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Play, according to some researchers, is an important part of learning. The Centre for Information Technology in Higher Education at the University of Natal, South Africa has conducted a study on the design and development of an educational adventure game. This study explores the area of adventure games rather than simulation games, which has been the preferred game type in educational environments. It is argued that adventure games provide a constructivist approach that is suitable for the exploration of complex ideas. The learners appear to be highly motivated and behaviorally active in these game environments.

The game design described by the author is based on a Game Object Model developed by the same author, which creates a relationship between pedagogical aspects and game components. This model identifies abstract and concrete interfaces and is divided into the game space and the visualization space. The game space is solely comprised of abstract interfaces (Play, Exploration, Challenges, Engagement) while the visualization space consists of mainly concrete interfaces (e.g., Graphics, Sound, Interaction) and some abstract ones (Fun, Drama).

In order to test the model, a game was developed based on a study to identify specific misconceptions held by biology students. The scenario of the game involves putting the learner in the role of a person whose mission is to find an anti-viral component hidden in a research laboratory, which is comprised of different levels. In each level, the player comes across puzzles that have to be solved in order to move forward in the quest. The higher the level, the more background knowledge of the subject matter is required.

The process of implementing the model was divided in three areas: content domain identification, game resource creation and software development. Each room was created to address one specific misconception and the puzzles in that room were designed around those specific learner outcomes. The look and feel of each room was used to reinforce the main concepts. The game development stage utilized 3D design, graphics editing and programming tools. The development team had a very clear vision of the levels before creating anything. The main lessons learned during development were very specific and would act as good guidelines for saving development time and costs for the development of a similar game. For example, the study tested how best to deal with texture mapping in 3D to obtain a realistic environment and minimize rendering times. The usability of the interface was evaluated through three iterations with the specific objective being to see how users would access the components of the game.
While this study is of good value in reducing the learning curve and development time for developers of similar projects, it lacks detail in the process of translating the learner outcomes to concrete and abstract interfaces as described in the Game Object Model. Furthermore, nothing is mentioned about user testing relative to the retaining of learner outcomes, which would have been valuable to evaluate the success of the implementation of this model.


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Introduction

With the expansion of technology and the investment of organizations in learning technologies the need for learning objects that can be shared and re-used for multiple purposes and in many situations is becoming more apparent. Unfortunately the discussion around learning objects has focused on the benefits of using learning objects or on the technical standards required to build them. Wiley (2000) takes the discussion regarding learning objects one step further by attempting to connect these re-usable digital entities with instructional design theories.

Definition

The comprehensive literature review provides the reader with a broader picture of the discussion around learning objects. Following the literature review, Wiley attempts to define the term, learning object, as he finds the existing ones very confusing or insufficient. Specifically, the most common definition provided by the Learning Technology Standards Committee is too broad, to the point of not excluding any person, place, or thing that has existed at any time. Wiley defines a learning object as "any digital resource that can be re-used to support learning" (Wiley, 2000, p.7). While this definition is narrow enough to include only digital resources and not, for example, people that existed in the past, it again seems too broad. A digital camera is a digital resource that can support learning when used by distance education students for communication, collaboration, and learning purposes, however, I would not consider it a learning object. Overall Wiley could have omitted the definition section from the paper, as I do not believe that it adds to the overall discussion.

Instructional Technology and Learning Objects

One of the main contributions of Wiley's paper is the discussion around connecting instructional design to the successful application of learning objects. Wiley emphasizes that within existing metadata there are no instructional design elements related to sequencing learning objects. If the Learning Technology Standards Committee is not appropriately sequencing instructional objects, then Wiley is rightfully concerned that the implementer of learning objects will also neglect to do so. This could lead to the use of learning objects as clip art that makes online instruction look "pretty", rather than actually support and enhance learning. While such instructional design issues are brought up, Wiley does not discuss how his ideas may be implemented.
Metaphor

The LEGO metaphor has been the most common one to introduce and explain the concept of learning objects and their behaviors. This metaphor assumes that any LEGO block is combinable with any other block, in any manner you choose. It also assumes that combining learning objects is so fun and simple that even children could accomplish this task. Wiley finds this metaphor inaccurate to some extent and proposes the atom theory as an alternative metaphor. According to the atom theory, every atom is not combinable with every other and can only be assembled in specific structures. This is closer to reality than the LEGO metaphor, as many instructional objects may not be combinable, because, for example, the content of one is not relevant to the content of another.

With regards to the person implementing the learning objects, comparing it to the task of a chemist combining atoms is more realistic than comparing it to a child putting LEGO together. Putting together learning objects in an effective and instructionally sound manner is not something that anyone can do. It requires that the person have a specific background and experience related to instructional design, ensuring that instruction is appropriate and effective for the specific audience and learning context.

Taxonomy

A second major contribution that Wiley's article offers is the creation of taxonomy to identify and organize learning objects. Unlike other taxonomies, which are linked to specific instructional design theories, Wiley's taxonomy is linked to several instructional theories, decreasing the time, effort, and resources required to categorize learning objects that are available for designing instruction. Specifically, learning objects are categorized based on specific characteristics that the object exhibits within different learning instances.

Conclusion

Wiley has addressed some of the key elements that are required for the successful and effective implementation of learning objects. These elements include: an instructional design theory, learning object taxonomy, and material that link the two together. Unfortunately, suggestions or recommendations are not provided for applying this theoretical information. While I agree with Wiley that "we need more theorists" in the world, it is also important that we discuss how such theories will be implemented, and start to experiment with their practical application, to determine if they are successful or not.

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