Learning Objects and the FATIH Project: Proposal of a Model

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Globalization together with new information and communication technologies (ICTs) and accelerated changes in society affect the economic and social life to a great extent. In order to achieve the goals mentioned in the strategy document, the necessary arrangements were made and FATIH (Increasing the opportunities and Technology Improvement Movement) project, a new project is being carried out. A scanning model was used in this research. The method of learning objects, the document review project, the Turkish education system, management information systems, have made the case for investigations. This information, in the light of the standards, learning about learning object Management FATIH project information system (LMS-Learning Management System) and learning content management system (LCMS-Learning Content Management System) for definitions and recommendations. Learning objects according to what criteria will be adopted, to evaluate and to determine how the deployment will be the shape of the study and a proposal for the creation of electronic content to the project system.

Keywords: Learning objects, Learning Objects Repository, Learning Management System, Learning Content Management System, FATIH Project, Interactive learning environments.

INTRODUCTION

The innovations and changes which are occurred in information and communication technologies continue to turn the whole world into a global town. The innovations and changes affect social and economic lives of society extensively. The technologic improvements which mark twenty first century lay the groundwork for a new social conversion in other words the improvements change both individuals and society and turn them into "information society".

Turkey's vision of conversion to information society is stated in the document of information society strategy of State Planning Organization (SPO) as "To be a country which becomes the focus of information and technology production, use information and technology effectively, produce more value by processes of decision oriented information, has the ability to race with the world and has a rising prosperity." At the top of strategic initiatives of Turkey, the process of conversion to information society that state change altogether both economically and socially presents big advantages for country by its rising economy, young and dynamic population structure, its experienced entrepreneurs who use the advantages of globalized world economy better day by day. (Bilici et al., 2011). As a changing instrument technology, important technologic innovations can cause change the whole paradigm. Computer which is known as web is such an innovation. It generates wide-ranging paradigm changing in peoples' communication, carrying on business and way of learning. As a result, radical changes occur for whom want to design, improve and learn education materials. (Hodgins, 2000; Urdan & Weggen, 2000; Gibbons, Nelson & Richards, 2000).

The most initial difficulties that are observed in the processes of teaching and learning integration to ICT (Information and Communication Technologies) are; a) being a complex and multi-faceted process which is composed so many dynamics such as ICT vehicles, teachers, students, school administration and education programs b) displaying different ICT integration models according to learning theory that adopted by researchers c) occurring perpetual changing in integration process because of interaction between technology-education.(Kaya, et al., 2011). For the reasons it complicates to make just one definition related to integration ICT. The integration of

ICT in education contains complex components as pieces of puzzle. To complete the picture each piece has to be in harmony with the others. The data derived from different countries show a successful ICT integration needs interconnected components such as buying equipment, in-service training for personnel, integration of curriculum, financial sources for maintenance, technical and pedagogic support, suitable quantity and quality for digital learning material. Deficiency of one of the components can cause inadequacy of integration process (Özdemir, 2009). The subject is handled as the common point in the reports prepared by countries which applied ICT integration.

Ministry of Turkish National Education (MONE) is a big foundation which executes the mission of education and training with more than 16 million students, more than 61 thousand schools, more than 600 thousand teachers and approximately 620 thousand classrooms. MONE carries on duties of planning, programming, executing, following and controlling of education-training services. To carry on the mission MONE has made wide investments to ICT so far and lastly it executes a big integration project of ICT. The project which is applied now is the biggest and widest one among the others applied so far. It is named as "FATIH (the move of increasing chances and improving technology) project".

FATIH (Increasing the Opportunities and Technology Improvement Movement) Project

The project contains the targets which take place in IT (information technologies) Policy Report, MONE Strategic Plan, Improvement Plans, Information Society Strategy Report which describe the Turkey's actions in the process of being information society and e-conversion produced in Turkey scope. FATIH Project is executed by MONE and Ministry of Communications and it is planned to finish within five years as 3(2010-13) +2(2014-15). It is aimed to accomplish the components such as schools' IT equipment substructure; 1st year is for secondary schools, 2nd year is for the second degree of primary school, 3th year is for first degree of primary school and nursery schools, e-content, curriculum, in-service training and usage of secure internet. It is stated that the effect researches will be done in the last two years of the project. First of all, determining the education attainments which need to effective usage of IT in curriculum and in the light of these attainments executing of the uploading processes of effective usage of IT are announced.

Within the FATIH Project, the basic target is determined as effective usage of IT vehicles addressing more sense organs in classrooms in the process of education-training to provide equality of opportunity in education and training and to improve technology. It is announced that the targets related to internet substructure, projection machine and laptop for 620 thousand classrooms in preschool education, primary and secondary schools. (http://fatihprojesi.meb.gov.tr). In the project process of application preschool education institutions and primary schools are not partaken. As it is shown by figure 1 FATIH Project is composed by five components which are connected with each other radially (Seferoğlu, 2010). The targets of the project components and the accession levels of the last target are handled.

According to Wiley (2002) a Learning Object is described as any digital information source that support learning and can be used many times in different courses, numeral sources that support reuse and can be used for education.

Figure 1: The components of FATIH project

Learning Technology Standards Committee which have researches on learning technologies (LTSC) describes LO as "any presence that can be used trough the education based on technology, re-useable or can be given references numeric or non-numeric (LOM, 2004).On the other hands Macromedia and Medyasoft software firm describes LO as each pieces of the numeric modular content that is used in education and training applications. Merrill (2001) described as "Knowledge Objects". Along with the descriptions, other educational concept theories that have been researched (Elaboration Theory, Work Model Synthesis, Domain Theory and Four-Component Instructional Design Model) draw attention to harmony of usage LO with computer based education.

Learning objects cause big changes in conception, improvement and delivering to learners of learning materials. One of the most important rings of the changes is learning objects which are reusable, adoptable, measurable and capable of being guide for the next generation (Cebeci, 2003). According to Learning Object Metadata (LOM) standards learning objects are defined as any numeric or non-numeric presence that can be used for education or training. This definition presents a wide interspace about the content dimension of learning objects (Duval & Hodgins, 2003). Learning objects content models are improved to solve the problem. Learning object or learning object content models define different kinds of learning objects and components. Learning object content models provide to define different kinds of learning objects and components decisively and determine the aims of learning objects re-usage. Six different learning objects content models in Literature can be classified as below. Among the models SCORM and CISCO RLO/RIO models are the most stressed ones.

- Learnativity Content Model,
- Microsoft Model (Elliot),
- ADL Academic co-lab Model,
- NETg LO Model ,
- SCORM' s Content Gathering Model
- Cisco's Reusable Learning Objects Model (RLO/RIO)
- General Learning Object Content Model

By taking into consideration of all subjects mentioned above the workings are started with Research and Development (RD) to make additions to standards of FATIH project or create or develop new standards in the light of new developments in software and equipment sectors. Features of Learning Object: Accessibility, reusability, interoperability are the main points of designing LO. McLaghlin and MacLaren (2001) collect rules under three topics as Educational, Design and Technic in their work of Learning Objects Improvement Guide. In the light of the main points the e-content production mechanism of project should be rearranged and revised. Structure of Learning Object: To use LO for different aims or different areas the objects should be known or wrapped up information that define them. The processing is made by means of "metadata" which means "descriptive information", "upper information" and "upper data".

As it can be seen in figure 2 LO have a structure that is usable for designing and improving the learning objects. Metadata explains the details of object and gives it a new meaning. By doing this, object can be used in two or more area and in the light of metadata added to object the meaning of object can change.

Metadata can be associated with an information collection like catalogues in libraries that help us reach books or documents easily. When LO have metadata, they can be searched and found easily and it provides to reach to learning content on time. LO are decomposed and independent structures so, they provide chance to support for individual learning by composing suitable lessons according to each individual's learning type by means of metadata(Cebeci, 2004).The situation shows that LO have the feature of reusability by help of metadata.

Kinds of Learning Objects: Although they have not got an old past LO are understood differently by different researchers. Millar (2002) claims that LO can be understood in various meanings by trainers. When the workings are analyzed it is seen that learning objects can be classified in different categories. Karaman (2005) classifies LO according to presentation type as subject explanation presentation, question topic, inactive picture, simulation, exercise, experiment, packet trainer, explanation with voice and picture, list, exam, quiz and situation of problem and according to aims of objects usage in different projects as information object, exercise/evaluation object, learning object, and application object. Churchill (2007) made the table to remove the confusion of classification of LO.

LO prepared in the working have the quality of adding to Churchill's (2007) different classification. One of the first workings made in our country conducted by Çağıltay (2002). The researcher gave information about approach of Reusable Learning Objects and stressed on the issue of its importance on online education. Moreover, a sample working developed for the individuals who are learning Turkish is analyzed to show approaches of usage of RLO to prepare online education material (Tekdal, 2004).
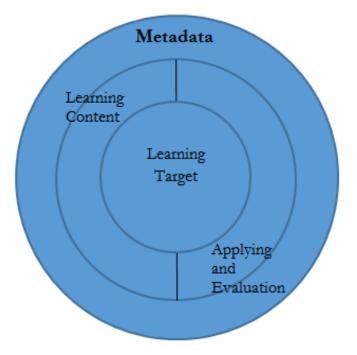
Figure 2: Structure of A Learning Object

Packaging Standards of Learning Objects: Contents are composed by combining learning objects with the each piece which are meaningful lesson content on their own in preparation of lesson. The structure in which lesson content and interface presented content separate each other help trainer to design the content. In other words, the meaning of packaging learning objects is composing digital learning collections (Karaman, 2005).

IMS Content Packaging : IMS Content Packaging is a special definition composed to send sources or learning objects from one program to the other, facilitating distribution, reuse and share of materials.

SCORM: SCORM as content packaging system is developed based on IMS (Ceylan et al., 2008).

Metadata Standards of Learning Objects: SCORM has got so many features that do not exist in IMS because it defines the connection between content sources prepared for education and administration of education systems at the same time. Moreover, the other packaging mechanism can be added to system by means of improvable additions. Different organizations suggest different education design models for education areas which designed by using LO. Wiley's "Lodas" model, Cisco firm's "Rlo-Rio" and Barritt and Alderman's (2004) "Addie" models can be counted among the most important models. He suggests composing content as a whole with details by lining LO after determining preparations needed to be done and decision and (Wiley, 2000).

LOM (Learning Object Metadata): LOM which is composed by a working group of LTSC within and known as the most common metadata defining standard. IEEE composed the base of LOM standard with common suggestion made to IEEE by IMS and ARIADNE formation in 1998 (Hodgins, 2000).By means of the standards using, searching, finding and evaluating of LO is easy for students and teachers. LOM is a semantic model that determine the own features of LO more that give information about LO adding to education. A LOM adopted system can present metadata in any interface that is requested according to choose of preparer and it can store the metadata (LTSC, 2001; Anido et al., 2002).

So many important organizations work on composing metadata standards. Each organization has differences in

Table 1. Churchill (2007) Kinds of Learning Object

LO type	Explanation
Presentation Object	Lesson explanation sources designed to present a specific subject
Exercise Object	Presentations about doing exercise as feedback, doing practicing and playing games for educational purposes, learning of specific procedures.
Simulation Object	Presentation of some real life systems or processing
Conceptual Model	Presentation of a basic or related concepts of a subject
Information Object	Showing organized information with details
Contextual Presentation	Information deduction from scripts displayed

formal and semantic structures because they focus on different features of LO and they compose standards by paying attention on features of users. Administers and developers of Turkish education system should determine the metadata standards in the big project. As Wiley said design of new education, design of administration information system, content design and administration should be put the work in Turkish education system.

Learning Object Repository (LOR): LOR is a system composed for storing, finding and using together of learning objects, defining information about the objects, usage rights and evaluation. According to ACOL (2001) learning object repository is an education training materials collection provided to online access to lessons presented in different instutions (Cebeci, 2003b).Three layers are mentioned in LO as presentation, application and database. Presentation layer is composed by user interfaces and the elements which provide connection with software spies. Application layer connect presentation layer to database layer. Database layer is a place where objects and metaobjects are stored. Header contains definitions about object along with the information of using it in education environment. One of the most important missions of LO is searching. Searching service is executed by the header.

On the other hand establishing of free digital learning objects library will be an important progress. MIT presented all education sources without payment to the world by web with the project named as Open Course Ware (OCW). It is encouraging activity. By supporting of the other institutions the establishment of Learning Objects Libraries will gain momentum. STRCT has executed a project which provides to turn course books prepared by academics to electronic book for university students.

Although object repositories are designed as object product delivered by so many sources some organizations compose repositories formed by objects prepared by them (Learnalberta, Nvml, Freudhental Inst. et al.). Generally well designed databases compose base of such object repositories which can contain so many objects.
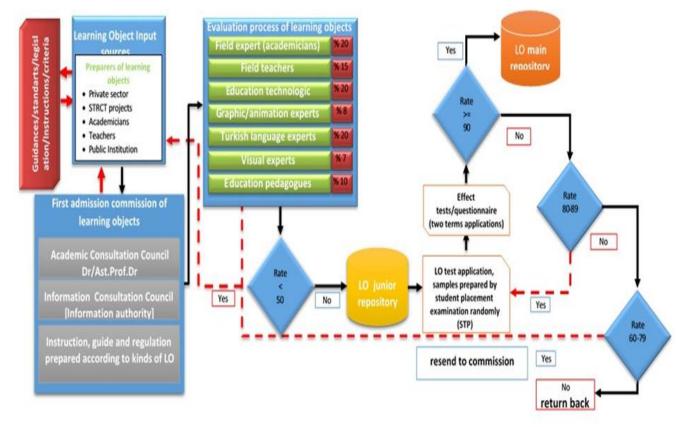

Figure 3: Structure and operation flow of NLOMIS

TTK: Turkish History Foundation **YEĞİTEK:** General directorate of Innovation and education technologies

An Offer for National Learning Object Management Information System(NLOMIS) within FATIH Project

MONE's units should update the definition of missions according to the projects or add new definitions for new information system. The arrangement is suitable for constructing a new information system and a new work flow as

stated in figure 3 by making fit to new information systems in FATIH project. The components which take place in the information system are:

Input Sources: It can be explained as learning objects prepared by teachers, academicians and public institution and every presence sources in every level such ad private sector, STRCT projects and the productions gained. The work/operation levels taking place in the process are shown in figure 3 "Input Sources of Learning Objects"

Pre-Acceptation of Learning Object: The application is ended by confirmation evaluating of learning object workings coming from input sources according to learning object pre-acceptation form in NLOMIS. The evaluation decision is given by the total point of commission members. There are two outputs as acceptance or refusal of learning object according to total points given by commission members. Pre-evaluation is composed by paying attention on criterion forms, existing instructions, standard and guide in the system. Criterion forms should be determined by two commissions formed by academicians and MONE experts. The commissions are named as "Academic Consultation council" and "Informatics Consultation council" (Figure 3).

Learning Object Evaluation Process: It can be defined as the most important process of NLOMIS (Figure 3). Online operation of the all elements of the process in the system should be handled as compulsory. LO which admitted to system should be seen automatically by related expert. Forms containing needed guides and criteria should be fulfilled within the specific time by experts and should be marked automatically by system. The marks should be taken as measurement point and the result decision should be given according to criterion points derived from weight percent by system. All components and structure of NLOMIS can be seen as shown figure 4. NLOMIS has 3 components as follows: (1) the components of LO repository, (2) Users, and (3) Evaluation.
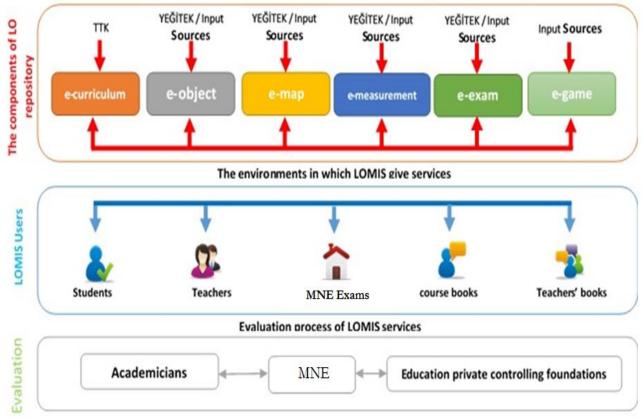

Figure 4: General structure of NLOMIS

Learning Objects Junior Repository: If the score is below 50 point the learning object are returned back to input sources of LO, if it is above 50 point the learning object are taken to repository named as Learning Objects Junior Repository. The LO taken to the repository is identified by information system and sent to schools automatically (Figure 3).

LO is applied through the two terms in the schools. The workings are executed by taking the opinions of operators and effect tests/ questionnaire on information system according to the result of application. If the measurement point is 90 or above learning object is taken to "LO Main Repository" if it is between 80-90 , the processes of test and application are repeated in another sample group, if it is between 60-79 it is resent to "Learning Objects Evaluation" commissions and if it is below 60 it is rejected. The working/operation flow of LO junior repository mentioned above are shown in figure 3.
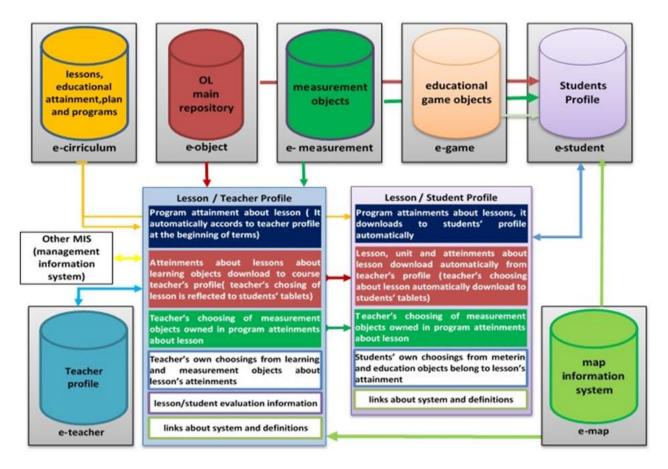

Figure 5: FATIH Project NLOMIS operation flow diagram

LO Main Repository: LO who takes 90 or above points are sent to "LO Main Repository" according to result of taking LO junior repository. Academic consulting commission is formed to evaluate the levels in the work and operations in the process and to control the process. LO taking place in the repository is evaluated by academic consulting commission. If there is a negative decision after the evaluation and the usage percent is below 50 the LO is resent to LO junior repository to re-evaluation and the re-evaluation process is started by commission. Five learning object repositories are planned in FATIH project (Figure 5). These are;

E-curriculum: It is a database which contains the all education levels and controlled by Head Council of Education and Morality (HCEM). HCEM should send the all curriculum to the database and it is responsible for composing the information in which LO should take place for each target and send it to information system.

E-object: the database which contains all learning objects including curriculum to use in learning content system is implied.

E-map: the database contains LO about learning objects to use in learning content system is implied.

E-measurement: the database which contains learning objects having the measurement information to targets of education system is implied. Measurement LO in the database is used in the process of lesson by teachers. E-exam is a database contains exams for general scanning and evaluation.

E-game: the database contains games as cognitive vehicle prepared according to play based learning model and theories is implied.

In the evaluation process of NLOMIS, all objects' usage rates in LO main repository, affect tests, opinions of students and teachers are taken continually. It is planned that the process of evaluation is executed by academicians, MONE FATIH evaluation unit and education private evaluation foundations. Accreditation of the private evaluation foundations, criteria and all needed legal arrangements are made by MONE (figure 4).
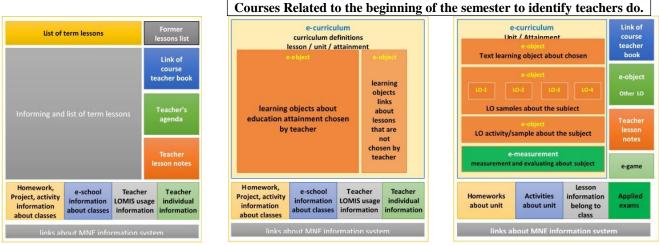

Figure 6: Teacher profile of NLOMIS

Along with details of curriculum of their own lessons, teachers are transferred to the profiles (Figure 6). In that level, teacher should compose the process about lessons through LO repository. When teacher composes the lesson plan, the definitions should be transferred to the students' profiles automatically (Figure 6). Students can see all contents about their lessons directly by their profiles. At the same time students have the chance of reaching all other LO in repository except from compulsory lesson profiles (Figure 7).
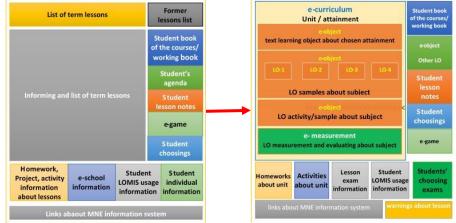

Figure 7: Student profile of NLOMIS

Learning objects should be arranged hierarchical in the level of curriculum and course as it is seen in figure 8. The hierarchy should be paid attention for adaptation of content information system to all curriculums belongs to educational system. As a result, construction of the system is important for the success of the projects which is expected to provide so many changes in Turkish education system. It can be said that basically composing a structure which has the working and operation steps shown in figure 4 is needed.

Within the project continuing and developing of ICT integration is the other important subject. Having a fund to support the project and provide ICT integration is beneficial. Supporting each inputs which will be applied to the projects, updating software and equipment which compose process of ICT integration and the most important one is supporting human resources in the project are provided by the "Education Fund".
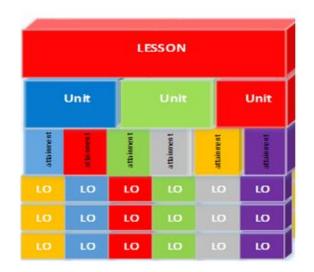
Figure 8: Lessons and unit hierarchy

RESULTS, DISCUSSION AND CONCLUSION

It is clearly seen that sources of information in internet are increasing rapidly and make life-long learning easy as parallel to improvements occurred in information technologies Every secured information on internet can be reached quickly and easily but most of information sources on internet are not suitable to standards. The processes of searching, choosing and reusing come into prominence while the information sources are increasing rapidly.

The process of combining ICT to education plays an important role on increasing student success, improving top level abilities of learning, forming process of information. For that reason, combining ICT with process of education has given importance and to get the target the workings of ICT's effective and productive usage have been done and it can be seen that the usage of ICT is handled variously in last years (Lim, 2007; Usluel, Mumcu and Demiraslan, 2007; Roblyer, 2006; Muir-Herzig, 2004).

Wang and Woo (2007) handled the combination process of ICT with education by different names such as micro, mediocre and macro. ICT integration is evaluated as lesson wide in micro level, subject wide in mediocre level and curriculum wide in macro level. New curriculum is aimed to be used effectively and in the light of ICT targets. However, there is not any frame that can show teachers the way of integration of ICT to lessons in micro level. So, a sample of teacher profile integrated with ICT and a sample of students suitable for that frame have been prepared. It is expected that the working provides to integrate ICT to education.

Learning Objects promise well about the problems given above. The workings have been continued to take place the technology for application. However, determining the standards, completing the workings and the projects about application are needed to embody to get the results. FATİF project applied in Turkey determined to standards about learning objects and has a suggestion about criteria effective on determining acceptation, evaluation and distribution of presents and learning objects LMS – Learning Management System and LCMS - Learning Content Management System.

Content management contents the processes of composing, broadcasting, sharing and storing of institutional information. The system which contains sources and vehicles used to make easy and standard as combined, based on structure of database are named as Content Management System (CMS). The applications of content management system provide to organize, control, store, file, share and present existing institutional information (Irlbeck and Mowat, 2007). CMS provides to management of shared files in the system and content management by controlling documents and contents in different numbers, sizes and dimension. Forming content, content management, content broadcasting and presentation of content are the basic factors affect and determine the CMS's success (Gülbahar, 2009).

The effects of FATIH project to educational process, planning needed works to make presented content suitable to curriculum in the supporting context and handling project program in that way is beneficial. Usage of technologies in FATIH Project is an indication of urgency that new educational programs have to be prepared as supporting to constructivist approach, application of technology and blended learning approach.

Technic and technologic deficiencies and changing which appears as a result of usages of innovations in the context of project of all partners should be determined to FATIH Project's upgrading. It is inevitable that an innovation which is added to educational process has effect on process of education along with outputs of the education. The effects of education technologies which are used in the context of FATIH Project on performance, learning perception, gratification, education plans, information technologies' careers, educational outputs which are defined as capabilities of 21.century and affects which are not planned before and just appeared because of usage of the technologies in and out school should be determined.

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