

ELEMENTARY SCHOOL TEACHERS' OPINIONS ON A LEARNING OBJECT REPOSITORY IN TURKEY

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The aim of this paper is to investigate elementary teachers' opinions on a learning object repository in an elementary school. For this purpose, a learning object repository is constructed including digital learning resources accessible to teachers, students, and other potential users. In the paper we introduce and describe properties of a new learning object repository developed specifically for teachers at the elementary school level in Turkey. Qualitative research model with an open-ended questionnaire was used assess how elementary teachers integrate a learning object repository into their educational environment. The study consists of a sample of 11 elementary school teachers in Turkey. Initial findings reveal that learning resources such ELOR can used effectively by teachers, especially when they become active participants of a learning environment by adding a learning object into the repository they have.

***Keywords:** learning objects, learning object repository, distance learning, elementary school, open educational resource*

1. Introduction

This paper is the extended version of the study that has been published in the proceeding of Society for Design and Process Science Conference in South Korea. Technology in the classroom of today has been increasingly promoted by educational policy specialists, administrators, teachers and students (Compton & Harwood, 2003). According to the International Society for Technology in Education (ISTE), technology can be used as a tool to change outdated educational systems and to improve student performance in order to enhance 21st century work, communications, learning, and the quality of life (ISTE, 2007). Fundamental to information content in educational systems are “digital learning objects”, generally defined as teaching and learning resources that can be integrated in technology-supported learning environment (McGreal, 2004). Wiley indicated that learning objects, compared to other learning technologies in terms of implementation and costs, are easily accessible, lower in cost, and easier to learn and use across the internet (Wiley, 2000). In order for these learning resources to be made more accessible for teachers, students, and other potential users, a centralized-system was established. In the literature, different terms have been used to describe this system, such as, digital libraries, online portals, collections, and learning objects repositories are some of them. In this paper, learning object repository (LOR) term is used to describe this system of digital resources.

Repositories built with metadata standards allow users to locate, evaluate, use, and share learning components and objects throughout these systems. To do this, a repository should include a “metadata”

guideline describing a learning object in terms of different aspects from, its technical to its pedagogical content (McGreal, 2004).

In the first part of the paper, design and development process of a learning object repository, named as ELOR, Elementary Based Learning Object Repository is described. The repository has been developed to enhance the teaching and learning process of elementary school teachers in Turkey and includes different types of learning objects suitable for the elementary level. The second part consists of results of a qualitative research study designed on a survey research model. In this type of the research a group of participants is selected to administer an open-ended questionnaire to them. The participants of this study were consisted of 11 teachers in elementary school level in Duzce in Turkey. The questionnaire including seven open-ended questions was used to collect qualitative data from the teachers in the spring semester of 2009.

2. What is a Learning Object Repository?

Recent developments and improvements of integration of technology into education have led to the more widespread use and greater popularity of learning objects in classrooms. This mutually beneficial use of computer technology and education has been noted by various authors (e.g., Baker, Gearhart, & Herman, 1994; Kozma, 2003). A technology (or internet)-based approach to learning and teaching has been focus of initiatives recognizing the need for the sharing of digital educational resources (Nash, 2005). A shared, centralized system (Sherwood, 2003) is established in order to create an effective environment that provides for searching, retrieval, and reuse. These systems have the potential to organize large number of learning objects varying in terms of, among others, file format, educational subject, grade level, and language. However, the main purpose of a repository is to enhance reusability by facilitating access to the learning objects by many individuals (Yancolvelli, 2004). Boskic (2003) notes that this system includes not only a database technology for storing the learning objects, but also architectures to encourage different users groups (e.g., teachers, learners, instructional designers) to discover, exchange, and reuse of those resources.

3. Educational Reasons to Use LORs

Some effects of repository usage on teachers and students have been previously investigated. For example, Okamoto et al. (2001) reported that different kinds of multimedia resources, such as intelligent and media-rich learning environments, and distance technology, should be the main focus for future education. Furthermore, teachers perceived those resources over the internet as information and collaboration tools in order to obtain educational content, and to effectively interact with each other. One of the many benefits of LORs is to make educational resources easily accessible to institutions and teachers. Another potential benefit of LORs is to provide teachers with information required for understanding and incorporating existing internet resources into their educational content and to meet current educational norms. The effect of resources of a digital library in supporting learning was investigated by Dong and Agogino (2001). Results of this study showed that the use of a constructivist model, as a current educational norm, when incorporating the digital resources into educational settings better meets the needs of teachers and learners.

4. ELOR: Turkish Learning Object Repository

Although there is a huge development of internet over the past 15 years, finding online resources, especially a certain level or area of interest, can be at times difficult because some search engines such as Google or some static list of websites are only sources for teachers, especially for novice teachers. As stated by Greer and Thomas (2004), the repositories have not been used effectively by school teachers because of the some interface usability issues and the lack of re-usable and effective learning objects. With this observation, ELOR has been specifically developed for elementary teachers in

Turkey to access and share learning objects over the internet, and also to provide a means for communication about these learning objects. In addition to this, users can select resources (learning objects) that would be best fit their learning and teaching experiences and needs. The working prototype can be accessed at www.ilknese.com. The prototype contains content with metadata, meaning that the repository does not store links for learning objects. Instead, it stores all the learning objects and information by which the learning objects may be retrieved. Teachers may search for desired learning objects by different fields such as “keywords”, “title”, “description”, “date”, and also more complicated elements like, “object type” and “level of difficulty”.

The prototype we have developed serves only elementary school teachers, and it concentrates on subjects such as mathematics and science. ELOR is also designed to share learning objects with other institutions using CanCore’s standards, a basic outline on how to create learning object metadata (LOM) (Friesen, 2005).

4.1. ELOR’s Object Selection

In order to create a more effective repository, learning objects are evaluated by administrator teachers before making the objects visible to users. An interface for administrator teachers is shown in Fig. 1. Teachers authorized for administrative functions can examine a learning object according to the criteria list as follows;

- the object is appropriate for the elementary level,
- the quality of the objects in terms of language and image is high (i.e., there are no language errors, and the interface of the objects is easy to use and is readable),
- the object fits the description in the metadata section in ELOR,
- the object does not require rarely used applications to work,
- the size of the object is within acceptable limits (i.e., less than or equal to 5 megabytes), and
- The object works independently in different platforms.

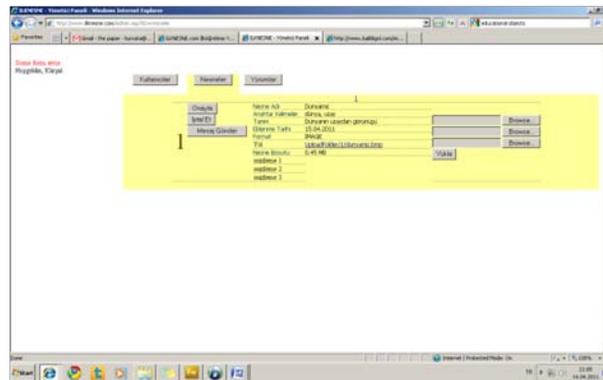


Fig. 1 ELOR Admin Interface.

4.2. ELOR’s Interface

ELOR, based on ASP technology, has a web-based only interface and displays only in the Turkish language. The repository has different capabilities for unregistered and registered users. The registration process is very simple and is available only for elementary teachers. Fig. 2 indicates the homepage of ELOR in Turkish for non-registered and registered users. Caws (2005) found in a study

that when students evaluate a learning object repository, they prefer a cleaner interface, with fewer elements. Thus, this repository is developed under the principles of cognitive load theory. According to this theory, there are different types of memory; sensory memory, working memory, and long-term memory (Sweller et al., 1988). The theory indicates that learning occurs in working memory, with limitations. To minimize the limitations, some learning techniques are used to decrease negative impact on repository use. The repository is designed in light of (1) the split attention effect in which irrelevant text and graphics are minimized, (2) the redundancy effect in which redundant sources is decreased as much as possible, and (3) the modality effect.



Fig. 2 ELOR Home Page.

4.3. Searching

Registered or unregistered users can use the basic or advanced search functions to search learning objects in the repository. The search function is available on all screens in ELOR, and in this way users can always change keywords to perform a search according to different fields in the metadata tags of LOs. These fields include the subject of the learning object, grade level, and score, as shown in Fig.3. While unregistered users can only watch and download learning objects, registered users, in addition, can also make comments on each learning object and distribute these comments via email. This is the most important property of ELOR because it allows teachers to share with other teachers information about the learning objects. Registered teachers can also view other screens, such as those that display personal information, learning objects they upload, and a statistical page with information regarding the learning objects they recently visited, downloaded, reviewed, and about which they made comments.

4.4. Adding a Learning Object to ELOR

Storing and labelling a learning object in the repository consist of two steps. In the first step, teachers tag the learning object with metadata. Registered teachers fill in necessary fields in the form as shown in Fig. 5 and then upload the learning object to the repository. During this step, users also have an opportunity to see a control page in which teachers can correct fields they have just filled out. The repository also guides the teacher on how to correctly complete this process (see Fig. 5). For some fields on this form, such as the difficulty level (see Fig. 4), teachers select values from a list of pre-defined inputs.

In the second step, teachers designated as content reviewers analyze the newly added record to detect and correct any language errors or other mistakes. These users follow the same form as shown in Fig. 5 to examine metadata tags of the learning objects. While registered users are given access to the

full set of metadata for a learning object, unregistered users can only view a short form of learning objects without the listing of full metadata tags.

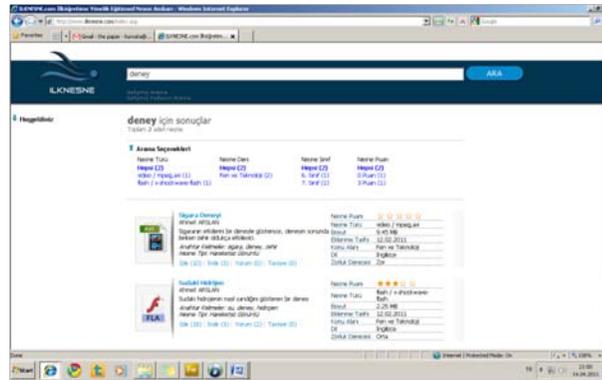


Fig. 3 ELOR Search Screen.

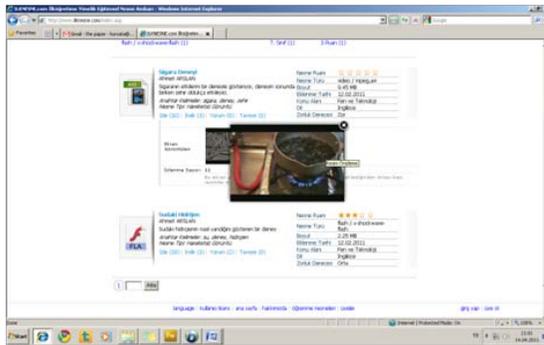


Fig. 4 Learning Object Preview Screen.

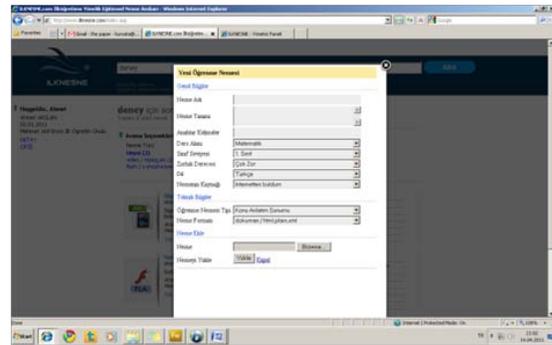


Fig. 5 New Learning Object Screen.

5. Methodology

The research methodology used to define teachers' opinions and comments on the ELOR based on the survey research as a qualitative method. This research method includes open-ended questions to collect qualitative data from the participants. The study consists of 11 participants all of whom are elementary school teachers in Duzce in Turkey. The participants involved in the study are from different fields, three from Turkish education, three from science, two from computer education and technology, one from religion, one from music, one from English.

The selection of participants for this study based on a criterion that is to enroll a workshop where ELOR was explained teachers in a detail way. In this workshop ELOR was used by teachers as a learning tool or resource to search, evaluate, and used a learning object related with their needs.

The data collection tool consisted of a questionnaire with seven open-ended questions. This type of the questioning method has different advantages for researchers. One of them is to acquire an open-

ended response from participants in their own words (knowledge and feeling), rather than forcing them to select from a defined fixed words. The other one is to use prompting questions to get participants to dig into the nature of the phenomena of the experience. The data gaining from the questionnaire also can be used to support theories and notions arising from the literature.

The data analysis was based on inductive coding technique. In this technique the raw data were firstly recorded on the computer and then it was transcribed into software such as Microsoft Word or any other word processing software. However, there are certain programs developed only for qualitative data analysis. ATLAS.ti is one of them and it was used to prepare data for managing, organizing, and analyzing for some certain statistical information such as the number of codes and references in order to get the themes (Shank, 2006). The software also has the ability to code data for different formats, such as text, video and audio of unlimited length. Finally, these themes were organized to better understand participants' answers and opinions about ELOR. To provide reliability of data, the list of main themes and codes that emerged during the analysis were analyzed by both a field expert and a qualitative research expert.

6. Results and Discussion

The opinions and perceptions of teachers about the ELOR (learning object repository) were gained from the result of the qualitative data analysis based on the interviews and observations. According to themes and codes connected with the opinions and understanding of teacher regarding the learning object repository, findings are combined under three main categories as below;

- Learning objects in ELOR used by teachers during the process
- Integrating ELOR into their classroom
- ELOR interface.

6.1. Learning Objects in ELOR Used by Teachers during the Process

The rationale for this first theme is to understand the kinds of the learning objects teachers select or prefer to use for their lesson. The learning objects in ELOR are evaluated by teachers with different properties and the properties are categorized under five codes, namely motivating, high quality, good variety, reusable, appropriate. The frequency of codes in this theme, "learning objects in ELOR used by teachers during the process" is presented in table 1.

Table 1 Learning objects in ELOR used by teachers during the process.

Properties of Learning Objects	Frequency (f)
Motivating and Helpful	9
High Quality	5
Good Variety	7
Reusable	15
Appropriate	3

As a property of learning objects, reusability is the one of most popular answers for teachers. Some teachers point out that learning objects are very helpful, especially at decreasing preparation time of lesson. For example a teacher stated that "...I can use them [learning objects in ELOR] in different content this is very important in terms of time saving because we had a heavy curriculum that we have to complete in time...". The second popular code stated by teachers is motivating and helpful. Five of the teachers indicated a positive attitude towards the learning objects taking place in ELOR. Example expression as "...when we have combined games with the lesson, it is very good for students...",

“...they [learning objects] affect students positively in terms of motivation and performance...”, and “...they [learning objects] provides teachers time flexibility...”.

6.2. Integrating ELOR into Their Classroom

(1) Integration of ELOR into the classroom environment is the second theme and the rationale behind this theme is to learn and uncover how teachers integrate the learning objects in ELOR into their classrooms environment after attending the workshop about learning objects and the repository. (1) Defining the content, (2) Searching of learning object, and (3) selection of learning object is the process of implementation described by teachers through interviews and observation reports. This process can be illustrated as shown below in Figure6.

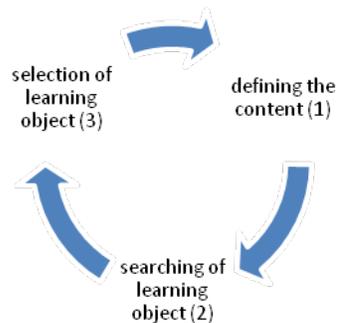


Fig. 6 Elementary School Teachers' Learning Object Integration Process.

Two of the teachers pointed out that the first step is to define the content because some of the content is not appropriate for use as a learning object. One teacher indicated that “...it depends on the essence of the subject, for some topics they [learning objects] are essential because students could not understand or embody, for some are not...”

Five of the teachers said that the process starts with using some of the keywords that are related with the main idea of the subject. Two teachers, however, preferred to start the process by using categorical list of the learning objects in ELOR. Sample statements are “...keywords are very critical to find a learning objects that you are looking for...they [keywords] must be related to main idea of subject...”

The third step is the selection of learning object by which teachers indicated used the learning objects in their classrooms. According to teachers, one of criteria is that “...it very important to begin lesson with an object taking students' attention...”. The other criterion, stated by teachers, is “...of course, the level of student is very important to select the best appropriate learning object...”.

6.3. ELOR Interface

The third theme regards ELOR interface how to teachers perceive usability of ELOR. According to almost all teachers who participated in the study, the most exciting part of the ELOR is the ability to add a new learning object to the repository. They stated that the ability to upload a new learning object to the ELOR is a very powerful motivational tool in order to increase learning resources and share the learning objects to other users in the repository. For example, one of the teacher said that “...I have a lot of learning objects, some of them are from internet and some them I created for my lesson so I want to share these resources to other teachers in my field. I can do that with this tool so I like it...”. Another teacher indicated that “...I like to share my own learning objects to other users...”

The other issue arising about ELOR interface is the clear design. Two of the teachers focused on clear design in ELOR and one of them indicated that "...the environment is very easy and understandable, that is I am easily locating whatever I want..." and the other "...I did not see any distracting elements in the repository...". Under this theme while almost all teachers mentioned "the easy to use" function of ELOR, they also think that there is a need for a specific training for using these kinds of resources effectively in order to enlarge their learning and teaching resources. In addition, two of teachers find filter options very helpful for locating a learning object categorically, especially when they do not know the keywords or concepts regarding a subject.

7. Conclusion

Opinions of elementary teachers regarding a learning object repository developed by the researcher in Turkey are analyzed under three categories/themes; learning objects in ELOR used by teachers during the process, integrating ELOR into their classroom, and ELOR interface. This study overall confirms that teachers are generally very willing to determine and select online resources to meet their educational needs. In addition, they like the idea to share their learning resources with other users in a repository and to get their opinions about these new learning objects.

ELOR's interface is one of the key issues stated by teachers during interviews and observation in classrooms environment. Teachers indicated that ELOR is a very easy and simple way to create a learning object, share them with other teachers via email, download a learning object in the repository, and search to find the most appropriate object for their needs. As stated by Rowand (2000), generally elementary teachers had negative opinions about LOR's screen design in terms of inconsistency and disorganization. This study showed that appropriate screen design affect teachers attitude towards a learning object repository positively.

The study also revealed that how teachers communicate with ELOR, and integrates ELOR into their educational environment. In this process, teachers firstly define the content, then search potential learning object related with the subject in the repository, and finally select the most appropriate object for their needs. Teachers pointed out that the content is very important for them because they decide whether the content is appropriate for using a learning object, or not.

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