Master's Program Reflection

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In the design and development process of the solar array maintenance course I created for the Cincinnati Zoo as part of IDT7180 Learning Technology Field Experience, I applied cognitive information processing theory, cognitive load theory, and the cognitive theory of multimedia learning. During the analysis phase of the design, I discovered that part of the learning problem was that the frequency of the to-be-learned maintenance procedures was too low for learners to retain the information through automaticity from repeated rehearsal (Driscoll & Burner, 2022). To solve this problem, I activated learners' prior knowledge as electricians and demonstrated how this knowledge is relevant to the new information about solar arrays to encourage the cognitive process of encoding (Driscoll & Burner, 2022). I did this by basing the design of the course on Mayer and Moreno's cognitive theory of multimedia learning. I developed videos with narration and on-screen text as well as text and imaged-based referenced guides to encourage learners to construct both verbal and visual models of the information (Mayer & Moreno, n.d.). To reduce cognitive load, I provided pre-training in the form of background information on solar arrays prior to the maintenance procedures (Mayer & Moreno, 2003). Pre-training helps learners build mental models of both the system components and "how a change in one part of the system causes a change in another part" (Mayer & Moreno, 2003, p. 47). This was essential in this case, because the goal of the course was for learners to combine the new information about solar arrays with their prior knowledge as electricians to be able to perform and troubleshoot maintenance procedures on their own.

I applied the ADDIE model to the design of the solar array maintenance course. After conducting a needs analysis, I designed the program to solve the learning problem and suit the learning context. The zoo's Facility Director wanted to bring the maintenance of the solar arrays

in-house to be performed by zoo staff electricians. The program needed to be flexible to accommodate varying levels of previous solar knowledge among the intended learners. The program also needed to be easily accessible on mobile devices to meet the needs of the learning context: in this case, on the move around a 65-acre park. In developing the program, I filmed a Melink technician performing the maintenance procedures. I used this footage to create multimedia content including videos, text-and-image reference guides, and interactive photos, employing the lessons I learned about effective multimedia design in IDT7160 Multimedia Studio. I implemented the program using Articulate Rise and evaluated its performance in the learning context. The results from the think-aloud user observations and user questionnaires generated good ideas for the improvement of the program.

Among the authentic, technology-mediated learning experiences I have created are the solar array maintenance course in Articulate Rise for IDT7180, the blended learning program in Canvas, *Scuba Diving at the Cincinnati Zoo & Botanical Garden*, for IDT8030 Design of Blended Online Learning, and *Adventures in Water Quality* in Articulate Storyline for IDT7120 Tools for Online Learning.

In IDT8130 Master's Project IDT, I had the opportunity to complete the full lifecycle of the ADDIE model when I evaluated the technology and strategy of my solar array maintenance course. I used think-aloud user observations and user questionnaires to collect and analyze data as I learned to do in IDT7090 Usability Evaluations and IDT7085 User Experience Questionnaires. The think-aloud observations generated quality ideas for improvement, and the steps I took analyzing the quantitative data from the questionnaires will prepare me to evaluate future learning programs intended for larger groups of learners.

In IDT7170 and IDT4150, I analyzed current research and emerging trends in the areas of mobile learning and educational game design. In both classes, I had very positive experiences working collaboratively on wireframes for a learning app designed for urban school gardens and a video game that teaches survival skills. I learned about Jakob Nielsen's 10 usability heuristics in the design of user interface and went on to apply some of these to the design of my solar array maintenance course in Articulate Rise (Nielsen, 2020).

How have my learning experiences shaped my future goals? When I started this program, I initially chose the Education track, because I felt I lacked the technical aptitude for the Design and Development track. Luckily, I was given some very good advice by my advisor to begin my very first semester with IDT7160 Multimedia Studio and IDT7110 UDL Online. In Multimedia Studio, I learned the theoretical foundations of teaching through multimedia and developed the self-efficacy to learn whatever software program I needed to bring my ideas to fruition. I can recall having fits trying to complete my first assignment in iMovie (but seriously, who doesn't have fits when working in iMovie?), and now I've learned to use Adobe Premiere Pro and Captivate, Articulate Rise, Review, and Storyline, Figma, GitHub, Audacity, Twine, Construct 3 and more. I fear no new software. Except maybe coding. But that's what cross-functional teams are for, right?

As for UDL Online, I learned very important lessons in learner variability, which have guided the design of my projects from including captions in videos to providing multiple forms of the material in online learning programs. UDL Online also gave me a taste of the school system and curriculum standards, which further influenced my decision to take up the Design and Development track. Good call, Dr. Seo. I see what you did there.

All my teaching experience throughout my career has been non-formal, from certifying scuba divers to conducting first aid/CPR classes, performing live honeybee demonstrations for school children to training staff divers how to use underwater power tools. I love to teach. I love to engage, to inspire, and to empower my students. The IDT Master's program has not only given me the pedagogical foundation I need to build effective learning materials, but also the technical aptitude to express my creativity, enthusiasm, and nurturing in online teaching just as I have in person.

References

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