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The development of M-LODGE for training instructional designers

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Abstract

Multimedia Learning Object Design Guidelines (M-LODGE) is a unique set of standardised procedures in designing multimedia learning objects comprising of POCIMPA – planning (P), learning outcome (O), content (C), ideas (I), method (M), practice (P) and assessment (A). The creation of the guideline was initiated due to the absence of standardized procedures in the content design of the learning object design. The purpose is to develop guidelines for the Instructional Designers (IDs) to aid them in the process of content analysis and produce design plan for multimedia learning objects. This is a case study involving interviews with experts and literature reviews to derive data for the guidelines. Apart from M-LODGE, a content design document was also developed to enable IDs to document content design process. The interview with IDs indicated that the guidelines and content design document have saved their time and effort spent in the decision making process during the learning object design.
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1. Main text

The first phase of multimedia learning object development involves the instructional designer (ID) analysing the instructional goals and needs in an attempt to understand the instructional problem, followed by selecting, sequencing, synthesising and summarising the content for instructional purposes and identifying the scope and content of the subject (Keppell, 2000). These areas represent the 'problem space' of the IDs. In addition, since most designers do not share a common understanding of what constitutes a learning object (LO), which leads to further problems in determining the structure , function, and the content of the Multimedia Learning Object MILO (Gibby et al., 2002; Mohan & Daniel, 2004; Lim, 2007). Current standards do not yet provide specific guidance on how to plan for or create multimedia learning objects (MILO), although some principles and guidelines available from existing literature can aid in the content design process (Beaudrie, 2001; Centre for Learning Technologies, 2000 in Reese, 2009). This study addresses the gaps and challenges perceived by the ID from a particular institution during their content design process of a multimedia learning object (MILO). From the findings, the researcher studied and proposed multimedia learning object guidelines (M-LODGE) pertinent to the characteristics and goals of an LO, which will assist the ID in producing the necessary content, instructional strategies, and assessments to build the MILO. It is hoped that this research will be able to offer greater insights on the instructional design of MILOs to

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authors and designers interested in this field, as it serves as a source of information to them on how to aggregate the content and decide on the instructional approach more systematically.

2. Methodology

This research was segmented into two phases: One involves the gathering of the data and information to produce the guidelines, and the other involves evaluating the guidelines' effectiveness. In this study, the participants are five instructional designers from an open and distance learning institution located in Kuala Lumpur, who are involved in the development of multimedia learning object (MILO).

2.1. Data collection

The data collection methods used to gather information for guidelines design and evaluation of the guidelines are described in following sections.

2.1.1. Gathering of the data and information to produce the guidelines
The data for the guidelines were collected via:
   a. Job analysis via a focus group interview of the IDs:
      Krueger and Casey (2000) describe focus group interviews as 'organized group discussions which are focused around a single theme'. He stressed that focus group interviews allow people with certain characteristics to provide qualitative data to help understand the topic of interest. The reflections of the respondents, who are IDs involved in MILO development, were recorded in this interview. The objective of this interview was to establish the gap occurring in the performance of the IDs in content analysis.
   b. Interview of subject matter experts (SME):
      Interviews with experts, who are involved in learning objects or any web-based content development, were conducted. According to Begner and Menz (2002) in Flick (2009), the expert interview can be used for preparing the instrument in a study of other targeted groups. In this study, the findings from the expert interview were used as the guidelines (instruments) for the IDs (targeted group). The first interview was conducted with a project director of the MILO development project. The second interview was conducted with the leader of the e-content development team.
   c. Review of the existing literature and best practices:
      Apart from that, the insights and information from the literature were used as context knowledge (Flick, 2009) of content development of the MILO. The findings from expert interviews were then triangulated (mapped) with the information extracted from the literature review to validate the information gathered from the experts.

2.1.2. Evaluation of the guidelines
A content analysis document was developed for the IDs to record their findings from content analysis. Each ID was given the task of analyzing a sub-topic from a print module developed by the institution and recording the analysis findings in the content analysis document during the first session. During the second session, each ID was asked to present their content analysis findings and explain their own experience of analyzing the content. In order to determine whether the guidelines were useful for them or not, a focus group interview session was conducted with the IDs. This interview focused on
   a. Their experience in conducting content analysis by using the guidelines and documenting their analysis findings.
   b. Feedback on how to improvise the guidelines.

2.2. Data analysis

Thematic analysis was used to derive themes emerging from the interviews and literature reviews. Thematic coding was chosen because this study involved researching a particular issue or perspective of a process (Creswell, 1998) (what are steps involved in content analysis, how do particular guidelines assist IDs in conducting content analysis). Coding was flexible to allow for the emergence of any unexpected potential categories (Conover, 2008).

3. Findings

The interview of the IDs during job analysis revealed that each ID analyses the content according to his or her own understanding and convenience. There is no standardization of the procedures involved in conducting content analysis. Also, there is no documentation of the IDs' decisions on content structure, presentation, and assessment made during the content analysis.

Interviews of two SMEs were conducted, as explained in Methodology. Before the interviews, the results from the interview of the IDs as well as the performance gap analysis findings were presented to the SMEs. Based on the findings, the SMEs suggested certain steps for conducting content analysis. The existing literature on LO structure was analyzed to extract the instructional components to be considered during the content analysis. A checklist containing all the key points regardingMILOcontent design was drawn.

1. Identify the learning objective (Cisco, 2003; Ally, 2004; Baruque & Melo, 2004; Thompson & Yonekura, 2005; Plodzien et. al, 2006).
2. Present the advance organizer (Ally, 2004).
3. Present the overview or introduction (Ally, 2004; Baruque & Melo, 2004; Plodzien et al., 2006).
4. Merrill's content performance index and Bloom's taxonomy to determine the cognitive level of the content (Cisco, 2003; Chyung, 2007).
5. Present content that includes facts, concepts, process, procedures, and principles (Cisco, 2003; Ally, 2004; Baruque & Melo, 2004; Thompson & Yonekura, 2005; Plodzien et al., 2006).
6. Choose an appropriate instructional approach from following cases: presentation, demonstration, collaborative learning, learning by discovery, problem solving, instructional games, tutorials, and drills and practices (Baruque & Melo, 2004).
7. Include practice or activities such as drills and practices, games, and problem solving (Cisco, 2003; Ally, 2004; Baruque & Melo, 2004; Thompson & Yonekura, 2005; Plodzien et al., 2006).

Later, the extracted components were mapped with the interview findings. All the information gathered through the expert interviews was also highlighted by the literature. The steps that have been mentioned in both the literature and by the SMEs were used as the content for the M-LODGE.

Table 1. Name of the table

Step	Explanation
Step 1: **Planning: P** Plan on how you going introduce the topic	The first step is to capture the attention of learner before the learning begins. Gaining attention is considered as one of the important instructional design inputs to be considered when designing the learning object. Among the ideas that can be used to gain attention are a. Using thought-provoking questions or interesting facts to capture the student's attention b. Using video scenarios and relating the video to the content to be learned c. Presenting a problem or case and asking trigger questions Using newspaper transcripts or articles to explain a current situation and relating it to the content to be learned
Step 2: **Learning Outcome: O** Identify the learning outcome(s)	It is advisable for each LO to address one or two learning outcomes (one is the most advisable) and also identify the level of the learning outcome based on Bloom's taxonomy. Example: At the end of this learning object, you should be able to identify the level of management according to the task description.

Step 3: **Content: C** Identify the nature of the content	Identifying the nature of the content helps you in determining the display of the content and the learning task using Merrill's Component Display Theory. Merrill (1983) listed different types of content, including concepts, facts, processes, procedures, and principles, in his two-dimensional performance content matrix. **Facts** - Remember the facts. **Concept** - Remember the definition and classify new examples. **Process** - Remember the stages, solve a problem, and make an inference. **Procedure** - Remember the steps and perform the procedure. **Principles** - Remember the guidelines and use specific guidelines to solve a problem.
Step 4: **Ideas: I** Organize the content into key ideas	After you have identified the learning outcome and the nature of content, you now need to organize the content. In this step, you have to chunk the content into a few key ideas. These key ideas should be well sequenced in order to avoid confusion when you organize and chunk your content in each frame during the design process. Some examples of key ideas: **LO title**: DNA structure **Key idea 1**: Present the building blocks of DNA **Key idea 2**: Show how the building blocks are linked **Key idea 3**: Demonstrate how the DNA helix structure is built
Step 5: **Method: M** Decide on content presentation method	Under each key idea, plan the content presentation. Text, video, audio, images, or interactive media that convey the facts, concepts, processes, procedures, and/or principles of the subject matter should be planned here. Example: **Key idea 1**: Present the building blocks of DNA **Content presentation**: Animation and text
Step 6: **Practice: P** Plan the learning task	In Step 4, you have identified the key ideas. In each key idea you should design learning tasks to provide some opportunities for learners to review facts, key concepts, and principles through exercises, instructional games, simulations, problem solving, and guided reflections. Example: **Key idea 1**: Present the building blocks of DNA **Learning task**: Label the building block of DNA **Learning task template**: Drag and drop
Step 7: Assess: A Plan assessment	An LO should assess whether the learner has achieved the stated learning objective. You have the choice of using traditional assessment methods such as quizzes (i.e., multiple choice, true-or-false, etc.) or non-traditional methods such as games and simulations. Example: Description: Recall the role of each level of the manager. Given a description of the task, choose the level of the manager. Choose the correct task description of a certain level of the manager. Assessment method: Quiz—multiple choice

After the final draft of the guidelines document was approved, the content analysis document was developed. The content analysis document is an online form in which the instructional designers record their findings from the content analysis (nature of content, learning outcome, cognitive level of learning outcome, summary) and document their design plan for the MILO, which includes the introduction, content presentation method, learning task, and assessment. Figure 1 shows the flow chart of the content analysis document. quality scans are not acceptable.
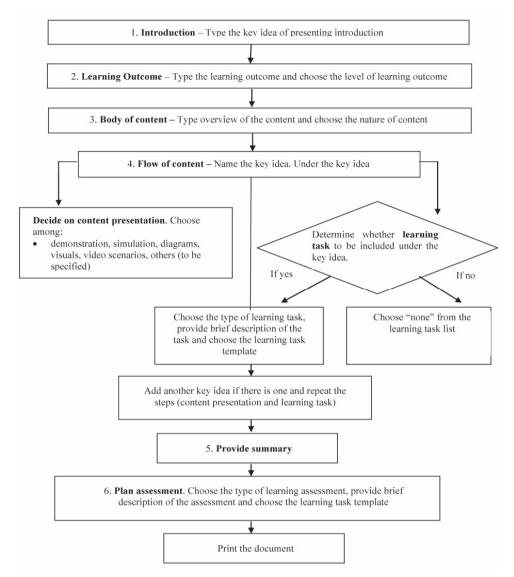
Figure 1. Flow chart of the content analysis document

A focus group interview session was conducted with the participants in order to assess the effectiveness of the guidelines and the content analysis document. In the interview, the IDs overall indicated that the guidelines and content analysis document helped them to save the time and effort spent in deciding the instructional approaches (content presentation method, learning activities, and assessment). The participants indicated that the step-by-step procedures with explanations were helpful because the procedures inform them on how bring out the ideas and arrange them. According to a participant, 'Steps 4 and 5, on organizing the content and planning the learning task, taught us how to chunk the printed content into key ideas. In this phase, we could already have idea of how to make each frame instructionally sound and arrange these ideas in order'. Two participants indicated that they could clearly see the purpose of doing the content analysis. One of them said, 'The guidelines serve as a guide to tell us what we should prepare before translating the printed content into an MILO content. It standardizes our process.'

They also indicated that the task has became more organized and structured. All the participants agreed that the content analysis document created a platform to document the ideas and decisions made during content analysis.

One of the participants mentioned that the recorded findings in the content analysis document would help the IDs save time in creating a storyboard. She said, 'We have already decided on the learning outcome, content structure, and brief ideas of the learning tasks during the content analysis. So, during storyboarding, we can focus more on finding external resources, designing the learning activities with feedback, and media programming.' According to another ID, 'by having the predetermined ideas of the MILO design, designing the storyboard would become easy. We just have to refer to the things that we recorded in the document.'

4. Conclusion and Recommendations

This study has highlighted the importance of planning the content design process before storyboarding. The guidelines developed had indeed helped the IDs from the particular institution. The guidelines and the content analysis document were an initial step to guide the IDs before they proceeded to the detailed design of the LO (storyboarding).

The interview conducted during the job analysis revealed that as 'the IDs' knowledge and skills necessary for storyboarding were inadequate'. Many of them did not realize that designing objects requires a different mindset than most IDs posses (Wiley, 2000). Metadata tagging, manifest file generator, and content aggregation are all new concepts to IDs in creating learning objects design (Kang et al., n. d), and it is too much for them to adjust and upgrade their design and development skills at once. Although the participants in this study are not involved in the areas of meta tagging of contents and manifesting files, they are expected to design pedagogically sound content for learning objects.The guidelines and content analysis document were the initial step to guide the instructional designers before they proceed to storyboarding. A similar initiative was taken by the e-learning research team in Ewha Womans University, where the team developed an e-learning design and development tool, Learning DesignerTM. Learning DesignerTM is their attempt to assist content designers and developers in generating learning objects easily.

By limiting the study to developing guidelines on how to conduct content analysis for multimedia learning objects, other possible avenues of research relating to this study were revealed. These possibilities surfaced as a result of the data collection and analysis. A suggestion was made to further develop the guidelines of instructional design framework for the IDs to follow during content storyboarding development for multimedia learning objects. The responses also suggested the creation of a platform to promote the collaboration between SMEs and IDs in developing content for MILOs, where the SMEs provide inputs on the content analysis and questions for learning activities while the IDs design presentations such as simulation, demonstration, and learning activities with feedback. Some possible recommendations for future research include the role of SMEs in content design and development of MILOs, optimizing the interaction between the SME and ID during content design in order to elicit and conceptualize unfamiliar content for the ID.

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