Report I

Section I

Part One:

Theoretical Assumptions

Mayer's (SOI) Model for Designing Instruction for Constructivist Learning

Mayer's model for Designing Instruction for Constructivist Learning focuses on how to present information to the learner. The main assumptions and theoretical foundations of Mayer's model are: knowledge construction is not reliant on behavioral activity and the learner can construct their own knowledge. This constructivist model helps learners apply previous knowledge to solve new problems. Mayer states that there are three different views of learning: learning by response strengthening (strengthens or weakens associations between a stimulus and the response), learning as knowledge acquisition (places new knowledge in long-term memory), and knowledge construction (learner actively constructs knowledge in the working memory). Mayer's SOI model uses the third view on learning. So, the instructional designer can develop an environment that requires the learner to make sense of information that is presented to them. Mayer proposes that the environmental design for constructivist learning depends on three prerequisites. The prerequisites are skills of selecting, organizing and integrating. This is why the model is called the SOI model. Learners have to have the skills that allow them to first select the relevant information to process further. Then they need to organize the information by making mental representations in their working memory. Lastly, they need to be able to integrate new incoming knowledge with existing knowledge. A main belief of this model is that when new knowledge is coming in during a learning situation, learners can build on prior knowledge to construct mental models of the information. The other two prerequisites are meta-skills which are the processes for self-regulation and will, which is the attitude and motivation behind the learning process. Mayer proposes that the learner will be able to retain the knowledge and then transfer the knowledge to a new situation if all three prerequisites exist prior to new knowledge construction.

Using Reigeluth's framework to understand Mayer's model is helpful in determining whether or not it is appropriate for our instructional module. The type of learning that occurs is constructivist learning learners construct their knowledge by using prior knowledge to understand materials that are presented to them. For, example learners will build on their prior knowledge of making assignments, assessments, and calendars to make similar ones using a learning management system like Blackboard vista. Learners are able to meaningfully interact with materials by selecting, organizing, and integrating information and the knowledge is represented in working memory and is then transferred to long term memory. The learner is in control of their learning and the instructional designer provides guidance and structure through the use of the materials presented to the learner. The focus of the learning is central to a specific topic or concept that the instruction is designed to teach. Grouping for learning is individual because each learner constructs their own knowledge. The primary interaction for learning is student working with the specific materials that are provided. The support for learning is mainly cognitive.

By breaking down the model using the Reigeluth framework, it is easy to see how Mayer's model is useful when designing and developing our instructional model. There are three main reasons why we think Mayer's SOI model is appropriate for our specific instructional model. The first reason is that using the selecting, organizing, and integrating instructional

strategies provides relevant methods for multimedia instruction. Using Mayer's model for Designing Instruction for Constructivist Learning in collaboration with Mayer's Cognitive Multimedia Learning Theory, we will have a plethora of tools, principles, and knowledge at our disposal in order to design our instructional module properly. Secondly, this model emphasizes the learner's ability to apply knowledge. The final reason why Mayer's model will be appropriate for our module is that the learners that will be using our module will have the proper prerequisites for problem-solving transfer. They all have appropriate cognitive processes, self-regulatory processes, and a positive attitude towards completing the procedures required to make assignments, assessments, and an electronic calendar using a LMS. Although they may be a little hesitant to change, they do have the desire to learn the material presented in our module.

When implementing Mayer's model, we must first look at all the components and sub-components. As we have already stated, the main components of this model are selecting relevant information, organizing the information for the learner, and integrating the material. The sub-components of this model are the techniques used by each method. The first component is selecting relevant information; this can be done by highlighting all the pertinent information for the learner with the use of headings, repetition, captions, outlines, etc. For our module, an instructional video will be made to outline the procedural steps needed to input due dates into an electronic calendar using a learning management system. Relevant information will be highlighted by including concise captions that reiterate and summarize the procedural steps demonstrated in the instructional video. The visuals used in the instructional video will also depict specific procedural steps that need to be taken and they summarize the procedure. By having both words and pictures that are clear and concise, Mayer proposes that the learner will be able to select the relevant information because extraneous information has been eliminated. Adjunct questions and learning objectives will also help the learner focus on the relevant information. Examples from our module would be: (Objective) Learners will be able to demonstrate the procedure of inputting assignment due dates, from their list of scheduled assignment dates, into an electronic calendar using a learning management system. Adjunct question example: What purpose will an electronic calendar serve in a learning management system?

The next component of the model is organizing information. This organizes information by constructing both a pictorial mental model that matches the verbal mental model. For our module we are going to use the enumeration method to demonstrate the step by step actions needed to perform a task. For example: split up the steps needed to input due dates into the electronic calendar. Using this method, we will make an outline of the procedural steps so that the learner can check their work as they complete the task. This will limit the amount of mistakes made by the learner. Flowcharts will be used to provide a step by step sequential graphic representation of inputting due dates into the electronic calendar in the learning management system. Signal words and title clips will be used in the instructional video to further organize the information. The title clips will be used at the beginning and the end of a section to provide headings and outlines or flowcharts of information that will be covered in that section. For example: the heading could have the title, "How to input due dates in an electronic calendar using a learning management system."

The last main component of Mayer's SOI model is integrating the new incoming knowledge with previous knowledge. The different techniques of integrating technology that will be used for our module are advanced organizers, animation with narration, worked-out examples, and elaborative questions. Advanced organizers show cognitive steps involved in the procedural

tasks that need to be completed. For example, the learner will be provided with examples of a completed electronic calendar that has been developed for a course. Then the learner will go through the steps of making an electronic calendar. The advanced organizer will use the learner's prior knowledge of constructing a calendar and compare it to the procedure of constructing an electronic calendar using a learning management system. Animation with narration will be used in the instructional video, learners will be able to watch and listen to the procedures used to input due dates in an electronic calendar on a learning management system. Worked-out examples will provide the learner with screen shots of an electronic calendar used in a learning management system with due dates already input in the electronic calendar. Lastly, elaborative questions require the learner to integrate new knowledge with prior knowledge because it asks the learner to think of a different situation where the information can be applied. "Can you describe a similar situation where you would use an electronic calendar to help students with time management?" This is an example, of an elaborative question about electronic calendars in reference to our instructional module.

Part Two:

Learner Analysis		
Information Categories	**Data Sources**	**Learner Characteristics**
Entry Behaviors	Interviews and Observations	*Performance Setting*: Learners have little to no experience with online course development. Learners have experience with time management skills. Learners have experience with designing assignments, assessments, and calendars. *Learning Setting*: Learners have experience with computers. Learners have experience with classroom course development.
Prior Knowledge of Topic Area	Interviews and Observations	Learners have experience with designing

		assignments, assessments, and calendars. Learners have experience with time management skills. Learners have experience with classroom course development.
Attitudes Toward Content	Interviews and Observations	The learners are hesitant to switch to an online course design. The learners do not necessarily believe that an online learning environment is better than traditional face to face learning environment. Therefore they consider the change difficult.
Attitudes Toward Potential Delivery System	Interviews and Observations	Learners believe that online course environments will benefit their students and promote a constructivist style of learning. Learners understand the benefits of the visually appealing online learning environment.
Motivation for Instruction (ARCS model)	Interviews and Observations	Learners have a positive attitude about learning how to convert their traditional class material to an online learning environment. The material

		presented in this module is interactive and informative and it will help learners to deliver instruction to their students in a new way. Learning with interactive materials will ensure that the learner is ***attentive***. The learners believe that the material is ***relevant*** to their future success as online instructors. Learners are ***confident*** that they can master the material and effectively incorporate it into their courses in the future.
Education and Ability Levels	Interviews and Observations	*Educational Abilities*: Learners are currently employed in the higher education field. Learners have successfully taught at the higher education level. *Ability Levels*: Learners have a varying degree of ability with computer skills. Learners have a varying degree of ability with constructivist course development. Learners have a varying degree of ability with generating strategies for

		time management for their students.
General Learning Preferences	Interviews and Observations	Learners are experienced with a variety of learning formats. Learners are used to being in control of the learning environment and their students.
General Group Characteristics Heterogenity: Race, Gender, Culture Age Language Special Needs Overall Impressions	Interviews and Observations	*Heterogeneity*: Learners come from various backgrounds. There is a mixture of different cultures, genders, and races. *Age:* Learners are all higher education professors. Learners' age ranges between 24 - 65 years old. *Language:* Learners are all fluent in the English language. *Special Needs:* Learners do not have any special needs. *Overall Impressions*: Instruction will need to be easy to use, efficient, and effective.
Attitudes Toward Training Organization	Interviews	Learners have positive feelings about the organization developing the materials and about using the computers for developing online

		courses. They believe this training will help them be more successful in online course development. Learners believe this training will help them generate strategies that help their students manage their time, participation, and assignments.
Context Analysis		
Information Categories	**Data Sources**	**Learner Characteristics**
Managerial/Supervisory Support	Interviews	Supervision of the learner is minimal. Learners will receive materials, resources, and technical support.
Physical Aspects of Site	Observation	*Facilities*: Learners will use their personal computers or a computer at the higher education site to access the training material. *Resources*: Online tutorial video and printed material. *Equipment*: These computers need to have download capabilities, Internet, access to the university

		server if accessing from a remote location and Adobe flash must be downloaded on the computers. The learners need a learning management system account on their computer. *Timing*: 45 min. with materials and software.
Social Aspects of Site	Observation	*Supervision*: As needed only for technical support. *Interaction*: Learners with materials and computer. *Others effectively use Skills*: The learners must possess minimal technological skills to complete module.
Relevance of Skills	Interviews and Observations	Meet the identified goal.

Section II

Needs Analysis and Instructional Goals

Needs Analysis was completed as a large group. The following is our portion of the needs analysis chart. We selected to focus on the goal that is in bold.

Topics	Needs	Goals	Method of Data Collections

Management	• Online course designers need to spell out their rules regarding assignment due dates and participation in their syllabi and direct students' attention to course guidelines and policies. • Online course designers need to be explicit about the participation rules. Students need to know how often they are expected to participate in online discussions to manage their time. • Online course designers need to organize information in an easy-to-follow order to save time for students. • Online course designers need to schedule regular office hours for students - even if those office hours are just times when they will definitely be online checking messages & let students know when those office hours are so they can either meet virtually or send urgent messages to during that time and get immediate response. • Online course designers need to create a discussion board for questions and direct students to go there to ask their questions. • Online course designers need to create an FAQ where students can check to see if their question was already asked and answered.	**Learner will generate strategies for students to utilize within the course that helps students manage time, participation, and assignments. (Problem-Solving – Intellectual Skills)** Learners will demonstrate learning management system skills and its functions, utilization of course tools given to maximize the helpfulness of the course, and provide proper feedback opportunities, materials, resource to students. (Intellectual Skills and Verbal Information) Learner will develop an online learning environment that is organized, easily navigational, and will help direct students to important information to promote meaningful learning outcomes. (Intellectual Skills and Verbal Skills)	Learner and Instructor interviews Online course review

Instructional Goals

Our main goal for our self-instructing module is:
Learners will generate strategies for students to utilize within an online course that will help students manage time (IS-PS)

The following are the sub-goals for our module:

Learners will create an assignment using a LMS (R)
Learners will create an assessment using a LMS (R)
Learners will create an electronic calendar using a LMS (R)

Section III

Task Analysis (Appendix A)