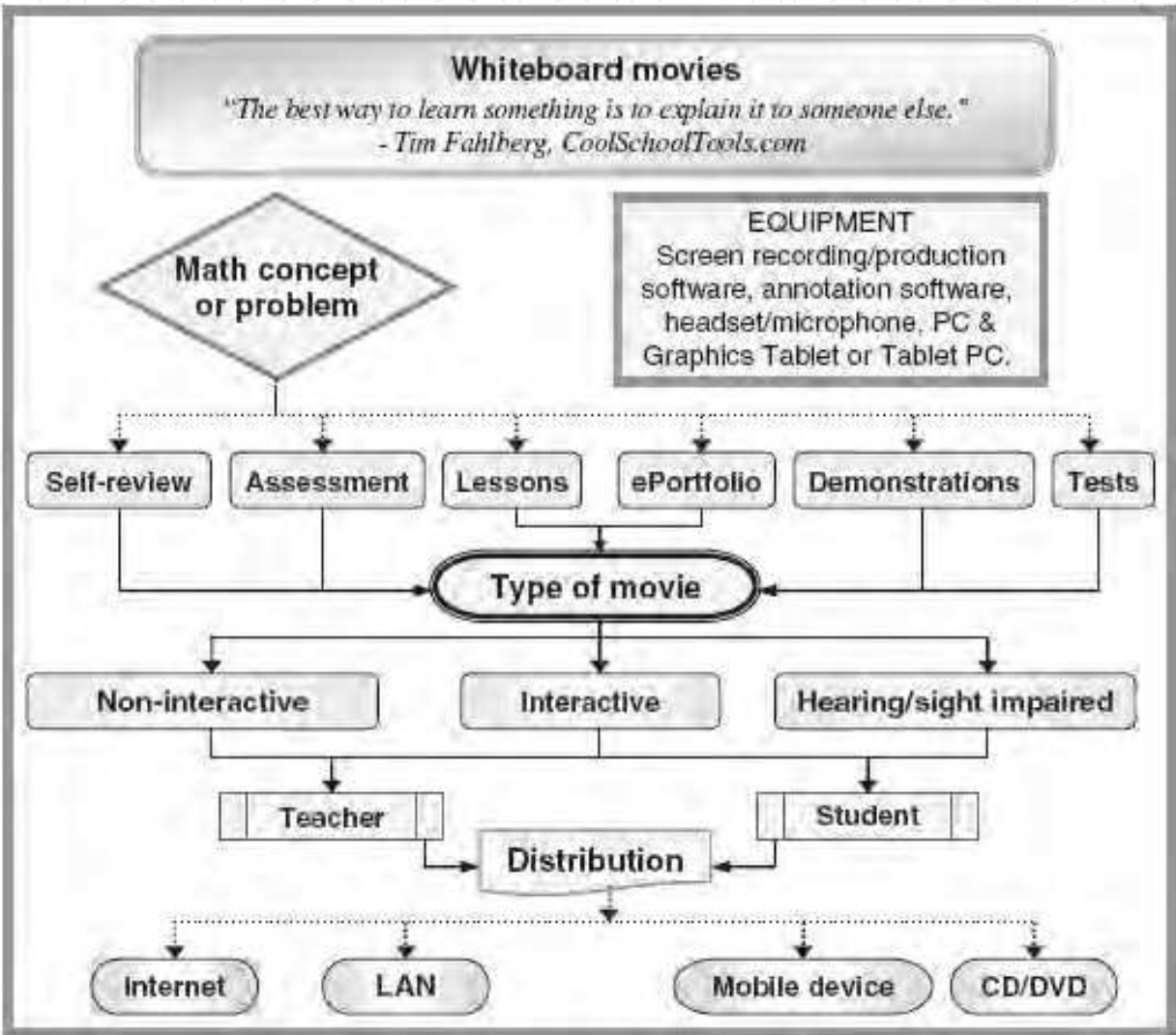

Fig. 1. Use of Whiteboard Movies in Mathematics Education (MacNeil,2006)

6.3 Current WBM techniques

Today, rapid developments in computer technology have led to the use of several facilities in education such as various effective and preferable software (e.g. TechSmith Camtasia Studio), cheap cable and wireless tablets and annotation software (SmartTech's SmartNotebook or Blade's NotateIt or Microsoft OneNote). In the integration process of WBMs in education, there are numerous alternatives provided by technology in creating equations and texts by using graphical calculators and animations. Today, among these

alternatives, people can choose and use the most appropriate one. Of all these, a simple personal computer (Desktop, laptop or tablet PC), headphones with a microphone, screen capture and annotation software and a digital pen can be used as effective educational alternatives with fairly little cost.

Although WBMs are considered by people who have a traditional education understanding as quite unprofessional, the images in CDs or on the Internet is just like the blackboard in the classroom.

6.4 Equipment necessary to create WBMs

In creating WBMs, basic standard tools include headphones with a microphone, pen graphics tablet, screen capture and annotation software

- **Pen Graphics Tablet**: Depending on personal preferences, a small 6x4 inc. tablet or a big 8x6 inc. tablet can be used. Cable tablets are cheaper and more reliable.
- **Screen Capture Software**: These programs allow recording the whole screen, a certain part of the screen, the selected part of the screen, the selected object or all the actions we carry out on the screen. Generally, the standard area of 640x480 pixel or 480x320 pixel is used for solving little problems. Screen-capturing programs allow combining a number of small records and creating files in the format of avi and swf.
- **Annotation programs**: These programs help use pen, shapes and lines to make WBMs more interesting and comprehensible.

6.5 Phases of creating WBMs (Fahlberg & Stojanovska, 2005)

To make them more comprehensible, it would be better to mention the WBM step by step. The most difficult thing to do here is typing on the graphics tablet. Typing on the Tablet practically takes 15 to 20 minutes. If disorders occur regarding the software during the records, these disorders should not be considered as a problem. The reason is that screen-capturing programs allow doing additions and corrections quickly and easily on the record and cutting the bad writings and mistakes easily in the last phase. The mistakes that occur during audio-recording can be corrected during re-recording. During production, the audio level can be increased or decreased, and the frame rates can be changed.

The basic steps are as follows:

Step 1.   Open the annotation software.
Step 2.   Turn on your tablet PC with your pen.
Step 3.   Prepare your necessary material (figures, texts and so on regarding the problem that you will solve). For solving the problems that will take longer time, we can prepare more than one page by using the properties of the annotation software.
Step 4.   Run the screen-capturing program and make sure the record window is easily visible. Do not type outside the screen by mistake.
Step 5.   Check your microphone and make sure the screen-capturing program records the audio.
Step 6.   Run the screen-capturing program.
Step 7.   Solve the problem. If you make a mistake in your speech during the problem solving process, stop talking, take a deep breath and start your statement again. If

you are typing, turn back to the annotation program and start typing and speaking again. While following these, you do not need to close the screen-capturing program because this program allows you to exclude the unwanted parts from the WBM.

Step 8. Import the WBMs to the screen-capturing program. Here, you can make additions, extractions and arrangements in your video.

Step 9. Thanks to screen-capturing programs, you can transform WBMs into the format of swf.

In applications, in order to obtain information about which students watched the WBMs for how long and how many times, it is better to transform them into the SCORM standards.

6.6 Who can create and benefit from WBMs

- Teachers can create WBMs to support their students' learning outside the classroom.
- Teachers can create WBMs for each other in terms of the teaching techniques.
- Students can create WBMs to express their own thoughts and to show their teachers how well they have understood the materials.

A study carried out in LosAngles (Unified School District) in 2004 demonstrated that there was a clear increase in students' performances in algebra and geometry (http://www.unitedstreaming.com/homePages/evaluation2004.cfm).

WBMs are expected to increase students' learning more. Although studies conducted on the benefits and use of WBMs generally were related to mathematics education, applied studies can be carried out on physics education as well depending on the belief that WBMs can also be used in other fields.

Since use of WBMs clearly increases students' learning and facilitates teachers' cooperation with their students, they also increase teachers' professional satisfaction. WBMs are now considered to be an educational technique which is creative in visual and affective respects and which teachers can use for their students at any educational level during their education lives without spending much money. WBM technology is also important for numerical instruction. The thing that authorities give importance to is the fact that the result obtained is worth the time and money spent. In addition, it is important note that the traditional instruction method should not be totally avoided. Therefore, it is better to remember the traditional instruction method briefly. Traditional teaching is concerned with the teacher being the controller of the learning environment. Power and responsibility are held by the teacher and they play the role of instructor (in the form of lectures) and decision maker (in regards to curriculum content and specific outcomes). They regard students as having 'knowledge holes' that need to be filled with information. In short, the traditional teacher views that it is the teacher that causes learning to occur (Novak, 1998).

7. Learning materials commonly used in education

In order to facilitate students' learning, different teaching techniques can be used. Students can be provided with alternatives which will help them entertain while learning. If they want, they can learn the subjects via audible slides, video-recorded lessons or WBMs.

Fig. 2. Teaching via slides

Moreover, students can learn the subjects via audible slides. They can not only see the slides but also reach the slide they want by clicking the subject-headings found on the left side of the screen.
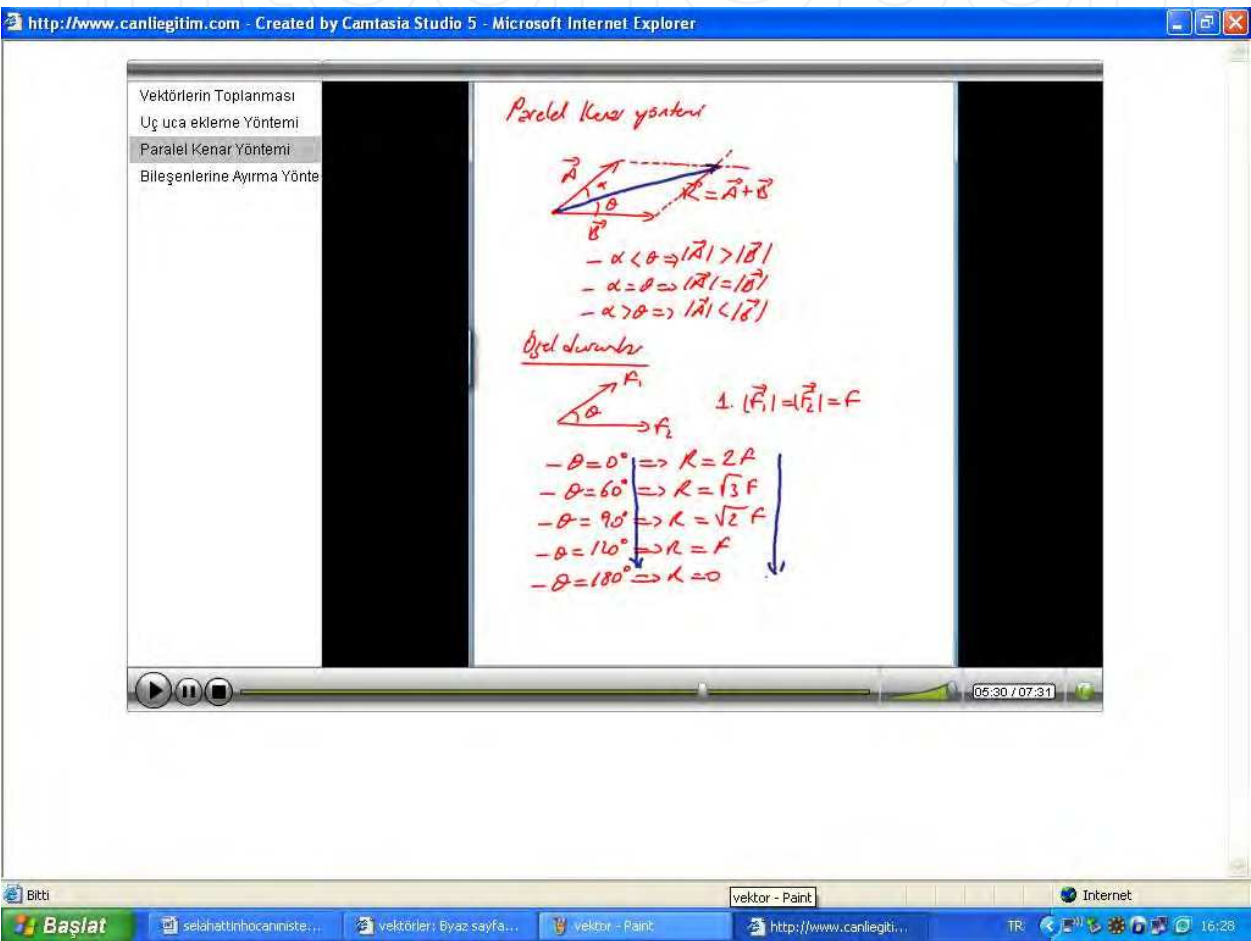
Fig. 3. Teaching via WBMs

One of the most important features of the WBM material is that it allows students to learn the subject in an audible and visual way.
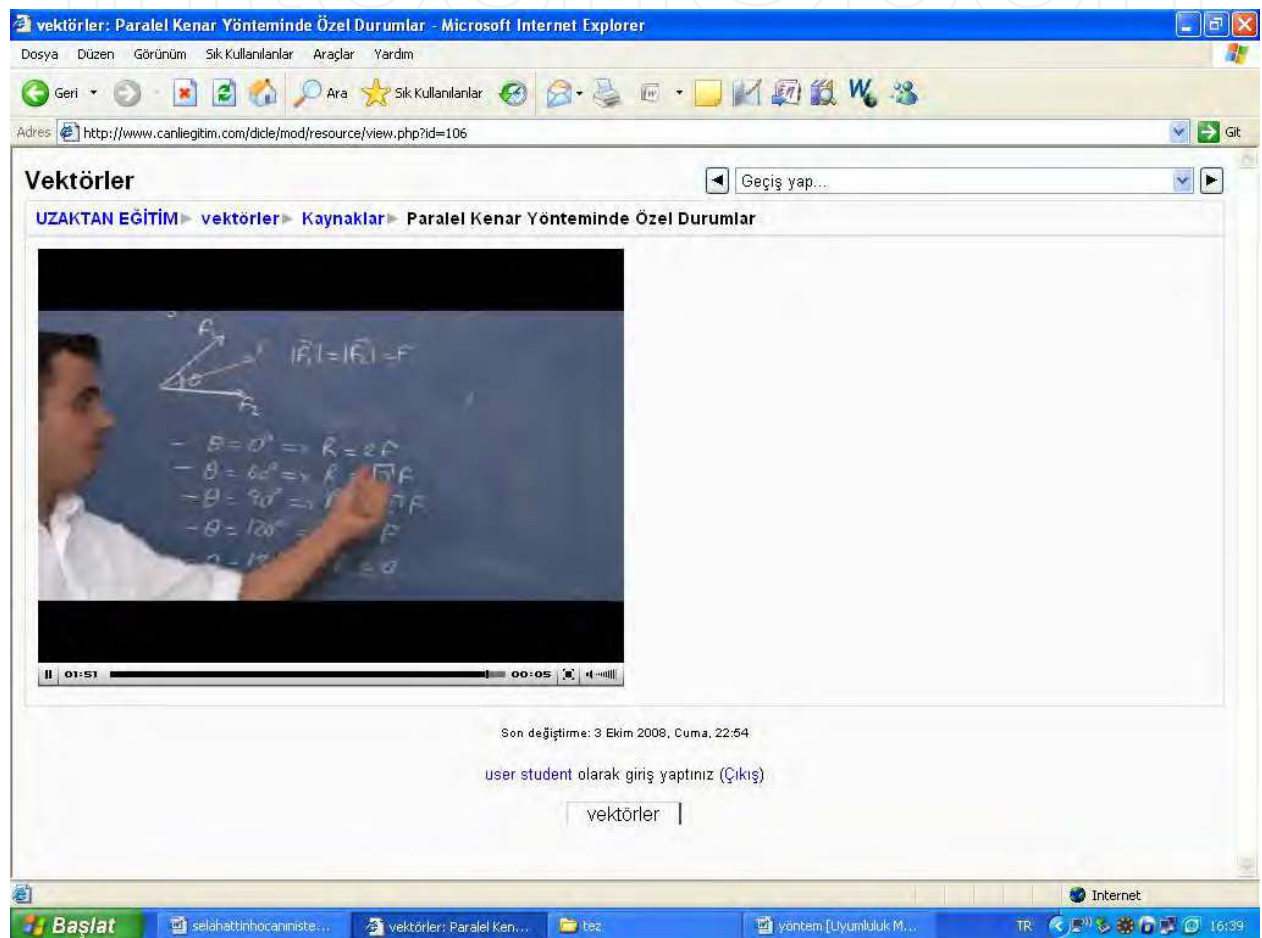
Fig. 4. Teaching via video-records

The purpose of video-records which includes teaching of the subject is to provide students with visual instruction. The video-records should focus on basic concepts and gains. In order to avoid uploading long-file videos in the web environment and to enable these videos to open fast, the picture quality should be low and the picture size should be small. In addition, video-records allow watching the videos again and again and analyzing the processes in detail (Yıldırım & Şimşek, 2005).
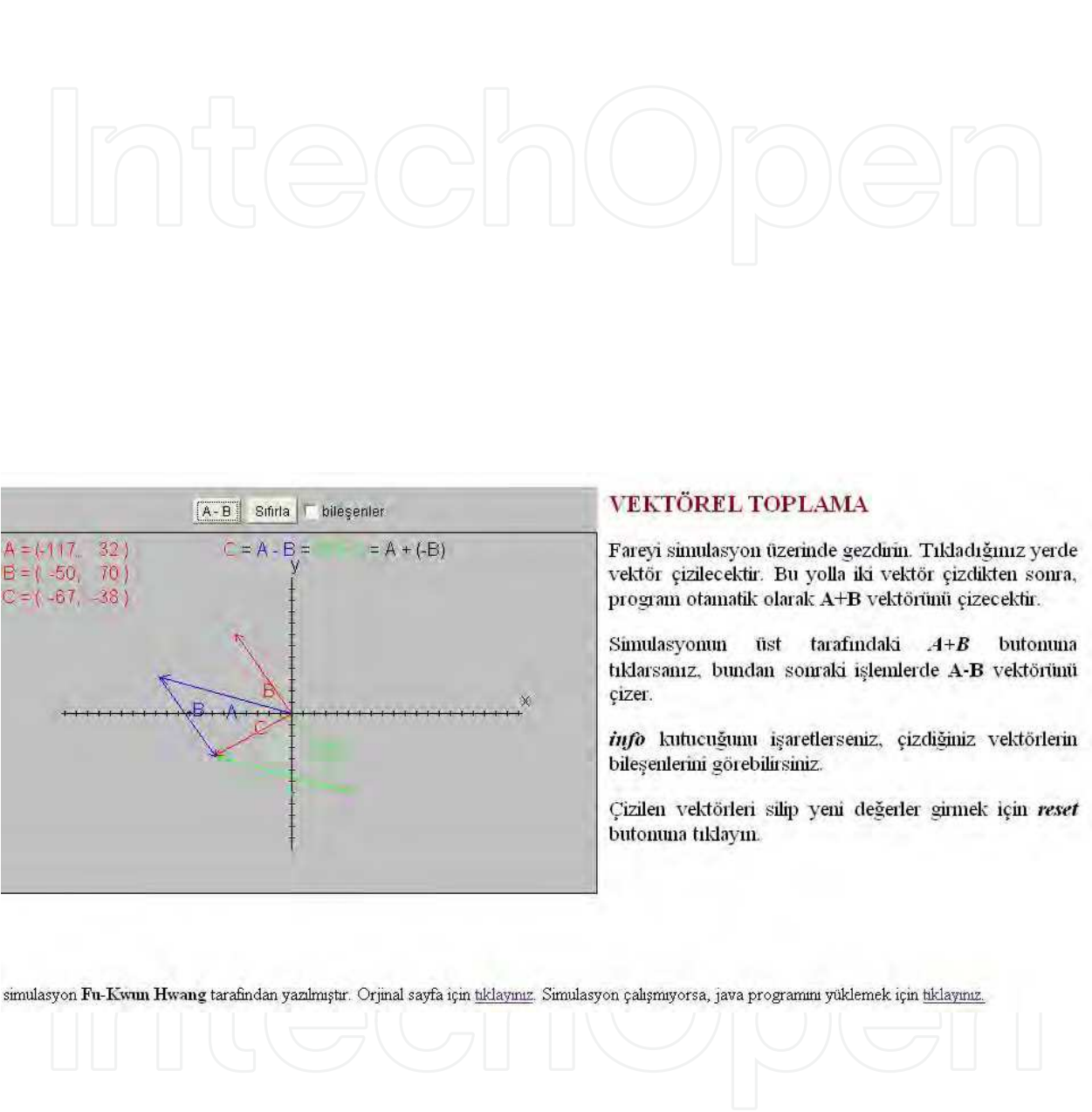
Fig. 5. Sample Java Applet Simulation -1
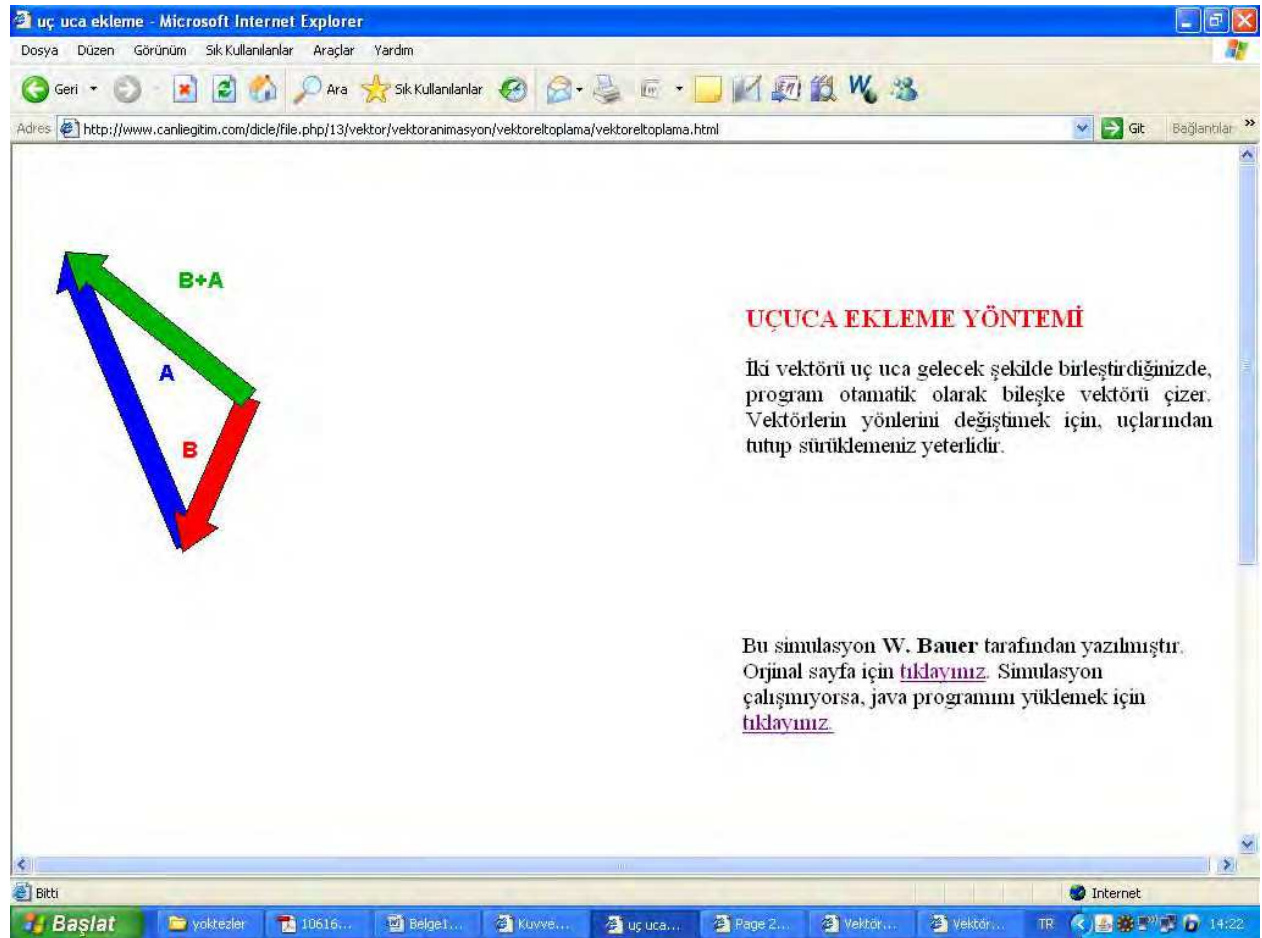
Fig. 6. Sample Java Applet Simulation -2
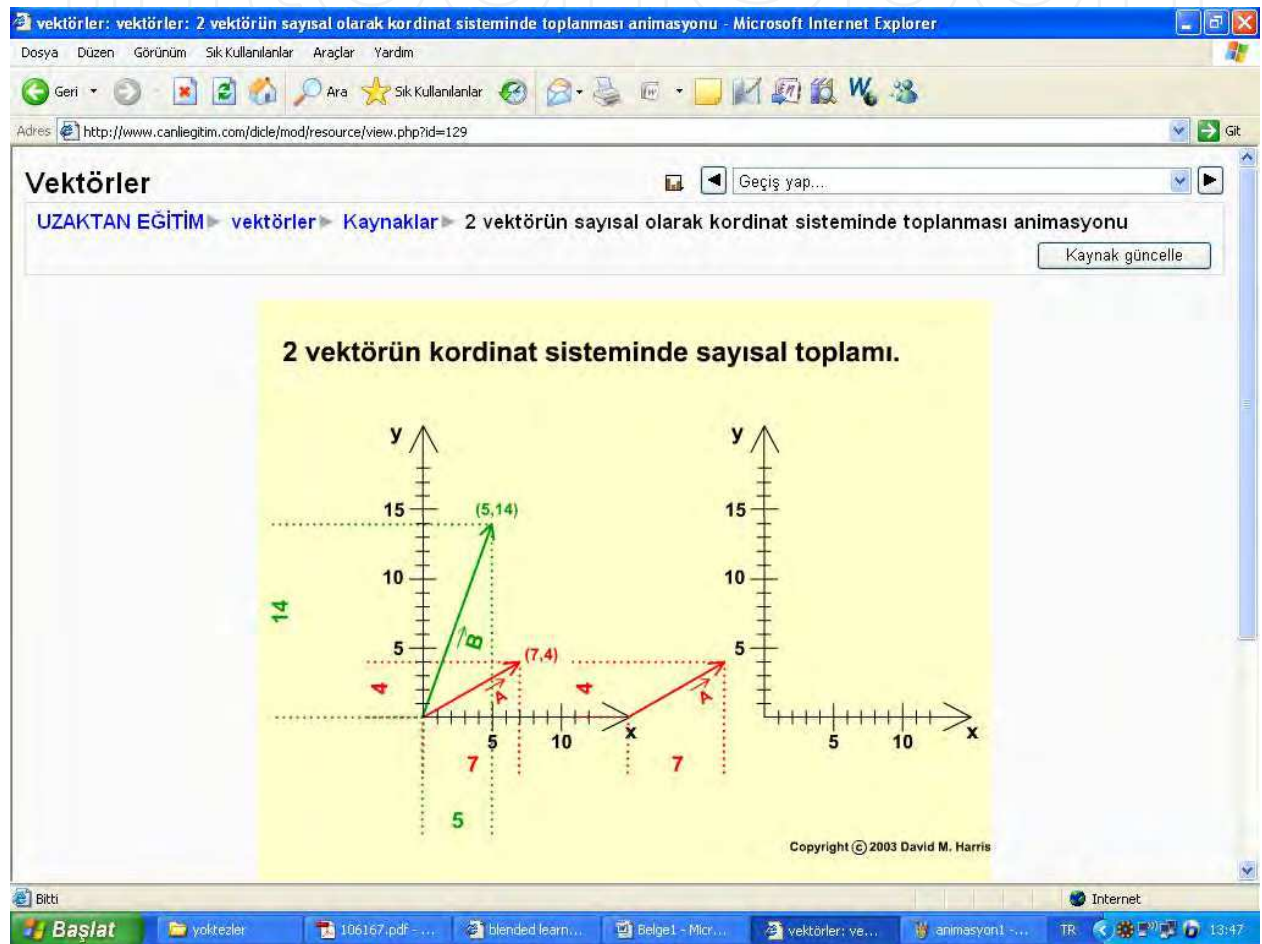
Fig. 7. Flash Animation Screen

In order to explain the subject better in course contents, various simulations and animations can be used. It is known that simulations and animations used allow concretizing the abstract information, increasing students' motivation, enforcing learning and storing the information permanently in the mind by addressing more than one sense organ. In addition, simulations and animations can present a large amount of information to users at a time and allow watching the videos again and again (Çalışkan, 2002). Figure 5, Figure 6 and Figure 7 present a sample screen of a page of simulations and animations included in Moodle as a lesson activity.
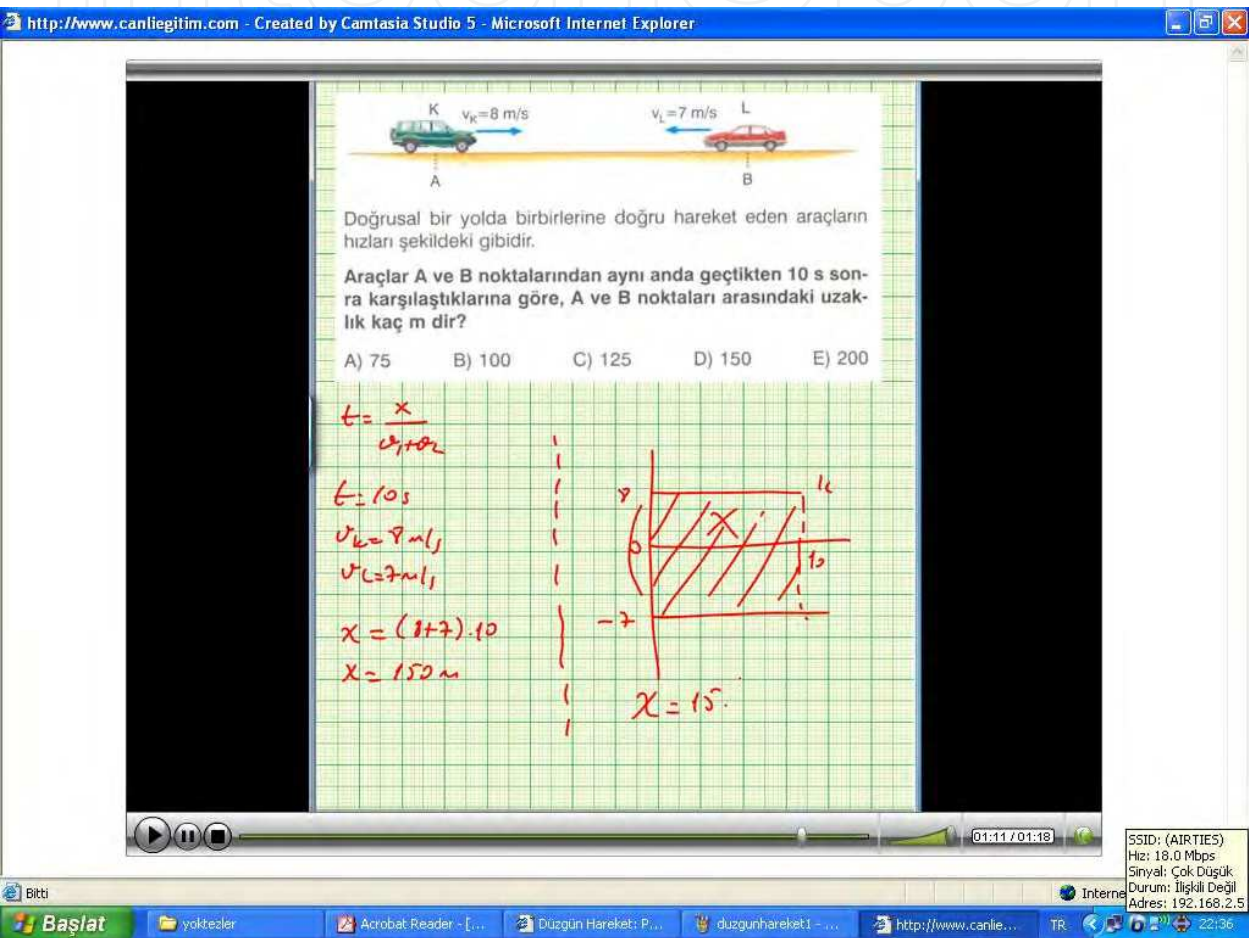
Fig. 8. WBM Screen

At the end of each subject, WBMs can be prepared to improve students' problem-solving abilities and to allow enforcing their learning and understanding the subject better. Thanks to WBMs that help enforce understanding the subject, students can not only follow the process in an audible and visual way but also watch the solutions to the problems. In order to obtain data regarding how many times and how long students have watched the solutions to the problems, all WBMs can be arranged in the SCORM format.

8. Conclusion

This part presents learning objects and related applications in physics education in e-learning environments.

The need for information and the rapidly-developing technology brought renovations not only to the society and the work life but also to educational applications. Among these technologies is the e-learning environment used in different fields. E-learning environments are now in our daily lives and have become a subject for scientific research and studies.

Since the use of learning objects in e-learning environments is new in practice, the benefits of these objects for the learning environments and the facilities they provided for distance education should be introduced both to the students and to the teachers. In the applications that we carried out with high school students, it was seen that learning objects were quite beneficial for the students and teachers and even for the parents in many respects when the learning objects were prepared effective. These applications also revealed that the students established communication not only with each other but also with their teachers. Moreover, it was possible for the parents to know about the academic development of their children. In short, learning objects allow information sharing, numerous revisions and feedback. Thanks to these features of learning objects, they allow permanent learning, student-centered learning and learning by doing. In addition, thanks to reusability of learning objects, an object once produced can be used a number of times, which helps avoid high cost and waste of time.

Learning objects can be used in various in-class or out-of-class activities such as activating students' background knowledge, supporting conceptual change, allowing multiple demonstrations, transferring learning and developing the skills.

For the spread of such applications, it is necessary to develop a number of different types of object stores. In addition, teachers should be trained on how to create, choose and apply learning objects.

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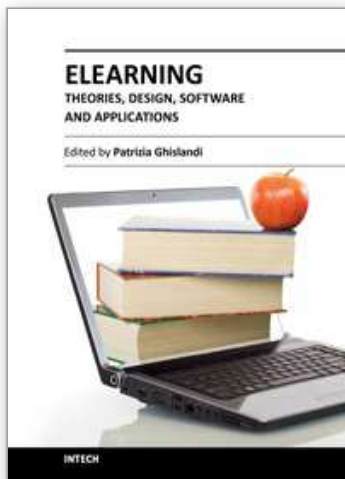
eLearning - Theories, Design, Software and Applications

Edited by Dr. Patrizia Ghislandi

The term was coined when electronics, with the personal computer, was very popular and internet was still at its dawn. It is a very successful term, by now firmly in schools, universities, and SMEs education and training. Just to give an example 3.5 millions of students were engaged in some online courses in higher education institutions in 2006 in the USA1.eLearning today refers to the use of the network technologies to design, deliver, select, manage and broaden learning and the possibilities made available by internet to offer to the users synchronous and asynchronous learning, so that they can access the courses content anytime and wherever there is an internet connection.

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