

## **Self-insight and reflection**

### **Portfolio Project**

#### **Overview**

The portfolio project consisted of designing and developing a Reusable Learning Object (RLO) as a computer-based training. The content of this RLO was based on Siegfried Engelmann's Theory of Direct Instruction. It examined non-comparative concepts. A non-comparative concept is one component of Direct Instruction's most basic knowledge domains. This compares to Gagné's Verbal Associations and Bloom's Knowledge Domain.

This RLO presents the 'identify' lesson of non-comparative concepts. Trainees are introduced to the overall 'rule' or category of the concept and then three types. This lesson precedes the 'methods' lesson, which provides guidance on how to sequence these concepts for teaching.

Below are self-insights and reflections on the design and development of this RLO project

### **Instructional strategies**

For this RLO, I blended two instructional strategies. First, I selected the Morrison et al. (2019) prescription for teaching rules. In accordance with Morrison et al. (2019), I developed two sections: presentation and assessment. The presentation section comprised of a deductive presentation of 'RUL-EG' or 'rule-example' sequence. I chose this sequence, in contrast to an inductive one, because the concepts presented were highly associative to prior knowledge. For example, one type of non-comparative concept is 'some' adjectives. By presenting existing categories and providing qualifications I was able to expedite the presentation.

Supporting this initial presentation of instruction was generative strategies, which are best practices (Marzano et al., 2001). I chose advanced organizers and mental maps. These would help trainees encode the content. I also organized styling by the information in accordance with the Horton's (2012) style recommendations. For example, the 'rules' are bold and big while 'examples' are plain and

small. In addition, the content images exemplified any information still in question.

Next, the assessment section consisted of recall and application parts. The recall part also known as the knowledge check occurred at the end as a summative assessment. I chose the end because the level of abstraction present in non-comparative concepts. They are inherently sensory. Application part occurred in the middle and as an ancillary to instruction. I blended this part with my second instructional strategy

The second instructional strategy chosen was the Carnine and Englemann (1991) procedure for teaching non-comparative correlation with 'and' or 'categorical rules' with multiple parts. The non-comparative correlation procedure corresponds to the Morrison et al. (2019) prescription. However, Carnine and Englemann (1991) also insist on an inductive presentation as a core component. Their inductive procedure is very specific: three positive examples that are maximally different and two negative that are minimally different. This presentation was then followed by a 'test' in random order. This method is research-based. I transposed this as a 'drag-and-drop'. This 'drag-and-drop' serves as a generative strategy and is part of Horton's

'connect' component (Horton, 2012). It also scaffolds the purely abstracted or 'text-based' assessment at the end of the instruction.

## **Design and Development Process**

The design process consisted of three phases: instructional design, usability and storyboard.

The instructional design phase comprised of selecting and planning an instructional topic. I chose the topic of Direct Instruction. This would be the center-piece to my new role in an instructional design department; however, it was still a 'fresh topic'. The planning aspects of the design process consisted of the gamut, including drafting a set of course and RLO objectives, an RLO outline, a flow chart of the learning task, media to be included in the RLO and an instructional strategy. Once established, all of these considerations were documented. The documentation was both a plan and 'rubber stamp' for going forward. For me, this was very much a 'living' document. The design continued well into the development. While unfortunate and highly undesirable, I was, consequently, able to learn far more about my topic of Direct Instruction.

The second or usability phase consisted of reviewing accessibility guidelines and Section 508 standards. For this, I compiled a list of Web Content Accessibility guidelines from the W3C. I check off the ones that would apply to the development of my RLO. These included 'alt tags' and 'notes' for screen-readers. I also wanted to make sure that my RLO's content could be accessed without Javascript or other scripts. For the 508, I reviewed outside resources, which provided rules of thumb. These outside resources included Web Aim.

The third or storyboard phase of the design process consisted of actualizing the content and visualizing my design from the design document. The actualizing of my content was the process of translating the RLO outline and flow chart task analysis into meaningful instruction. I attempted to translate the theories of Direct Instruction to a workable RLO. As I mentioned earlier, this process was not efficient. I first centered the instruction around a few principles of Direct Instruction. Then, I selected one principle. Finally, I abandoned the principles to take a more practical approach of providing instruction on a particular methodology. Unlike the revisions in the actualization process, the visualization component remained consistent. This included layout decisions, such as text-image placement and ratio. For these large aspects, I consulted the *Contrast*,

*Repetition, Alignment, Proximity* and *Learner Control* principles. For example, I decided to repeat heading placement. These principles also led to smaller decisions, such as navigation and accessibility features.

Like the design process, the developmental process occurred in three phases: prototype, usability test and Sharable Content Object Model (SCORM).

The prototype phase realized the vision of the storyboard. During this phase, content and visualization became a 'real' RLO; that is, structure, style, interaction and information would create the small piece of instruction. The prototype was created by Storyline Articulate. This tool presented a few challenges. First, Articulate invited the opportunity for revision. Interactivity that I had not planned for could be easily but not always quickly accomplished. Second, the Articulate took time to learn. I started and deleted several projects because I was unfamiliar with how the interface operated. I spent nearly a week watching videos to develop a 'feel' of the tool. Next, despite the 'maturity' of Articulate as an application, I did eventually encounter technical problems. For example, the built-in navigation would not populate the slides in the correct order and even acknowledge that a slide existed. I was not able to solve this problem. Finally, I was able

to create an RLO that was visually pleasing; nonetheless I wish I had more time to develop the practices to be more 'user' interactive.

The next phase was the usability test where the 'kinks' were worked out. The usability test assessed the navigation, appearance, content and assessment of the RLO. This test helped me remediate problems in the navigation and content deficiencies. For example, I solved a problem with the first slide of the knowledge check repeating. I also, per the advice of my reviewer, added audio. This usability test set me up to publish the RLO.

The last phase was the SCORM phase. The SCORM phase is the publishing phase. A title was established and an HTML format was selected. I chose HTML-CSS-JAVASCRIPT format. Reporting and tracking, which is the most salient feature of SCORM, was also decided at this phase. The reporting feature recorded whether or not the user passes the course. The tracking feature provided a placeholder of where the user left off.

## **Accessibility**

Accessibility components were significantly considered during the development of this project. These components included providing 'alt' tags for every textbox and object. This continued to providing audio with captions. For a caption fallback, I also provided content in the 'notes' section for screen-readers. Last, I was careful to select large font sizes and a sans-serif font.

### **Interface design and Visual Design Principles**

The interface design and visual design principles were incorporated into the layout, color scheme, fonts and even the content. I followed the *Contrast, Repetition, Alignment, Proximity* and *Learner Control* principles. The color chose contrasted highlighted and background decorative elements. The font sizes and placement were consistent across the entire RLO. There were two main forms of alignment per main and aside elements. Images and text were always in close proximity. Last, added audio controls provided users with the ability to mute the audio.

### **Assessment Methods**

There were two main assessment methods: recall and application. These assessment methods were recommended by Morrison et al. (2019). The recall, especially, is a standard for my organization. It provides for a uniform validity measure. In addition, the recall was used as a method to assess trainees' verbal associations. The trainees perform their tasks in solely a 'text-based' environment; that is, they do not encounter or use images or realia to create their lessons. The application method was chosen as a way to bridge the tangible to the abstract. It also provided for a more interactive experience.

### **Usability Test Feedback**

The usability test provided numerous revision suggestions. First, the reviewer commented on the parsimony of the content. He suggested that audio be added to ensure the users did not quickly peruse passed salient content. Second, the reviewer commented on giving personalized feedback to each assessment item. For this, I was constrained by Storyline's features. However, I did provide a review dialogue box, which provided an explanation of the correct content.

### **New insights into Competencies**

After taking this course, numerous insights come to mind. The first insight was developing my competencies in elearning course authorware tools. These tools provide for the opportunity to diversify assessments so that they are not solely written-based. The second insight was the importance of cognitive load theory. I would like to continue exploring the coherence and contiguity principles. In addition, nuances are numerous in cognitive load theory and I would like to thoroughly track all their recommendations. My last insight regarded usability. I would like to further develop competencies in user experience. These design decisions greatly affect the interaction and therein learning of any RLO I make.

## **Professional Growth and Reflection on Computer based-Training (CBT) Design**

### **CBT at Work**

I will expand my use of CBT at my current position by continuing to develop the current RLO and by advocating for RLO use. First, I will continue to develop the RLO about Direct Instruction. I started but not

decided not to include an RLO about the 'methods' of Direct Instruction. I believe that RLOs have great potential with programmed instructional methods to provide simple-complex skill development. This includes providing instruction about procedures as well as instruction that can provide immediate targeted feedback. Procedure instruction through CBT and RLOs provides is better able to provide for interactive and representational practice. Interactivity is sustained by Mayer (1997). Targeted feedback can occur per test item and is preferable (Marzano, 2001). While programmed instruction 'workbooks' could provide and have provided instruction similar, they come with limitations. Targeted feedback is not a feature of 'print materials'. Second, with the development of RLO's for my organization, I will advocate for their use in teacher trainings. Teacher trainings, especially now as they are remote, are solely as text-based. These trainings would greatly benefit from CBT. Multimedia in CBT, if done right, is a benefit. It has thoroughly been sustained as more efficacious to learning than text alone (Mayer, 1997). That coupled with interactivity is a benefit as it furthers retention (Marzano et al, 2001). Flexibility, likewise, is a benefit (Alessi and Trollip, 1999). Learners are able to make choices about how and when to engage with instruction. For these reasons, I plan to expand the use of CBT at work.

## **Concepts Gained**

The most valuable concepts gained during this course were Reusable Learning Object (RLO) and Sharable Content Object Reference Model (SCORM). The RLO was a concept that I have been casually reading about in the last few years, especially in publications by David Wiley. However, then, the concept was still very much intangible. I tried imagining it from a computer science perspective, i.e., object-oriented language. It was not until this course that I actually witnessed concrete what it was and its potential. That is, I learned that RLO was a small piece of instruction with a fully functional objective, 'absorb' phase and 'practice' phase. In addition, this RLO could be added, subtracted or exchanged with courses in a range of content areas or topics. The second most valuable concept I learned in this course was Sharable Content Object Reference Model (SCORM). SCORM, like RLO, was a concept that I had seen when touring elearning course authorware tools. It too was intangible. During the course's weekly calls, I extracted SCORM's core features. That is, I learned that SCORM tracks learners' progress, reports learners' achievements and provides consistent standards for a swelling industry. RLO and SCORM

are essential concepts in the instructional design field and I am highly appreciative that I have a solid grasp of both going forward.

## **Impact**

This course will impact my instructional design by encouraging me to explore the opportunities in elearning. I will now consider how I can better provide instruction in a dynamic way and also in an asynchronous way. I can provide instruction in a dynamic way by using the course authorware tools to develop 'drag-and-drop' practices and 'click events' that provide elaboration. Both of these features can augment programmed instruction. Updating programmed instruction practices could lift its appeal and more importantly further learning. In addition, I have a better understanding of how to develop instruction asynchronously. This is extremely important to me since many of the trainees that I am assisting are located in India and Kenya. Having this alternative method could greatly ameliorate any connectivity issues. Going forward elearning will always be kept in mind.

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