

Quality Development of Learning Objects: Comparison, Adaptation and Analysis of Learning Object Evaluation Frameworks for Online Courses:

E-Learning Center of an Iranian University case study

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Abstract

The purpose of the present study is investigating, comparing evaluation frameworks of learning objects and deriving the more important indices. After doing so, comparison, correspondence and analysis of the frameworks are done. Realizing the most important indices, the e-content of the two lessons of M.Sc courses in one of the foresaid centers has been evaluated. In this research, we pursue the analytic approach of literature review in offering theoretic bases to practical application of the theory, and then by two-round Delphi technique, important criteria and their significance were identified by experts. The purpose of this study is to show the important scales for the evaluation of the learning objects, having the most important role in e-content of E-Lesson and the use of case-study for detecting weak points and improvable aspects. The findings reflect that most of the performed studies have focused on quality of the objects and on correspondence of the e-learning standards with objects formulation and there isn't sufficient study in strategic and planning aspects of learning, having crucial role in learning quality and effectiveness of the E-content of E-lessons. In addition, in these studies, the classification of the scales is not based on specified aspects for learning objects evaluation. The present study answers the following questions: Which factors affect the design and formulation of the quality of learning objects? Onto which aspects one must pay attention to effective designing of E-content of E-Lessons? Which scales of learning objects are the main highly referred ones evaluation in previous studies? Which aspects are the improvable and challenging ones, not being focused enough?

Keywords

E-learning, E-content; Learning Object; Learning Object Evaluation; E-learning Standards; Instructional Design

Introduction

E-learning as a very functional term has been introduced in education field along with information technology and e-learning has been considered as a long term planning with a huge investment in educational centers, especially in the universities of many countries (Triantafillou, et al. 2002; Kuo, 2012). Many universities and educational institutes around the world have been designed for providing e-learning from the beginning in order to response to increasing educational demands. Betts reports that in many developed countries application in e-learning courses are many times higher than the total higher education growth (Betts, 2009).

The essential ability of E-learning is more than its access to information and its transactional and communicative abilities are its base. The purpose of the qualitative E-learning is combining variety and solidarity in such an active learning environment which is mentally challenging. Level of these transactions is more than a one sided transition of content and embeds our thought range with respect to the relations between the participants in learning process (Grison and Anderson, 2003; Bonner and Lee, 2012).

E-Learning Elements

The first are the ones capable of being named physically these exist physically or at least

electronically. These elements are: learning files, management software and information banks. The second are the conceptual ones such as: courses and lessons, necessary to be understood completely for the discussion of E-learning (Fallon and Brown, 2003).

Learning Objects and E-content

LO1 is the smallest part of the content which itself could be a learning unit or meaning. The size of LO can be varied, but the best performance of LO is having a special learning aim. LO must be meaningful and independent on content. In other words, it must not depend on other parts of learning content to get completed. This means that each LO could be used in several lessons or courses (Fallon and Brown, 2003).

One can infer the LOs as the elements of E-learning. As they correspond to same standards, one can use any combination of them provided that they were matched each other. Anyway, by matching LOs, one can form bigger parts of the learning content such as: topics, lessons or all courses and so on (Fallon and Brown, 2003).

Knowledge element, learning source, online materials and learning components are all words with the same usage as "LO" (Krauss and Ally, 2005).

E-learning Standards

Aviation is one of the first industries in early 80's which accepts the computer-based learning in a large scale. AICC was founded in 1988 (Fallon and Brown, 2003). At the same year, US Department of Defense founded Advanced Distributed Learning Initiative (ADL). Its primary mission is to develop and promote the learning methods for US Military, but the results have many applications in other public and private sectors. ADL published the first edition of the SCORM in 1999 (Fallon and Brown, 2003).

The foresaid standards offered proposals in both conceptual design and performance. Some of them like: AICC and IMS are more focused on determination of the technical specifications and the others like: SCORM and AICC are the reference models of performance (Triantafillou, et al. 2002). One can refer to Dublin Core and ARIADNE as other standards institutions. The first was commenced offering metadata standards. It represented a model including fifteen parts, supporting online storage and recovery of public resources. It differed over these issues from

previous resources: it's simple, and it has balance capability, universal acceptance and development capacity. ARIADNE has been commenced its activities since 1966. Its focus is on providing tools and protocols supporting productivity, storage, delivery and reuse of learning courses (Fallon and Brown, 2003).

Technical LO Evaluation

The various approaches to LOs attempt to meet two common objectives:

- To reduce the overall costs of LOs.
- To obtain better LOs (Wiley, 2003).

LO evaluation is a rather new concern. [5, 6] increase of LOs, writers, design variety and their accessibility to educators trained or untrained led to the tendency to investigate how to evaluate LOs and which scales are appropriate to judge their quality and profitability (Haughey and Muirhead, 2005).

Literature Analysis

Evaluation of learning objects, is needed to develop criteria for judging them (Kurilovas and Dagiene, 2009).

Vargo et al (2002) Learning Object Review Instrument (LORI) for evaluating learning objects have developed. Version 1.3 LORI using 10 criteria to evaluate learning objects, including: 1 – Presentation: aesthetics 2 – Presentation: Design for Learning 3 - Accuracy of content 4 - support for learning goals 5 - Motivation 6 – Interaction: usability 7- Interaction: feedback and adaptation 8- Reusability 9- Metadata and interoperability compliance 10- Accessibility (Vargo, et al. 2003). The 10 criteria of a literature review related to instructional design, computer science, multimedia development and educational psychology have been achieved (Kurilovas and Dagiene, 2009). Each measure was weighted equally and was rated on a four-point scale from "weak" to "moderate" to "strong" to "perfect" (Vargo, et al. 2003).

In the same year, Belfer et al Presented the version 1.4 LORI, with the 8 criteria which are such as: content quality, learning goal alignment, feedback and adaptation, motivation, presentation design, interaction usability, reusability, and value of accompanying instructor guide (Belfer, et al. 2002).

Nesbit et al in 2004 propose version 1.5 of LORI that had nine criteria, these criteria include: content quality, learning goal alignment, feedback and adaptation,

¹ Learning object

motivation, presentation design, interaction usability, accessibility, reusability and standards compliance (Leacock and Nesbit, 2007).

Krauss and Ally gave a paper in 2005; it was based on LORI. The aim of this study was identifying challenges and problems of instructional designers in the design and evaluate the effectiveness of a learning object. This paper presents a framework of eight criteria for evaluating learning objects that these criteria include: content quality, learning goal alignment, feedback, and adaptation, motivation, presentation design, interaction usability, reusability, student/Instructor guides (Krauss and Ally, 2005).

Susan Smith Nash's article entitled "learning objects, learning object repositories, and learning theory: Preliminary best practices for online courses," published in 2005, This paper examines the current practices of learning objects and best practices have been studied. And by combining theories of learning, a new approach has been proposed to improve. In this paper, the factors for determining the usability of learning objects are presented. These factors include: relevance, usability, cultural appropriateness, infrastructure support, redundancy of access, size of object, relation to the infrastructure / delivery (Nash, 2005).

Nicole Buzzetto-Moore and kaye pinhey 2006, an article entitled "Guidelines and standards for the development of Fully online learning objects" presented, that in these article, 18 Qualitative criteria for evaluating learning objects of online courses of University of Maryland Eastern Shore were introduced, these criteria include: Prerequisites, Technology requirements, Objectives and outcomes, Activities support learning, Assessment, A Variety of tools enhance interaction, Course materials, Student support, Frequent and timely feedback, Appropriate Pacing, Expectations for student discussion / chat participation, Grading, Course content, Navigation, Display, Multimedia (if appropriate), Time devoted, Reusability (Buzzetto-More and Pinhey, 2006).

Six action areas for establishing Learning Object of technical quality criteria are suggested by Paulsson and Naeve in 2006, these criteria include: 1) A narrow definition 2) A mapping taxonomy 3) More extensive standards 4) Best practice for use of existing standards 5) Architecture models 6) The separation of pedagogy from the supporting technology of LOs. Most evaluations of learning objects have not done much with this vision Focus in this Model on technical

quality criteria for Learning Objects. Other quality criteria, such as pedagogical quality, usability or functional quality are in these scopes. Some aspects of quality are addressed by Van Assche and Vourikari (2006), they suggested a quality framework for the whole life cycle of learning objects (Paulsson and Naeve, 2006).

The MELT content audited in 2007, including an in depth examination of project partners who exist content quality guidelines. It proposed a checklist to help them make decisions about what content from their repositories for enrichment in the project that should be made available. This checklist is divided into five categories: pedagogical, usability, reusability, accessibility and production. This list is by no means vision and not all of the criteria can always be applied to all of Learning Objects. The MELT project partners seek to provide access to learning content that meets nationally recognized quality criteria (MELT, 2007)

SREB (Southern Regional Education Board) in 2007 with the aim of improving the quality of its training programs, are provided a checklist for learning object evaluation, that has 10 criteria that include: 1) Content quality 2) Learning goal alignment 3) feedback 4) Motivation 5) Presentation design 6) Interface Usability 7) Accessibility 8) Reusability 9) Standards compliance 10) Intellectual property and copyright (SREB-SCORE, 2007).

Tele-University of Quebec in 2007 improved the effectiveness, efficiency and flexibility of Learning objects, implement a quality assurance strategy wick called "quality for reuse" (Q4R), the scientific projects that were started at the university, as well as proper storing and retrieval strategies. They have organized these strategies into four main groups, this group includes: organizational strategies, and then three strategies inspired by the life-cycle of a LO, that is from its conception to its use/reuse (adaptations) (Q4R, 2007).

Ministry of Education and Science of Lithuania in June 2008, the criteria for technical evaluating of learning objects to help teach computer, set out to take the assessment tool called the Lithuanian learning objects evaluation tool. These criteria are: 1) Methodical aspects. 2) User interface 4) LOs arrangement possibilities. 5) Communication and collaboration possibilities and tools. 6) Technical Features. 7) Documentation. 8) Implementation and maintenance expenditure (Kubilinskiene and Kurilovas, 2008).

The study of Kurilovas and Dagiene in 2009 with the combination framework (Vargo et al, 2003), (Paulsson and Naeve, 2006), (MELT, 2007), (Q4R, 2007) and studies in 2007 (Kurilovas, 2007), proposed the original set of LO evaluation criteria, and it is called "Recommended learning objects technical evaluation tool". This tool includes LO technical evaluation criteria suitable for different LO life-cycle stages. These criteria are:

The first (before LO inclusion in the LOR): Narrow definition compliance, Reusability level: interoperability – decontextualisation level - cultural / learning diversity principles – Accessibility – LO Architecture, working stability, design and usability. The second (during LO inclusion in the LOR): Membership or contribution control strategies, technical interoperability. The third (after LO inclusion in the LOR) retrieval quality, information quality. [5]

Guenaga et al. in 2012, introduced a tool for evaluating learning objects, that this tool is composed of two aspects of the technology and pedagogy. In this survey, a questionnaire was designed where each of these two aspects was included in several criteria (Guenaga, et al. 2012).

Kurilovas and Zilinskiene in 2013, introduced a new AHP method for evaluating quality of learning scenarios. In this research, qualitative measures of learning scenarios are divided into three sections: learning objects, learning activities and learning environment, that each of three sections has several indices in terms of internal quality and quality in use (Kurilovas and Zilinskiene, 2013).

Research Analysis

Analysis and Comparison of LO's Evaluation Frameworks and E-content

In this section, frameworks and models are technically focused on LOs and E-content (Table 1).

In table 2, we have qualitative scales of these fourteen frameworks along with a respective figure. At last, in table 3, the scales corresponded to each other. In fact, table 3 shows the scales frequency in models and frameworks, then their importance, it also shows the differences between models and frameworks and the scales existing in some of them. We can recognize researcher's focus, improvable challenges and aspects by such comparison that the future studies will handle the weak points and strong points.

TABLE 1 LO'S EVALUATION FRAMEWORKS AND E-CONTENT

Symbols used in table 3	Year	LO's evaluation Frameworks and E-content
F 1	2002	Vargo et al (LORI 1.3)
F 2	2002	Belfer et al (LORI 1.4)
F 3	2004	Nesbit et al (LORI 1.5)
F 4	2005	Krauss and Ally
F 5	2005	Susan Smith Nash
F 6	2006	Paulsson and Naeve
F 7	2006	Nicole Buzzetto-more and Kaye Pinhey
F 8	2007	MELT
F 9	2007	SREB (SREB-SCORE)
F 10	2007	Q4R
F 11	2008	Kubilinskiene and Kurilovas
F 12	2009	Kurilovas and Dagiene
F 13	2012	Guenaga et al
F 14	2013	Kurilovas and Zilinskiene

TABLE 2 CRITERIA OF LO'S EVALUATION FRAMEWORKS AND E-CONTENT

Symbols used in table 3	Criteria of LO's evaluation Frameworks and E-content
C 1	Presentation aesthetics
C 2	Presentation design for learning
C 3	Accuracy of content
C 4	Support for learning goals
C 5	Motivatioon
C 6	Interactioon usability
C 7	Interaction feedback and adaptation
C 8	Reusability
C 9	Standards compliance
C 10	Accessibility
C 11	Learning goal alignment
C 12	Student/Instructor guides
C 13	more extensive Standards
C 14	Best practice for use of existing standards
C 15	Architecture models
C 16	The Separation of Pedagogy from the supporting technology of LOs
C 17	Organizational strategies
C 18	Life Cycle Strategies
C 19	Intellectual property and copyright
C 20	Los arrangement possibilities
C 21	Communication and collaboration possibilities and tools
C 22	Technical features
C 23	Interoperability
C 24	Cultural/learning diversity principles
C 25	Technical interoperability
C 26	Retrieval quality
C 27	Information quality
C 28	Relevance
C 29	Redundancy of access
C 30	Infrastructure support
C 31	Size of object
C 32	Relation to the infrastructure/delivery
C 33	Assessment
C 34	Expectations for student discussion/ chat participation
C 35	Navigation

TABLE 3 COMPARISON OF CRITERIA OF LO'S EVALUATION FRAMEWORKS AND E-CONTENT

Frame work	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
C1														
C2														
C3														
C4														
C5														
C6														
C7														
C8														
C9														
C10														
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C34														
C35														

Limits of Qualitative Frameworks of LO Evaluation

Undoubtedly, each of the frameworks and models and E-contents has its limits because of unique activity of respective institution, model or the strategy and purpose of the researchers. According to the above table, LORI, Krauss & Ally and SREB have many same scales and their focus is on E-content evaluation and qualitative promotion of content with respect to some standards components. There is no focus on metadata, object details and organization' technical features and its strategies. But Q4R has 4 main strategies to guarantee the quality of LO which Kurilovas & Dagiene offered a more complicated model by the use of them as their base along with some limits including: (LORI 1.3), (LORI 1.5), (MELT,2007), (SREB,2007), (Guenaga, et al. 2012). They didn't investigate the

different steps of life time cycle of LOs. Q4R didn't sufficiently investigate the technical evaluation scales of LOs prior to their location in LO's store. LORI 1.3, LORI 1.5, MELT, SREB, Q4R and Guenaga didn't sufficiently investigate the scales of reusability. (Kurilovas & Dagiene, 2009) and (Kurilovas & Zilinskiene, 2013) model is focused on technical evaluation of LOs and put aside the strategies and learning purposes and as the result the appropriateness of the content and strategy.

Method of Research

Two-round Delphi Method

We used Delphi Method to determine the validity of the paper's criteria. Delphi has been designed as a structured communication technique by RAND in 1950s to collect data through collective opinion polling (Gallenseon, et al. 2002).

In fact, experts' opinions were used to assess the validity of the paper's criteria. In this two-round Delphi method, the panel of experts includes 16 professors and experts in e-learning, information technology, computer engineering, instructional technology and systems engineering fields. The questionnaire construct was designed based on the following Likert Scale: 1. strongly unimportant 2. unimportant 3. neutral 4. important 5. strongly important. Research structure illustrated in figure 2.

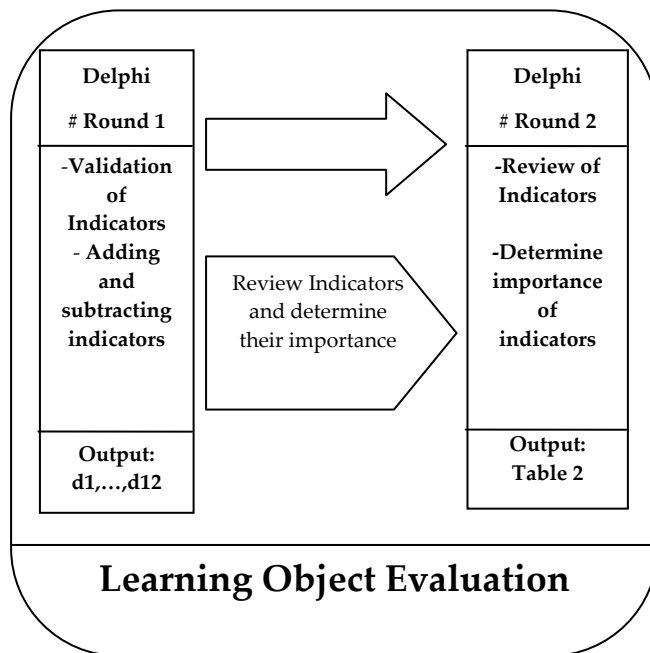


FIG. 1 RESEARCH STRUCTURE

After studying literature, research exploring Delphi method has been used in this study. And several

specialized sessions and working group appropriate criteria for evaluating learning objects of e-content were studied. Apart from the questionnaire survey interviews and meetings were conducted as well.

After reviewing the literature of the learning objects , e-content evaluation and examining the previous credible quality criteria, in expert panels and specialized working groups, criteria with respect to the scope and nature of these applications were identified. After identification and validation of indicators, and adding or subtracting of indicators by them, in the first part of Delphi Method, in the second part of Delphi Method, after review and approval of selected indicators, a questionnaire with 35 criteria was given based on Likert range in order that the experts indicate their views about the importance of each indicator. After two rounds of the Delphi method, the indicators were fully identified and validated by experts.

Pair comparisons and importance determination of indices

As mentioned in the methodology of research, in two-

round Delphi method, important indicators have been identified and their significance was determined by experts. These indicators are: Presentation design for learning, Accuracy of content, Motivation, Interaction usability, Interaction feedback and Adaptation, Reusability, Standards compliance, Accessibility, Learning goal alignment , Architecture models, Organizational strategies and Cultural/learning diversity principles which represented in table 4; d1, d2, d3 ..., d12, respectively.

In this method, before the comparison, one must determine the importance of the indices, and then refer to its overall importance by scoring it. In white slots, we do pair comparison and write the letter of more important index there and then score it _Zero for the ones with the same importance and three for the most difference between importances of indices according to experts in the Likert. Finally, the results were arranged by aggregating the scores.

As shown in the last table, d1, d4, d6, d8 have the most importance, and then comes d3, d5, d9, d12, at the third step comes d2, d10, d1, and at last rank comes d7.

TABLE 4 PAIRED COMPARISON INDICES

Index	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12
d1		d1:2	d1:1	0	d1:1	0	d1:3	0	d1:1	d1:2	d1:2	d1:1
d2			d3:1	d4:2	d5:1	d6:2	d2:1	d8:2	d9:1	0	0	d12:1
d3				d4:1	0	d6:1	d3:2	d8:1	0	d3:1	d3:1	0
d4					d4:1	0	d4:3	0	d4:1	d4:2	d4:2	d4:1
d5						d6:1	d5:2	d8:1	0	d5:1	d5:1	0
d6							d6:3	0	d6:1	d6:2	d6:2	d6:1
d7								d8:3	d9:2	d10:1	d11:1	d12:2
d8									d8:1	d8:2	d8:2	d8:1
d9										d9:1	d9:1	0
d10											0	d12:1
d11												d12:1
d12												

TABLE 5 THE FINAL SCORE FOR EACH CRITERIA USING PAIRED COMPARISONS WITH OTHER INDICATORS

Index	Total Score	Rating
d1	13	d1 : 17.33 %
d2	1	d4 : 17.33 %
d3	5	d6 : 17.33 %
d4	13	d8 : 17.33 %
d5	5	d3 : 6.66 %
d6	13	d5 : 6.66 %
d7	0	d9 : 6.66 %
d8	13	d12 : 6.66 %
d9	5	d2 : 1.33 %
d10	1	d10 : 1.33 %
d11	1	d11 : 1.33 %
d12	5	d7 : 0

Case Study

According to the indices which identified by experts, 2 lessons of E-lessons have been offered in one of the E-learning centers in Iran universities and then they were evaluated.

This university E-learning center performed some studies in 2003. It then commenced its activity as the pivotal project in order to reach to the knowledge of designing and performing E learning systems and to establish in internal network of university. The project is focused on one lesson in some fields of M.Sc in 2008-2009. In the mid 2010, it successfully takes the Master's course of those fields. As a result, E-content of the 2 lessons was selected for evaluation by the use of a framework including the foresaid indices.

First lesson content is about human resources which represented as a WORD and a POWERPOINT file. 8 3-hour sessions cover the 134 page WORD file (font: 11). The content consists of tables, figures and ... for better understanding of the lesson. At the end of each session there are some relative questions. The POWERPOINT file consists of 206 slides presenting the headlines. In this center, there are some record rooms for masters to records audio file of the lessons and also they can chat with students and answer their questions.

The content of the second lesson is about knowledge management. The course consists of a WORD (150 pages, font: 11) and a POWERPOINT presented like

the first one. Again the content consists of tables, figures ect. for better understanding of the lesson. But in the design of the foresaid lessons, the masters are more focused on the course discussion rather than learning, evaluativeness, effectiveness and other aspects. As an example, in the content of the lessons there is no point about needs evaluation, determination of master-student tasks, students' evaluation strategies and methods. In addition, there is nothing about strategies, purposes and sessions. As the students have no physical attendance, masters should present a useful content by the use of equipments and creativity and focus on environmental, cultural, social, telecommunication and other limitation. Master can increase the effectiveness by the use of animated files and films_ these two lessons are weak with regard to this point.

The contents of the lessons are evaluated by 3 expert masters by a 9-question questionnaires and Likert scale.

E-content Evaluation of First Course

The result of e-content evaluation of the first course are shown in table 6.

E-content Evaluation of Second Course

Result of e-content evaluation of second course are shown in table 7.

TABLE 6. RESULT OF E-CONTENT EVALUATION OF FIRST COURSE

Indices Professors	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	Average of all indices
First professor	2	4	3	4	3	3	5	4	2	2	3	2	3.08
Second professor	3	5	3	4	4	2	4	5	3	3	3	2	3.42
Third professor	3	4	4	3	4	3	3	4	2	2	2	3	3.08
Average	2.66	4.33	3.33	3.66	3.66	2.66	4	4.33	2.33	2.33	2.66	2.33	3.19

TABLE 7. RESULT OF E-CONTENT EVALUATION OF SECOND COURSE

Indices Professors	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	Average of all indices
First professor	2	3	3	2	4	3	4	5	3	3	2	2	3
Second professor	2	4	3	3	3	2	4	4	2	2	2	2	2.75
Third professor	2	3	4	2	4	3	3	4	2	2	3	2	2.83
Average	2	3.33	3.33	2.33	3.66	2.66	3.66	4.33	2.33	2.33	2.33	2	2.86

Discussion

As shown in table 6 and table 7, the content of the first lesson has a low performance in scales number 1, 6, 9, 10, 11 and 12 which means it was weak at Presentation design for learning, Reusability, Learning goal alignment, Architecture models, Organizational strategies and Cultural/learning diversity principles; because master designing of them are weak at designing regarding visual, hearing, image display and graphical elements relative to learning purposes. Also, they have unacceptable level of LO designing with respect to reuse and effectiveness and their respective content don't appropriately assign the purposes. This content has medial performance regarding scales number 3, 4 and 5 which means that it has medial level in Motivational content, Interaction usability, Interaction feedback and Adaptation. One can say that the use of tables, Figures and etc as well as coherence of the content, raising questions and incitement challenges are useful, but lack of visual slides, films and animations makes it medial. The content is also medial regarding to offering LOs having simple mutual relation and operational liaison with qualitative features, so corresponding to students' needs and giving feedback to the masters. At last, it has acceptable performance regarding scales number 2, 7 and 8; that is, Accuracy of content, Standards compliance and Accessibility, because it has content credit, accuracy and enough details and balanced ideas and the foresaid standards and has accessibility for everyone. The content of the second lesson is weak at Presentation design for learning, Reusability, Learning goal alignment, Architecture models, Organizational strategies and Cultural/learning diversity principles; it means, it is weak at designing LOs with necessary capabilities and designing inappropriate E-content regarding to meet the purposes. It has the medial level with respect to the scales number 2, 3, 5 and 7. At last it is only acceptable in scale number 8_ accessibility. Paying attention to the weaknesses and challenges in the center, we should promote masters' ability and familiarity regarding to qualitative indices of LO evaluation to improve the E-contents. Designers also should interact with design models and learning technology and the approaches to meet the learning needs of content. We can also predict and evaluate the offered contents and give feedback to masters.

Conclusion

As shown in this study, the most important criteria for evaluating learning objects are analyzed by studying

literature, and were examined by two rounds of Delphi with experts in various fields. After identifying the appropriate indicators, and their significance was determined by experts. Then the paired comparisons were performed to determine the percentage of indicators relative to each other, and then as a case study, e-content of the two courses of virtual e-learning courses generated from the one e-learning center of Iran were evaluated by experts and professors in this field.

In this study topics such as components of e-learning, learning objects and e-content, e-learning standards, technical evaluation of learning objects, analysis and comparison of LO's evaluation frameworks and e-content were discussed.

According to the results, in order to design and develop learning objects and e-content, various aspects and dimensions should be addressed, such as instructional design, strategy and importance qualitative aspects. This study identified 35 important criteria for evaluating learning objects, and after surveys, significant weaknesses and areas for improvement were obtained. Given that these areas were also provided with valuable suggestions.

Summary and Suggestions

The Evaluation of E-content helps organizations to promote their content quality and offer more effective learning plans. Although there are many standard institutions, we need something else to produce an E-content with an acceptable quality and effectiveness consisting of useful LOs. In fact, standard refers to the least qualitative specifications of LOs.

Models and frameworks presented here are evaluated by researchers. They are useful for offering better LOs and as a result better E-content. These frameworks are set to promote the quality of E-content by developing standards and more features and components. But the challenge is the use of such a framework with appropriate qualitative scales meeting students' needs and tendencies.

According to the limits, to evaluate the E-content, one first determines his aim and focus and then choose one of the models and frameworks. As said before, to evaluate LOs technically, Kurilovas & Dagiene model covers more aspects and has the capability to develop regarding to strategy. But one of the main issues is the ignorance of coordination of E content and learning design in the previous studies. We should review the

design models and learning technologies in order to evaluate the E-contents regarding to effectiveness and learning aims. We must do that because the final aim of E-lessons is to present an effective content and reach to high quality learning. So we should promote the designers abilities.

In all the foresaid models and frameworks, researchers had chosen the scales for the evaluation, some of which take same aspects and others take different aspects of content. In present study, important criteria was identified and confirmed by experts and then we performed a case study in e-learning center of a university in Iran. In this research, e-content of 2 Master's lessons were evaluated by some experts .The results show that this study center faces problems regarding to production of high quality E-content. Some recommendations were made as well to promote the ability of the designers.

It is recommended in future studies, main aspects related to LO evaluation be determined and classified. Also organizational strategies and learning purposes shall be investigating cause of their importance in content production. It is also recommended that researchers investigate the scales related to LO designing in known models and learning technology in order to increase the effectiveness of E-content for the students of e-courses.

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