Development Phase of Instructional Design Model

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**Introduction**

In this development paper, I will discuss about the technical aspect of my development product, the navigation structure, and instructional design theories that influenced my development. I initially planned to develop my video using iMovie but I changed it to Powtoon, which allows me to create a more organized/structured video that is animated. I had to learn new tech skills because this is my first time developing video using Powtoon. I housed all my development products on my class website, thus I had to develop an additional page. I used Gagne’s Nine Event of Instruction along with instructional design theories, such as Merrill’s First Principles of Instruction (2002), Keller’s motivational theory, Cognitive Load Theory, and visual design principles to assist me in developing effective instruction and instructional materials.

**Technical Aspect of Development**

The technical aspect of my development process is developing the video to review the concept. To develop the video, I used Powtoon.com. It is a website that allows development of animated presentation slide and video. I the free version of the animated video to create my video. Since this was my first time using Powtoon, I watched the tutorial video that were provided. The first tutorial video that I watched was an interactive video that required me to interact with the tools that are available for use in Powtoon. Beside this video I simply played and experiment with the different kinds of tools available for creating my animated video

From experimenting with the different tools I learned how to add more video clips, select and search for a background, insert text and pictures. In addition to pictures, Powtoon has animated props that I can select from. Besides the pictures and props that what were available to me to use, I needed to insert my own picture because Powtoon does not have a ways for me to type up math equations. I had to view Powtoon video tutorial available on YouTube to learn how to insert my own media. As a result, I had to type up the math equations in word, take screen shots, and insert them as pictures in the video.

For the video, I wanted to have a voice recording of the content materials presented in the video. Therefore, I used Audacity to record my voice. I learned how to use Audacity from my ETEC 676D course. Audacity enabled me to record and edit voice recording. Even if I make mistakes, audacity allows me to cut any mistakes that I made. From ETEC 676D, I learned how to remove unwanted noises and trim my audio. I learned how to compressed and normalized my audio recording in Audacity by viewing YouTube tutorial videos. The compressor and normalized feature enabled me to edit my recording to sound more professional (clear and crisp).

**Navigation Structure**

 I organized all my development products on my class website by creating an AP Review page (http://xiong101.weebly.com/ap-review.html). On that page, I listed the three different lessons that review concepts and procedures on applying the definite integral to problems involving rectilinear motion. The focus for my project for only to develop instructional materials for lesson 3, position of a particle. For lesson 3, listed and created links to the necessary resources and materials for that lesson. I organized the list of items by sequence of occurrence during the lesson. For instance, the lesson plan or facilitator’s guide is listed first, followed by the video, handout/practice problems, and end of lesson assessment. See Appendices Folder for all development products.

**Instructional Design Theories**

Gagne’s Nine Events

 Instructional design theories influenced my decision about sequences of instructional

activities and development products. I developed my lesson plan or facilitator’s guide based on

Gagne’s Nine Events of Instruction. See Appendix A for my instructional flow chart, which

included all nine events.

Merrill’s First Principle

In addition to using Gagne’s Nine Event of Instruction as the structure for my lesson, I also applied Merrill’s First Principles of Instruction (2002) to assist me in developing effective instruction. I utilized the five principles (problem-centered, activation, demonstration, application, and integration) in the following manner. The problem centered in my instruction involves having students solve AP Calculus problems related to the definite integral concept of particle in rectilinear motion. In this particular lesson, students are engage in finding position of a particle or object. This lesson activates students’ prior knowledge because it reviews concepts and skills that students were taught. Students will be using previous experience, in particular, working with integrals and particle in rectilinear motion. The video in the lesson was utilized to help activate prior knowledge. The demonstration aspect was incorporated to have the instructor to first demonstrate how to use and apply the concept to related AP free response questions. Students then apply their knowledge with practice problems and on the end of lesson assessment (which are free response questions adapted from past AP exams). The lesson also included the integration principle by having students engaged in peer-mediated instruction. In the lesson, one student will assume the role of a coach and the other one will play the role of the tutee.

Keller’s ARCS Model

Besides focusing on developing the instructional structures, I also used Keller’s ARCS Model. ARCS model stands for Attention, Relevance, Confidence, and Satisfaction (What are the ARCS Categories?). This lesson was developed to provide student with intrinsic and extrinsic motivation. The instructional structure provided opportunities for students to review and practice skills and concepts that they already know and preparation for the AP exam (with a goal

to earn a college credit for the course).

Variability was used to get students’ attention. The lesson plan incorporated stating and displaying the learning objective for the lesson to get students’ attention. Furthermore, the short video was developed to review the concepts and procedures for applying the definite integral to finding position of a particle in rectilinear motion. Students’ attention is maintained in the lesson by working on adapted free response questions from past exam. Relevance is established in the lesson by informing students about how the concept of integral will be assess on the AP exam and practicing related free response questions to the topic. Practicing related questions from past exam also establishes confidence in students because they will be familiar with the topic and the format of how it will be assessed. Students’ satisfaction was met in the lessons because their need to work individually and then in pairs was incorporated in instructional activities. In addition, students are able to apply their knowledge to the appropriate level of rigor of the exam and evaluate their strengths and weaknesses using the scoring guide.

Cognitive Load Theory

 Cognitive Load Theory influenced my development of the video and handout/practice problems. I utilized what Chinnappan and Chandler (2010) and Ayres (2006) suggestion for teacher to reduce high intrinsic and extraneous load task. I lowered the cognitive load task by developing a video that only focused on one concept. I did not develop any AP related example problems in the video because I my goal was to minimize the complexity of the task and only want students to focus on recalling the mathematical concept. In the video, I also utilized both modality, visual and audio to help enhance learning and reduce the modality effect (Sweller, 2002). The math equations, pictures, props, and animation in the video provided students with a visual aid of the concepts and was integrated with the audio (a voice recording) to explain the abstract math concept.

I developed the handout/practice problems to include space for students to write on because it helps reduce high extraneous load task. Students. The handout contained the question and table, graphs, or equations, which enables students to directly write or mark up the questions, table, graphs, or equations. Integrating work or notes right onto the problems in the handout reduces split-attention effect (Sweller, 2002).

ABC’S R’US Visual Design Principles

I applied Beriswill’s ABC’s R’US visual design principles when I developed my website page for this project and my video. The visual design principles stand for Alignment, Balance, Contrast, Chunking, Repetition, and Simplicity (Beriswill). When I created my website page to house all my development product and my video, I applied the principle in reverse order of the acronym. That is, I started with simplicity and ended with alignment.

In my website page that house my development, I kept it simple. I had a small introduction to what is on the page and then items are listed in bullets. I used the same size font, style, and color throughout my entire website. Items that have an attachment or link has a blue color text. All the title of each page is at the top center. All texts are written on a white background for all pages. There is no picture on the page because I am using it to organize the necessary materials for this lesson. All texts are aligned on the left while the title is at the top of the page.

I applied simplicity in my video by including only the key concept or idea written on the screen. I used repetition by using only the same size font, style, and color throughout the video. Chunking was applied when I placed all the video slides’ heading (except the title slide) at the top of the screen. I created contrast in the video by having a white background and used black colored text. There was only one slide, with no text and only animated prop that had a background that was an olive green color but the props were black. I achieved balanced in my video by having equal weight of text and pictures or props per video slide. In the video, I aligned all my slide heading at the top center and all equation (which were imported as images) were aligned in the center.

Instructional Activities

 In the lesson, I designated time for students to practice the skills that goes with the concept that is reviewed in the short video. I applied Dobbins, Gagnon, and Ulrich (2014) suggestion on using peer-mediate instruction to assist students (especially students who have difficulty with mathematics) in reviewing concepts and skills. The peer-mediated instruction in the lesson was structured into a Kagan cooperative learning strategy known as Rally Coach (Clowes, 2011). In Rally Coach, students work in pairs and takes turn solving a problem while the other is the coach. Thus, students are given opportunity to be a tutor and tutee in the peer mediate instruction.

**Conclusion**

I developed my instruction and instructional materials based on instructional design theories. I had to teach myself to create an animated video using Powtoon for the first time. I utilized tutorial videos from Powtoon and from YouTube to assist me in creating my video. I also relied on tech skills from another course to help me record and edit audio for my video.

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