

Quality e-activities through Learning Objects

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Abstract: - Activities developed through e-learning systems need to be supported by some learning theories in order to promote their quality. The type of information to manage for e-learning is a topic that has led to the emergence of new concepts for resource development like Learning Object (LO) concept. This paper is an awareness of the elements that should be considered for quality e-activities taking into account LOs instructional design for e-learning systems. According to this we analyze the most important ideas from learning theories that need to be rescued for quality e-activities. On this basis we propose a model to develop quality e-activities for e-learning systems.

Key-Words: - E-activities, E-learning, Learning Objects, Quality, Learning Theories, Instructional Design

1 Introduction

Nowadays development technologies are promoting new ways of communication in order to help people to learn without border problems. Internet is an important element that provides different kind of learning experience where people can use tools that aim to learn with other people.

These possibilities are changing the way to learn and the kind of activities in order to achieve learning objectives. This work is a proposal that try to clarify the kind of activities we are facing and give some ideas that could help the way to design and develop learning activities. To achieve this we are based on e-learning system and we refer to e-activities as the kind of activities developed into e-learning system.

The challenge of defining the type of information to manage for e-learning is a topic that has led to the emergence of new concepts for resource development. One of these concepts is LO, which considers resources as independent units that can be re-used for new educational situations.

Our proposal is based on LOs as lessons which promote e-activities as one of the most important element to achieve learning objectives.

In order to define quality e-activities through e-learning system in section 2 we analyse the most important ideas from conductivism, constructivism

and social-constructivism theories and their influence on e-activities. After that in section 3 we analyse an instructional design for LO that promotes quality e-activities. Section 4 shows a model which explains e-activities development and the elements that promote the most important ideas from learning theories. Finally section 5 stands out our conclusions.

2 Learning Theories as a basis of e-activities

Learning theories aim to explain us how learning occur and are an important reference in order to direct teaching and learning process. There are different kinds of tendencies which have their own vision about how learning occurs. According to this we want to review the most important ideas from conductivism, constructivism and social theories and their influence on e-activities based on LOs

Theories based on conductivism argue that learning is based on objectives that can be measured and watched. It emphasizes content feedback and content design into other things. On this point of view LO concept defends that information must be divided into little chunks that aim to reuse it for another context [5] [9]. On this basis LOs as little chunks

must have specific learning objectives which can be measured and watched.

However a very little chunk of content may be a problem in order to join them to achieve a specific objective.

A possible solution about this problem is defining LO as a minimal lesson with contain an objective and some activities that aim to achieve them. According to this we define a LO as a “unit with a learning objective, together with digital and independent capabilities containing one or a few related ideas and accessible through metadata to be reused in different contexts and platforms” [7]

Constructivism theory sustain that learning is a continuous process where a person construct their own knowledge based on their experience, media interaction or people communication. [1] From this point of view learning objectives depend of the context and needs to express what a student will be able to do and what previous knowledge needs to have.

On this basis, constructivism argue that activities must promotes learner participation in order to learn according to their own experience, it is mean learner must be the principal actor into a learning process. Therefore, learner ideally needs to be able to apply their knowledge to other situations.

According to mentioned above, activities must be able to motivate and promote questions like why am I learning this issue?, and how it can be useful for me?. This issue requires that LOs contain different kind of contents like concepts, procedures, competences, etc.

Another tendency derived from constructivism is the socio-constructivism. This tendency is derived of the idea that people can learn interacting with other people. This issue occur into a process where a person construct their own knowledge according to their social experience and thanks to some help that another more experimented person is able to give.

Taking into account this tendency, activities are a good way to learn with other people. Internet and some technologies used by e-learning provide a big opportunity in order to interact and learn in society.

Nowadays, some efforts exist to promote this kind of activities. Some tools like blogs, wikkies, etc. are some examples of this tendency of learn with other people.

3 Instructional design that promotes e-activities

E-learning systems based on reusable LOs means the possibility of accessing specific content according to the learners' needs. To avoid interoperability

problems there are some organizations that are working to develop standards and specifications to manage resources for e-learning systems.

In order to apply some design for contents it is necessary to consider some methods depending of learning situations, it is possible through instructional design. According to [10] instructional design is a theory that offer an explicit guide about how teaching to learn.

Instructional design theories are related with the kind of information to try depending on what and how to teach. About LOs some instructional design theories exists. Merrill [6] proposes the instructional transaction theory directed to mechanized process. According to his definition “is an attempt to extend the conditions of learning and component display theory so that the rules are sufficiently well specified to be able to drive automated instructional design and development”.

This theory describes knowledge in terms of three types of knowledge objects: entities, activities, and processes. Also it identifies a lot of things like interrelationships among knowledge objects including: components, properties abstractions, and associations between entities, activities, and processes.

However, Merrill [6] theory has been criticized about their excess structure because it does not facilitate the content developers work and put into practice.

Based on Merrill theory [6], Cisco Systems [3] suggests a guide for reusable learning objects creation. This guide proposes specific structures for any kind of specific learning object. Also provides a help guide and examples for their classification.

To ensure solid structures for multi-courses Cisco Systems [3] provides five levels of hierarchy: course, module, lesson, topic, sub-topic. Each one of these levels has specific elements to structure them.

The general structure is composed by: Course: introduction, module, lesson, topic, sub-topic, practice, evaluation; Module. Overview, lessons, summary, practice and evaluation; Lesson: Overview, topics (concept, Fact, procedure, process, principle), summary, practice and Evaluation; Topics: contents related with concepts, facts, procedures, process and principles.

Cisco LOs structure [3] is shared by Moreno and Bailly-Baillièrè [8], but they add some changes. They propose to group contents into three kinds of them: data and concept, procedure and process and finally reflection and attitude. In this way it is possible to simplify the content developers work covering other related type of contents. They also suggest adding sequenced activities after summary and self-

assessment for each topic.

Nowadays, LOs instructional design is a topic that is highly discussed. However according to mentioned above there are some things that must be considered to ensure a quality LOs instructional design.

LOs are individual units of learning or modules which need to be enabled with other ones to build the largest units (didactic units, courses, etc.) [11], it's mean they are part of the whole, but each one of LOs must be useful to be reused by itself in other didactic units. According to this in order to complete a LO as a quality unit of learning and to compose didactic units (DU) with them, we think it is necessary to consider the following issues.

- **Overview:** According to [3] and [8] a didactic unit needs a general vision which can be explains general objectives and introduction about the LOs content. Introduction is an important element for any kind of content because as well as their informative function about the contents, establish the purpose of the topics and orient learners to what they are expected to learn. By other side it is a motivation element that aims to engage the students letting them know why the subject is important for them.

An overview must provide a LOs objective too. As we explain in LOs definition according to LOs reusability characteristics ideally an objective must be simple with one or few related ideas. We suggest that an objective must be directed to learn one kind of content because in this way all the instructional design would be targeted to achieve this specific objective.

Other important things that must be included in a LO overview are: Their own title; the list of topics that aim to know their sequence; the number of hours to be available to achieve the objective that aim to organize the learning and finally keywords that aim to know students related areas involved with the LO content.

- **Contents:** In general any kind of content must have some quality characteristics taking into account different issues. From a pedagogical point of view contents must be in line with logic and psychologic meaningful. That's mean by one side discipline logic (content sequence, methodology, kind of activities, etc.) and by other side users suitability (level of difficulty, user interests, etc.). Other issues related with any kind of content are the information veracity, correct data, good

redaction and orthography, suitable size, colour and kind of letter, etc [12].

However taking into account the LO characteristics, it is important that contents do not mention something about the time for example, this week or this semester... because it could to delay its reusability for other educational situations. The same thing must be taking into account for the audience, so phrases like "dear engineering students..." must be avoided.

Ideally contents must be presented in a multiple formats in order to attend different cognitive skills and learning styles e.g. videos, animations, graphics, etc.

- **Activities:** Activities may be directed to promote new knowledge acquisition and prepare users for a final assessment. Activities may be included into any kind of content during all teaching and learning process. They help users to know if they must to take the next lesson or a content feedback.

Some authors [2], [4] promotes constructivist learning environments for Learning Objects. They emphasize that activities must be most diverse as possible to attend different kind of users: case studies, to resolve problems, collaborator work, reflect about situations etc. We are agree with the necessity of this kind of activities, however we think a deep reflection about them is necessary before their applications to LOs.

First, activities are too related with the kind of contents. This issue may affect the kind of activity to employ, for example if LOs contents are just talking about basic concept, fact or data the kind of activities may be directed to reinforce them, for example relating the correct concepts, checking true or false, etc. Probably another activity like "study case" does not needs to be employed at this level of complexity.

According to this, in order to answer different complexity levels contents and cognitive domains, we suggest taking into account three kinds of activities: Initiation, Re-Structuring and Application.

Initiation activities are designed to teach basic content for a specific subject. An example of this is a quiz. Re-Structuring activities classification may be directed to promote new knowledge acquisition, such as activities that promote questions, investigation, etc.

Finally, applying classification activities may be directed to promote students' experience in order to achieve their new concepts acquisition, for example a Study Case.

Didactic Unit is composed by a group of individual LOs. Due reusability characteristic some authors [3], [8] recommend to made some activities at the end of DU, it is because to avoid consistency problem with new LOs adaptation in order to attend the whole of each one of individual LO content.

- **Summary or Conclusions:** As whatever kind of teaching and learning process, it is advisable a summary after contents review. For a suitable summary it is important to point out the principal ideas and relation between them, in this way it is possible to reinforce the contents and learner progress.

Also it is important to relate the contents with other knowledge areas by diagrams, schemas, conceptual maps, etc.

- **Assessment:** An evaluation must take into account each one of learning objectives. So

they must be directed to any kind of content and their level of difficulty. Evaluation may be doing as activities; however it is very important that students can know what activities will be evaluated. Clark [2] promotes activities of practice and activities of evaluation.

The first one has to support students to acquire new knowledge providing feedback, pointing out the most important information, and to prepare them for a final evaluation. The second one must be a final experience together with an approbation or not degree. They be use to verify if the objectives were achieved or not.

4 A model for e-activities

According to instructional design proposed our model is based on LOs interaction. Students interact with LO trough some e-activities as shows figure 1.

According to constructivism theories, activities

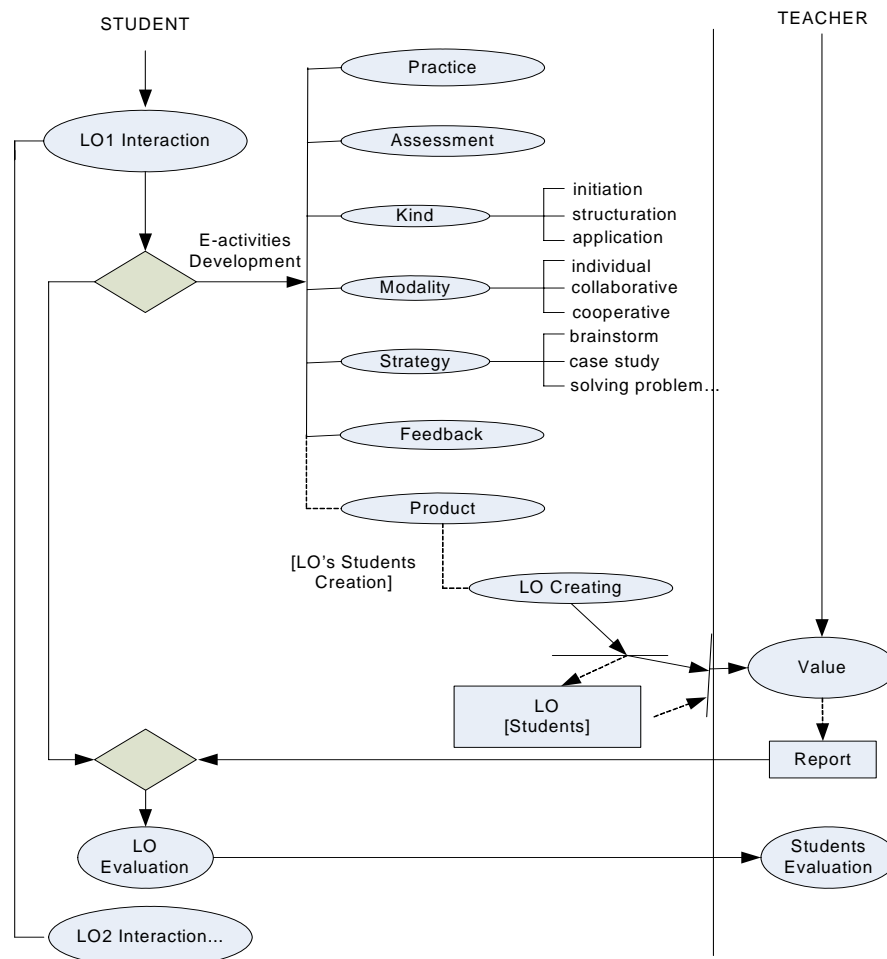


Figure1: A model for E-activities

have to promote some practice in order to acquire and learn new contents. This practice can be made through some e-activities as a practice to reinforce contents and as an assessment in order to pass to another learning stage. Practice and assessment activities are part of three kinds of activities as we said before: initiation, restructuring and application.

Modality of work promotes learning as an individual or group experience. According to learning objectives modality of work must promote individual, collaborative or cooperative activities. Strategy refers to some ways to develop activities like brainstorm, case study, problem solutions, etc.

Collaborative and cooperative strategy promotes social learning and there are a lot of technologies that can make it possible. However there are some objectives that promote individual learning and it is as valid as social learning because of the objectives.

As constructivism theory promotes we think each kind of activity needs to be reinforced through feedback because it is very important that student can be able to know what contents they have learned and what those that needs to be reinforced are.

One of the most important ideas from constructivism is that people are the principal constructor of their own learning. These theories promote learning by doing where one of the most important issues is what a person is able to do. To achieve this it is very important to consider some process and procedure activities that aim to apply the students' knowledge.

According to this into our model we suggest the possibility that a student can create a product like their own LOs. As shows figure 1 by some activities students can create a LO that needs to be valued for the teacher. The teacher has to create a report in order to evaluate the LO and reinforce students about it. According to this it is possible to incorporate the LO as a content into the course promoting a continuous information feedback.

In order to guarantee a LOs quality it is necessary they be evaluated by students. It is very important that students express if the LO content and activities are useful to achieve their learning, so it is recommended that teacher can know students evaluation in order to make possible adjustments.

4 Conclusion

Development activities are used as a way to achieve some learning objectives, for this reason any kind of activity needs to be justified by learning theories.

Technology development is providing new ways of communications and opportunities to communicate with others and interchange learning experience In

this paper we emphasize some learning theories ideas that can be used for e-activities in order to direct them to help students to achieve learning objectives. In other words, we are trying to remind the importance of learn by activities instead of the technology development.

On this basis our model is an awareness of promote quality activities through a e-learning system, taking into account the LO concept that needs to be involved in virtual teaching and learning process

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