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Abstract

Instructional design is one of the key activities in every higher education e-learning environment. There exists many instructional design models among which is the e-instructional model where the instructional content is made up of reusable learning objects. A reusable learning object in this case is a chunk of instructional content that can be used to achieve a single learning objective in a lesson or a course. A reusable learning object is made up of smaller chunks called assets which may be of different data types such as text, images, videos, among others. One of the ways through which the reusability of such learning objects can be improved in higher education instructional design is through adaptation. Learning object reusability in this case is the ability of a learning object to be used in multiple contexts for multiple purposes while learning object adaptation is the process of modifying an existing learning object in instructional design with the aim of achieving a new learning objective in the learning environment. The major challenge in learning object adaptation is that the available tools for adaptation are format-specific and can thus support adaptation of learning objects whose assets are of one particular data type, leaving out those learning objects with multi-format assets.

In this research, we investigate design issues that hinder reusability of learning objects in higher education instructional design and we propose approaches in which such design issues can be addressed. We study the current standard metadata structure of a higher education reusable learning object and propose new metadata elements aimed at improving reusability of such learning objects in higher education instructional design. We then take a positivism philosophical position and adopt a deductive research approach to develop a Model for Adaptation of Learning Objects with Multi-format Assets(MALOMA). The design and evaluation of this research artifact (MALOMA model) adopts the 3-cycle model of design science research as the key research method. This MALOMA model has been evaluated in four different phases using analytical evaluation methods and experiments while iteratively making refinements as required by the design-evaluate cycle of design science research.

The results of MALOMA model evaluation indicate that the reusability of learning objects with multi-format assets can be improved in higher education instructional design through adaptation. This adaptation can be done by first decomposing the RLO into its assets, then adapt the assets based on the instructional design requirements, and then assemble the adapted multi-format assets into a complete package of a reusable learning object. The adapted learning object can then be vetted by a subject expert(to either approve or reject it) for publication into the e-learning environment to improve quality in higher education instructional design.

Keywords: *Instructional Design, Learning Object Reusability, Learning Object Adaptation.*