Learning To Fly
An Explanation of AECT Standards & Artifacts
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INTRODUCTION

Selecting representational artifacts covering a two and a half year body of work seems a bit like choosing one's favorite child. Each brings unique qualities to the table and forces the submitter to accept and reject based on their adherence to requirements set out by a completely independent body, in this case the Association for Educational Communications and Technology. Although I don't disagree with the standards they set forth, I did find myself rejecting wonderful creations because they did not quite hit the mark required by the standard.

During my research of the e-portfolio process, I learned many definitions of the term, "Metacognition." At first I thought that this was just another twenty-five cent word that educators sprinkle within their papers to prove that they are smarter than the individual reading them, but one definition of the process rang true with me. John Ottenhoff, Vice President for Academic Affairs and Dean of Faculty at the College of Idaho has described Metacognition as knowledge of one's own cognitive process (Ottenhoff, 2011). In short, this portfolio was a less a process of standing before a class demonstrating my talents with a computer and more of a final review for myself to learn how I actually learn.

This revelation has not made it any easier tossing a number of my children by the wayside, but the body of work presented provides a comprehensive demonstration of my learning process, and more importantly, how I use that learning process to teach others. I entered this program with a sound computer and technical background. The piece of Educational Technology that was missing was the Educational portion of the program. The artifacts within this portfolio and the justifications presented below clearly demonstrate that I have mastered the instruction and am ready to progress to, what I consider, the most important part of my continuing education, which is the implementation of what I have learned.

STANDARD 1 - CONTENT KNOWLEDGE - Candidates demonstrate the knowledge necessary to create, use, assess, and manage theoretical and practical applications of educational technologies and processes.

Indicator: Creating-*Candidates demonstrate the ability to create instructional materials and learning environments using a variety of systems approaches.*

Artifact: [EDTECH 501-RSS in Education](#)
Artifact: [EDTECH 513-Nuclear Podcast](#)

I've chosen two artifacts for this standard specifically because the standard specifies a variety of approaches. In my mind, one of the most important distinctions between traditional education and educational technology is the ability to present information in multiple forms, thus exposing the learner to multiple forms of the same material thereby ensuring that the requisite information is retained. Roxana Moreno and Richard Meyer illustrate this concept using thunder and lightning (Moreno & Meyer, 2000). A student learns to associate the visual lightning with the audible thunder. Their brain has intrinsically linked the two together. Therefore when the two are combined with an audible explanation of the phenomenon, that information is absorbed and

retained. They go on to state that it is the function of the Instructional Designer to choose the appropriate tools so that these connections may be made and learning enhanced.

The podcast artifact was designed out of necessity. As an instructor at a nuclear power plant, I'm confronted daily with the dilemma of too much work and too little time. At the same time, it is important for our engineers to stay connected with the happenings within the industry. While they may not spend the time to read a newsletter citing industry events, they will take the time to listen to a 5 minute audio piece describing them. Presenting the information in an audio format, allows them to listen to the information while they continue to open the computer applications required to start their day. By creating this learning environment, I have increased the odds that learning will take place on the job as well as in the classroom. The artifact has a distinct introduction so that the learner will hear the introduction and prepare themselves for informational input. Essentially, it is a Pavlovian marker informing our engineers that important information will follow.

The RSS tutorial uses a different approach, and although we have incorporated RSS feeds into our training program, this video was created to reach the educators who were my peers in the EDTECH 501 class. Although the instruction is entirely video, it, too, uses a variety of methods to reach the learner. I feel it's important to start each video with a face to face introduction describing the topic. This type of video introduction accomplishes two things. It sets the stage for the learner with a topical introduction and also establishes a visual mental presence in the learner's minds that this is their instructor for the remainder of the lesson. For me, this mental visual presence is most important. The learner will be hearing my voice for the remainder of the video. By establishing this mental image, I maintain my place in their mind for the remainder of the instruction; essentially, I'm sitting beside them while they learn. The other important factor in this unit of instruction is the screencast. Screencasting is especially useful when presenting topics which will require some sort of computer operation. The learners, in this case K-12 educators may not be particularly computer savvy. Therefore it is paramount that the lesson, not only tell them how to perform a task, but show them as well. The important concept here is to create varied environments within the platform to create the connections within the mind of the learner.

Indicator: Using-*Candidates demonstrate the ability to select and use technological resources and processes to support student learning and to enhance their pedagogy. (p. 141)*

Artifact: [EDTECH 536-Final Project](#)

While technology has presented educators with a great many opportunities, it has also created the same number of challenges. Quite literally, computers and technology make anything possible. This is both a blessing and a curse. In the past, the choice of learning materials and methodologies were narrowly focused and thus fairly standardized. Now, however, Instructional Designers and Educators are confronted with a wide range of selections and therefore must

choose the best methods for the presentation of their material. They need to ensure that the material is aligned to the objectives, that the information is up to date and accurate, that it engages the learners and maintains their interest (Molenda, 2013). Engaging the learners and maintaining their interest presents the greatest challenge. The generation of learners that today's educators face have been raised in a world where any information is available with the click of a mouse and video graphics are realistic and interactive.

The selected artifact for this standard has been selected precisely because it passes all the litmus tests mentioned above. Flash Kaard and the Chalice of Algor is a video game designed to teach elementary school students their math facts. I chose this format specifically because I feel that addition, subtraction and multiplication of numbers should be something that students do in their heads without writing out the calculations. The timed nature of the challenges forces the player to respond quickly to progress through the game. All too often educational video games "combine the entertainment value of a bad lecture with the educational value of a bad game" (Squire & Jenkins, 2003). When designing the game, I specifically tailored it after commercial games in order to capture the student's interest. The introduction and story are designed to engage the learner while the quest within the game keeps them at it. Essentially, they are playing a game much like The Legend of Zelda, but this time with math included as part of the experience.

Previously, such skills were taught using flash cards and required the students to demonstrate their skills in front of the class. By using a gaming format, the skills can be developed privately without peer pressure or fear of failure. Learning is self-paced and part of an enjoyable challenge. The barriers inserted into the game ensure that each student masters the required skills before progressing. While student evaluation is not directly possible, the gaming format offers great opportunities for the students to practice their skills while the instructor observes unobtrusively monitoring each individual's progress.

Indicator: Assessing/Evaluating-Candidates demonstrate the ability to assess and evaluate the effective integration of appropriate technologies and instructional materials

Artifact: EDTECH 501-School Evaluation Summary

The evaluation specified in this artifact is not the evaluation of students, but instead, it is an evaluation of the tools used to teach the students. Given the ever-changing nature of technological development and the natural resistance of educators to adapt to the change, evaluation is the most important part of the ADDIE process. Throughout this program, what has surprised me the most is the lack of resources when it comes to educating the educators. While school districts are happily spending tens of thousands of dollars equipping classrooms with tablets and chrome books, it seems they balk at investing a mere fraction of that expenditure teaching their teachers to properly use the equipment. Joe and Noel Bitner cite this lack of education as one of the primary reasons for delays in incorporating technology into the

classroom. They point out that fully integrating technology not only involves a change in normal classroom procedures but also requires teachers to use tools that may be unfamiliar to them (Bitner & Bitner, 2002).

My artifact for this indicator is an analysis of the use of technology when training workers at the Millstone Nuclear Power Station. It might be assumed that, as a large Fortune 500 company, Dominion Power would fully embrace the use of technology in training its workers. My evaluation of our program revealed quite the opposite. Indeed, we are doing exactly what our educational counterparts are doing. We are investing a great deal of capital equipping our classrooms with technology, but investing very little in actually training our trainers to use it. In fact, my assessment revealed that we were only achieving a 2.2 on a 4.0 scale with our incorporation of technology into are training program. Given the fact that we are undergoing a radical change in our workforce due to aging issues, this rating is unacceptable. Our instructors are generally chosen based on their knowledge of the subject matter and therefore are not always well equipped to create informative and engaging lessons for the classroom. They may be at ease delivering a Power Point presentation, but when it comes to fully utilizing technology's potential in the classroom at Millstone, as with the education world in general, more training is required.

Indicator: Managing-*Candidates demonstrate the ability to effectively manage people, processes, physical infrastructures, and financial resources to achieve predetermined goals.*

Artifact: EDTECH 512-Course Documentation

As can be imagined, operating and maintaining a forty year old nuclear power plant can be a time consuming experience. Nuclear plant generation companies are confronted with these challenges daily and work to balance maintaining their equipment with the training required to keep their workforce well educated. Additionally, these companies face the challenge of an aging workforce with almost five percent of their employees retiring on a monthly basis. These retirements mean that replacement workers are necessary and that the training of these workers becomes just as important as the maintenance they perform. A recent paper on the aging workforce urged companies to create a large pool of workers from which to hire (Lave, Ashworth & Gellings, 2007). Creating such a base of possible recruits will require new methods of thinking on the part of these companies. Traditional educational methods are not ideal for this given task. Bringing recruits in for traditional classroom instruction will divert resources from training departments. These resources are better used training those already hired instead of those who may be possibly hired in the future.

The artifact presented demonstrates a possible middle ground for these companies. Creating an online course presenting the fundamentals of nuclear power allows these companies an opportunity to turn a relatively small investment of server space and a part time instructor into the long term gain of an educated pool from which to attract new hires. By utilizing an online approach to the problem, companies are able to trade the investment of the student's time, with

the possibility of a job interview in the future. By making such a program mandatory for consideration, these companies assure themselves of a pre-educated workforce without investing the capital required for paying their wages. Indeed, such programs could be used to enhance the company image by offering such programs for current military service members increasing their chances of finding employment upon discharge. The selected artifact describes the format of such a program as well as defining learning outcomes and evaluation methods.

Indicator: Ethics*-Candidates demonstrate the contemporary professional ethics of the field as defined and developed by the Association for Educational Communications and Technology.*

Artifact: EDTECH 504-Final Paper Peer Review

Section 1, sub-section 4 of the AECT's Code of Ethics states that "In fulfilling obligations to individuals, members shall conduct professional business so as to protect the privacy and maintain the personal integrity of the individual." (AECT, 2007). Protecting the privacy of the individual is the cornerstone to any profession in which personal interactions take place. As an instructor, it is paramount that individual deficiencies be kept private from the rest of the group. The public forum is a place for praise, while critiques should be conducted away from the eyes and ears of the rest of the group. Peer reviews in a classroom environment challenge these norms. On the one hand, much can be gained by reviewing submissions and having one's own submissions reviews. On the other hand, such reviews point out weaknesses and may be a source of embarrassment for the creator of the material. Such situations are regularly encountered in an online learning environment.

The artifact chosen for this requirement is a peer review I performed during the EDTECH 504 course. I found the piece I was assigned to review lacking in a number of areas. A great many of my peers in the class performed only cursory review of others material, generally stating that they loved the submissions they reviewed and "Great Job!!!." As a student, the last thing I want to see when someone is reviewing my material is "Great Job!!!" It suggests a level of enthusiasm which is better expended on a third grade spelling test rather than a final paper submitted in a Master's Degree program. It also indicates to me that the reviewer did not spend the time necessary going over the material and took the coward's way out. Every written piece in the world can do with a bit of editing. Editing, by its very nature, is often subjective and no two individuals are always going to agree on the way in which a sentence should be constructed. I felt submitting a review such as this would do a disservice to my peer. At the same time, I knew if I submitted the artifact to the forum, it might prove to be a source of embarrassment to them in front of the class. I circumvented this dilemma by submitting my review to them via a private email. At the completion of the class, I obtained permission from the individual to use the edited product as a portfolio artifact. I, of course, deleted the name from the final product, but I wanted to share it because I feel that the suggested changes led to a better overall product and provided food for thought as others tackled the same assignment.

STANDARD 2 - CONTENT PEDAGOGY - Candidates develop as reflective practitioners able to demonstrate effective implementation of educational technologies and processes based on contemporary content and pedagogy.

Indicator: Creating- Candidates apply content pedagogy to create appropriate applications of processes and technologies to improve learning and performance outcomes.

Artifact: EDTECH 502-Interactive Concept Map

Often times as an educator, it is necessary to present identical material in various ways. One of the unique capabilities of the online learning environment is that it allows an Instructional Designer to hyperlink illustrations to other, more expansive descriptions. By doing so, the learner is presented with a series of related visuals tied to more detailed descriptions. Using images arranged to create a concept provides navigational cues that are often absent in materials which present hyperlinks as series of words linked to other articles (Sumner et al., 2005). These navigational cues are a great help when it comes to understanding larger concepts.

The interactive concept map created for this artifact was chosen specifically for the reasons stated above. The learner is presented with a visual outline of a Reactor Protection System. The various images are then linked to more specific material providing information on the system's various components. In this lesson, it is important that the learner take away both general, the block diagram of the Reactor Protection System, and specific, Introduction to Nuclear Instrumentation, knowledge in order for the lesson to be effective. By selecting an interactive concept map to deliver the material, I was able to provide both in a single lesson format, thus providing the learner with a "One Stop Shop" for Reactor Protection knowledge. Additionally, such a format provides a means in which the learner can go back and review what they have learned. The HTML format creates a means of presenting the material online accessible via the group's web page. This provides an ease of access not available in the traditional text format. Presented as text, this lesson would consume a great number pages and require the learner to skip back and forth within the text to glean the required information from the words provided. The concept map format allows all information to be available at the click of a mouse button.

Choosing the appropriate format for material will become increasingly important in the future. Educational Technology currently and will continue to provide an infinite means for presenting class material. It is the task of the Instructional Designer and Educators to choose the appropriate means of presentation. Bells and whistles are perfectly acceptable as long as they enhance the presentation. When they venture into the realm of providing distractions, methods should be rethought and retooled to improve learning.

Indicator: Using - Candidates implement appropriate educational technologies and processes based on appropriate content pedagogy.

Artifact:

As previously stated, Educational Technology offers a wide range of formats to choose from when creating a presentation. At times, the choice of format can be as challenging as creating the material itself. The ASSURE model (Molenda, 2013) serves as a good jumping off point for selecting the appropriate technology to use to present material. In that model, the learners are analyzed, objectives are created, media is chosen and utilized in order to require learner participation and lastly, methods are evaluated to ensure that they are appropriate given the lesson's objectives.

The Rich Media Tutorial chosen for this artifact serves and a fine example of material, method and media combining to present an engaging learning experience. Although creating a website is something that can be described an illustrated. There is no substitute for a well presented screencast as a format for teaching the rudimentary computer user on expanding their talents. The goal of the lesson is to teach the student how to create a website that looks exactly as they envision it, without making compromises based on limited computer skills. As such the lesson needs to be broken up into sections addressing selection of the illustrative components and then assembling those components together in an HTML format. The use of the screencast allows the learner to follow along and duplicate the steps as required. An ideal learning experience would involve the learner opening the appropriate programs with their own content and viewing the results as they progressed. The end goal being that the user gains confidence and learns to apply the techniques as they develop websites for their own use. To be sure, a different format might have been chosen, but such choices may lead to confusion on the part of the learner. By projecting captured video of the process at work, the students know that the tools function as designed, and furthermore that their application of the process can be successful as well.

Indicator: Assessing/Evaluating - *Candidates demonstrate an inquiry process that assesses the adequacy of learning and evaluates the instruction and implementation of educational technologies and processes grounded in reflective practice.*

Artifact:

Two of the greatest barriers to wide spread online education are concerns over the quality of learning outcomes and the additional support and expertise required to present top notch online classes (Allen & Seaman, 2013). While the second issue tends to fade away as educators become more familiar with online formats and courses are designed and presented in subsequent semesters, the quality of learning outcomes remains a great challenge. For me, the greatest obstacle to quality regarding learning outcomes is the standardization of format, and the ability of both teachers and learners to adopt that format successfully.

In the brick and mortar world, different teachers have different styles, each adopting their own to play to their individual strengths. While styles may differ, the single overriding constant

in brick and mortar education is the classroom. Students know as they slide into their seats and the teacher stands before them that teaching and learning are expected to occur. This expectation must be translated to the online environment in order for distance learning to be truly effective. Evaluating various online courses to a standard serves as a means to accomplish this.

The artifact for this indicator is a comparison of two online courses. The rubric I chose to evaluate the courses was taken from the Quality Matters organization and is actually one I used to evaluate my own online course in EDTECH 512. One of the underlying principles of a Quality Matters review is that it is "based on collaboratively identified evidence found in the course rather than the personal preference of an individual reviewer." Such reviews are vital for the continuous improvement of Educational Technology. Best practices should be adopted by all. This is not to say that online learning should be a homogeneous experience. As with the classroom, online educators should adapt the framework online learning to best fit their style, but as the classroom stands as a constant in the brick and mortar world, so too, should a standardized format be used for the virtual classroom. Rubrics such as the one derived by the Quality Matters organization should be created and each online class presented by an organization should be held up against this common measuring stick. As new and better technologies become available, they should be incorporated into programs and their results evaluated. Distance learning presents limitless opportunities, but those opportunities should never lose sight of the ultimate goal, which is the transfer of knowledge.

Indicator: Managing - *Candidates manage appropriate technological processes and resources to provide supportive learning communities, create flexible and diverse learning environments, and develop and demonstrate appropriate content pedagogy.*

Artifacts: , [EDTECH 505 Summary Activity](#) [EDTECH 505 Course Summary](#)

I selected two interrelated artifacts for this indicator in order to show how disparate activities can combine to create a supportive learning environment. The first artifact provides a weekly review of material covered in the EDTECH 505 course. Rather than just a simple series of questions, I wanted to create a fun activity which would stimulate conversation in the class. Turning weekly review questions into a hidden object game promotes discussion within the group. While all students should know the correct answers to the questions, not all may be able to find the appropriate items within the room. Educational gaming exercises promote communication and social interaction between the participants (Kriz, 2003). These interactions create a situation where the students, not the teacher, create a supportive learning environment. Making the game a continuing class length exercise with a reward at the end of extra credit points means that the students will continually participate and communication will continue to grow over the length of the semester. It also means that the students do not have to complete the activity during the appropriate week, which allows them the flexibility to concentrate on other assignments when necessary.

The second portion of this artifact is a review of the material covered during the course. The Pow Toon video format was specifically chosen because it creates an entertaining learning environment while still covering many of the germane facts presented during the course. The courtroom theme and various witnesses allowed me to break the video into chapter segments, highlighting the important concepts of each chapter. Essentially this format allows me to say to the student indirectly, "Here is what you should know for Chapter 1, Chapter 2, etc." There are, of course, many ways to conduct an effective review and present the material, but the cartoon format allows the learner to take a breath and enjoy the summary of a great deal of material.

Indicator: Ethics *- Candidates design and select media, technology, and processes that emphasize the diversity of our society as a multicultural community.*

Artifact: [EDTECH 502-M-Learning Activity](#)

Few things cut across multicultural lines like art. While the forms and construction may differ, each culture brings its unique perspective to the art it creates. Likewise, every culture appreciates the beauty that art adds to the world. For this artifact, I've chosen an m-learning activity I created regarding the mural art in New London, Connecticut. Downtown New London has a rich history, and oddly enough is home to largest collection of mural art in New England. By combining pre-packaged historical walks created by the New London Landmarks Association with a YouTube video produced by the Hygienic Art Gallery, I've created an opportunity for students to discover and enjoy the art that surrounds them while at the same time taking in the history of this longtime whaling town.

I chose the m-learning format for this activity specifically because it takes advantage of all the tools available on a cell phone. Unlike tethered e-learning which utilizes desktops and laptops, m-learning takes advantage of handheld computers and mobile phones (Traxler, 2009). During the course of the activity, students access the internet, watch videos and use their GPS along with Google Maps to track their route. Additionally, they use their camera function to take pictures of themselves in front of their favorite mural and post it to their Facebook page.

Anyone who has seen a group of elementary school students at an art museum knows the issues that such a group has with art appreciation. Conversations take place in hushed tones, and the self-expression that art should inspire is muted based solely on the venue. By moving the art appreciation outdoors and linking it with phone based activities, suddenly art becomes a bit cooler. Thankfully the mural art in New London features a wide diversity of ethnicities and types, running the gamut from Andrew Wyland to Sol Lewitt. Because the students are in an outdoors environment, they can express their opinions and discuss the differences and similarities that the art portrays.

STANDARD 3 – LEARNING ENVIRONMENTS - Candidates facilitate learning by creating, using, evaluating, and managing effective learning environments.

Indicator: Creating *- Candidates create instructional design products based on learning principles and research-based best practices.*

Artifact: EDTECH 502-Webquest

Every four years, classrooms around the country hold mock elections. These activities empower students, teaching them language, critical thinking skills and the democratic process (Today, The School, Tomorrow-The World). Unfortunately, such activities generally are limited to coincide with actual elections. I've chosen this particular artifact for the reason that it combines the best practices of a mock election with a background lesson in presidential history. Additionally, this activity has the advantage that it can be performed each year regardless of whether an election is being held.

The lesson also allows students to choose how they will function as a team and encourages them to work together to choose the best candidate and present the best product. Along with the natural competition that an activity such as this produces, there is the added incentive of extra points on the assignment. By providing multiple resources to presidential facts, the exercise allows the students to pick and choose their factual sources, tailoring their learning experience to what they do best.

Lastly, the activity presents an opportunity for public speaking without forcing individuals who may not be comfortable to participate. Again, the purpose of the exercise is for each individual to play to their strengths and downplay their weaknesses. Allowing the students to choose their roles within the team creates an opportunity for learning without being threatened or uncomfortable.

Indicator: Using *- Candidates make professionally sound decisions in selecting appropriate processes and resources to provide optimal conditions for learning based on principles, theories, and effective practices.*

Artifact: EDTECH 511-Interactive Courseware

One of the best things about computer learning and educational technology in general is the ability to create virtual worlds in which learning can take place. The artifact for this indicator demonstrates the power of the computer environment. The Adobe Flash activity submitted uses a multiple approach format to reach the learners. In this case, they are learning about electricity. Although helpful, lectures and videos do not always reach every student in the class. Often with science a hands on approach completes the circle. Indeed research has shown that hands on activities enhance cognitive learning (Korwin & Jones, 1990).

While proven, often the cost and availability of the hands on activities can prove prohibitive. With electricity, the traditional approach would be to purchase a number of circuit boards and have the students engage in a guided experiment. There would be very little free experimentation due to the fact that electricity can be dangerous. Such experiments, while quite useful, would have the drawbacks of the danger factor and the cost factor. This activity eliminates that

downside. Creating a virtual circuits lab allows the students to participate in both supervised and unsupervised experiments. The can put their components in any configuration they want without fear of damaging school property. Additionally, such an activity allows elementary school students with limited mechanical ability to learn as well as their dexterous counterparts. In short, the computer learning environment levels the playing field. Lastly, the entire question of cost is eliminated by using such a program. The entire activity uses a common web browser that every tablet or computer possesses. This eliminates the cost of purchasing expensive proprietary software and eliminates the expense and storage of traditional circuit kits. This activity combines the best a traditional learning with ease of use of modern technology.

Indicator: Assessing/Evaluating - *Candidates use multiple assessment strategies to collect data for informing decisions to improve instructional practice, learner outcomes, and the learning environment.*

Artifact: [EDTECH 505-Final Evaluation Report](#)

Every so often an academic assignment aligns perfectly with real world needs. For me, the EDTECH 505 final evaluation report was just such an assignment. Our power station has recently seen a large transition of its workforce. As a result of the knowledge drain, station efforts in troubleshooting broken equipment has suffered. This issue came to a head in November 2014 when INPO, (Institute of Nuclear Power Operators) our internal regulating agency, issued an Area For Improvement on Complex Troubleshooting. As a result of this AFI, we were tasked with performing Troubleshooting Training for all engineers on the site. Given the fact that the Engineering Training Population consists of approximately 200 Engineers, this was no small undertaking. All training conducted at the power station is subject to an effectiveness review, but as this training was required to correct an INPO identified deficiency, the evaluation for this training had to be well constructed as a package for evidence should they require it.

The methodology for this evaluation was based on direct and historic observations of troubleshooting efforts with a concrete set of grading criteria. As with anything in the nuclear world, results of this evaluation had to be based on the facts, just the facts and only the facts. Because we wanted to change not only the knowledge level of the engineering workforce, but their behaviors as well, an additional review was conducted of our grading of the, so called, Red and Green Behaviors. Lastly, because nuclear power is a results based business, a final review of reworked equipment was conducted. It is interesting to note that while there are many models for training, all models contain some form of evaluation as their conclusion (Eseryel, 2002). The results of the evaluation showed that the training had hit the mark and that troubleshooting efforts at the station showed a step change in performance. As a result, this training has been included as part of the initial training for all new engineers at the power station. In this way, we

can ensure that we maintain our level of knowledge and expertise at a high level and transform an Area For Improvement into a strength.

Indicator: Managing *- Candidates establish mechanisms for maintaining the technology infrastructure to improve learning and performance.*

Artifact: [EDTECH 505-Evaluation Proposal](#)

For better or for worse, competition is the Banquo-like specter lurking over all industries. Everywhere, individuals within a construct are being asked to do more with less. This paradigm becomes particularly annoying when it involves new products and opportunities. Companies, already stretched to the limits of their budgets, hesitate when confronted by emerging markets. Formative evaluations offer such companies an ideal tool by which to chart their course.

The artifact submitted for this indicator manages just such an issue. The company in question is looking to expand its business and is interested in using its Determining Instructional Purposes program to do so. The evaluation proposed will analyze the existing technology to establish whether or not it can support and sustain the desired growth. The evaluation is broken up into three parts; one for each facet of the proposed expansion. With the end goal being improved performance and sales opportunities, the evaluation looks at the program's viability, marketability and sustainability. The proposal outlines a series of steps for gathering data to determine each. Although tailored specifically for the hypothetical company presented in the assignment, the mechanisms established by the proposal would work as a means to manage any technology infrastructure. Its goals and methods would be useful for any such program.

In 1967, Thomas F. Gilbert established Rule One for a theoretical approach to learning he named, Praxeonomy. His approach was intended to aim training exactly where it was required. To do so, he insisted, one must apply the following equation, $Deficiency = Mastery - Initial\ Repertory$. This theory is at the forefront of industry's approach to worker training. Training is targeted such that it closes the gaps within the workforce. By doing so, companies become more competitive as they expend fewer resources to improve performance. Tools such as this artifact can only help them achieve their goals.

Indicator: Ethics *- Candidates foster a learning environment in which ethics guide practice that promotes health, safety, best practice, and respect for copyright, Fair Use, and appropriate open access to resources.*

Artifact: [EDTECH 502-Copyright Scavenger Hunt](#)

The layout of the internet and its browser programs, by their very nature, blur the lines of copyright. One need only click on the developer's tools tab to view the code that may have taken days to produce. That code can then be replicated in a text editor and voila, the interloper has a readymade website that they can tweak to serve their own purposes. Additionally, a right mouse

click on a web-based image results in the ability of the user to make that image their own. The possibilities of the internet are endless as demonstrated by Napster's rapid growth at the turn of the century (Green, 2002), and while personal copyright infringement is mired in modern day legal quicksand, such issues have no home in the academic world.

It is important that learners are exposed to these copyright issues at an early age. It is no coincidence that plagiarism web tools have been created. When informational content approaches infinity, students may be inclined to take the plagiaristic plunge. I actually had a fellow student in an undergraduate class who submitted a solution to a homework problem that he retrieved from an internet site as his own work. He was caught and expelled, of course, but it was only because he copy and pasted the solution as it was posted on the website. Had he had the foresight to change the variables of the problem and the format of the solution, undoubtedly he would have sailed through the course, the professor none the wiser. This is why the artifact submitted for this indicator is so important. Copyright infringement is the gateway drug to plagiarism.

The scavenger hunt provided to the students with this artifact seeks to teach them, not only the difference between right and wrong, but where the grey areas lie in copyright law. There are some, myself included, who believe that everything should be out there. That if something is on the internet, it should be free to use for anyone, but, then again, I'm not making my living writing whiz bang web pages. The artifact guides the student through the lesson while providing links for them to expand their knowledge. It also presents an interactive quiz in order for the learner to test their knowledge on completion of the activity.

Indicator: Diversity of Learners - *Candidates foster a learning community that empowers learners with diverse backgrounds, characteristics, and abilities.*

Artifact: EDTECH 502-Virtual Field Trip

The artifact submitted for this indicator is a comprehensive lesson on the Panama Canal. I had the added benefit of actually passing through the canal while creating the lesson. I designed the lesson such that it would appeal to all types of learners. There are various sections covering varying aspects of the canal ranging from its history to its engineering principals. There are also various activities included in each lesson. I felt it was important to include different types of questions in an activity such as this. Multiple choice quizzes are an adequate means of testing basic knowledge retention, but with a modern wonder such as the Panama Canal, it is important that the learners consider how the facts fit together rather than just the facts themselves.

I also felt it important to include various formats of message delivery. Students learn best when there is a combination of motivations and strategies employed when creating the learning environment (Garrison & Cleveland-Innes, 2005). By allowing the students to freely navigate the lesson, they explore as they see fit and thus control their own learning experience. Educational technology allows lessons such as this artifact to be used with a 24/7 environment. By making learning entertaining, students become part of the journey. Through the use of hyperlinks and

search engines, they can go as far down the rabbit hole as they choose. This promotes deep learning where the student seeks to understand and explore. The results can only be beneficial.

STANDARD 4 – PROFESSIONAL KNOWLEDGE AND SKILLS - Candidates design, develop, implement, and evaluate technology-rich learning environments within a supportive community of practice.

Indicator: Collaborative Practice *- Candidates collaborate with their peers and subject matter experts to analyze learners, develop and design instruction, and evaluate its impact on learners.*

Artifact: [EDTECH 503 Design Project Package](#)

As previously mentioned, at Millstone Power Station, we are experiencing a large turnover in our work force. The artifact submitted for this indicator was an activity designed to qualify more of those workers to test circuit breakers. This is an important in plant skill where the lack of qualified individuals is affecting the ability of the maintenance department to keep up with their workload.

The first portion of the package analyzes the demographics within the Electrical Maintenance Department. The pre-course analysis consisted of a survey distributed to the workers. The results of that survey were tabulated and presented ample evidence supporting the need for this course. An examination of the qualifications of those workers qualified to perform high current testing on circuit breakers also took place which again supported developing and teaching this course.

From the analysis, objectives were then developed in conjunction with the Subject Matter Expert from Electrical Maintenance. These objectives were covered in the instructional materials developed for the course. It was determined that the most effective course of action would be to hold the course in the Breaker Overhaul Facility which houses the CB 8130 test equipment. The instruction consisted of a Power Point Presentation followed by an actual demonstration of high current testing. The evaluation of the learners was administered in two parts; the first being a written examination and the second an evaluation of the learner's ability to perform high current testing on circuit breakers. Successful completion of a Task Performance Evaluation is required for full qualification.

After completing the design of the materials for the lesson, I again met with the SME to review the materials to enhance the learning experience. Some tweaks were performed and a simulation utilizing a computer model was added to allow the students to identify when a breaker failed its high current testing.

Indicator: Leadership *- Candidates lead their peers in designing and implementing technology-supported learning.*

Artifact: [EDTECH 522-Online Learning Tools](#)

Of all the standards and indicators presented by the AECT, for me, this is the most important. I believe in Educational Technology as a craft and believe it is the best way forward for teaching our children. Without leadership in the field, other schools will suffer a fate similar to that of some New York schools in 2007, where laptop computers were removed from classrooms due to under use (Hu, 2007). Today's educators need to move beyond being computer users and instead embrace the role of computer designer. They must be able to create content rather than just using snippets they download from websites like Vimeo and YouTube.

This artifact encourages teachers to do just that. The video, which is a brief introduction to the world of Pow Toon, shows teachers how such free tools can be used to create classroom content. While the assignment called for a voice thread to be created to demonstrate an Educational Technology learning tool, I decided to use the tool itself to create the presentation. The goal of the presentation was not only to introduce my peers to the possibilities of using cartoons for learning, it was also there to inspire them to create their own lessons. The presentation outlined the best practices to be used with cartoon learning stressing that while the entire class shouldn't be taught by cartoons, there were some areas within a presentation where out of the box thinking would be appropriate. I feel it's important when introducing a technology tool to also suggest ways of using it. Such a practice sparks creativity and allows educators to strike out on their own. The goal of using such tools is not to be Stephen Spielberg, but instead offer entertaining alternatives to a class, which increases engagement and promotes learning.

Reflection on Practice - *Candidates analyze and interpret data and artifacts and reflect on the effectiveness of the design, development and implementation of technology-supported instruction and learning to enhance their professional growth.*

Artifact: [EDTECH 501-Tech Trends](#)

Some of the most common barriers to integrating technology in the classroom are time, training, resources and support (Dias, 1999). While these barriers are commonly mentioned, the barrier that is often omitted is foresight. Merely keeping pace with technological development is not enough. Educators need to get ahead of the curve in order to truly affect their classroom environment. Consider education's track record with the internet. Twenty years ago, the internet burst onto the scene as a repository for knowledge. Only in the last ten years has the education community viewed the internet as a valuable resource.

Three dimensional printing is the next step change in technology. School science departments in England have already introduced 3D printing to produce components to create working rockets (Paton, 2013). The same creative spark that YouTube gave to burgeoning cinematographers will be given to all students as they can actually create three dimensional representations of their ideas. We have already incorporated 3D technology into our lessons at the power station. In a recent course on circuit breakers, software which allows the learner to manipulate various components within the breaker in a three dimensional space was utilized such that the student could see the ramifications of removing the component before performing the

manipulation on plant equipment. In an agreement with the software's owner, I am working at rewriting the program such that it guides the student through the procedure ensuring all steps are followed. This artifact represents my research into three dimensional printing and the opportunities it presents.

Assessing/Evaluating *- Candidates design and implement assessment and evaluation plans that align with learning goals and instructional activities.*

Artifact: [EDTECH 512 Online Course](#)

One of the things I've enjoyed most about the program has been the ability to create alternate forms of student evaluation. All too often, even in the online educational world, assessments are limited to the typical multiple choice exams and submitted written assignments. Online learning allows an instructor to create assignments which are both enjoyable and revealing. These type of alternative assessments allow the learners to display their critical thinking skills while at the same time engaging them in an activity that stretches the borders of tradition (Muirhead, 2002).

There are two specific evaluation methods within this artifact that demonstrate the ability to create engaging activities while still being able to measure a student's progress. The "Which Superhero Are You?" activity is an interactive quiz activity that tests the objectives of the first unit of instruction. While a specific grade is not given for the activity, by knowing which character will be revealed for a given score, the instructor can gauge the learner's progress without revealing the grade of each student. The student is required to reveal which superhero they were in the corresponding writing assignment, thereby allowing the instructor to evaluate while they review the response.

Another activity used in the class is a decoding activity based on the radioactive decay of various elements. Obviously the objectives of this lesson could be tested by a series of questions requiring the learner to reference a Table of Nuclides and identify the subsequent isotope, but such an evaluation is not nearly as engaging as a decoding activity where the correct isotope reveals a single letter in a word. Again, such and activity allows the instructor to evaluate a learner based on their response submitted during the week's writing assignment. The advantage of this type of examination is that it allows the learner to self-correct should they answer a question incorrectly. As the code word is itself a name of an element, they may be able to identify where they went wrong, allowing them to go back and repeat the area of deficiency.

Indicator: Ethics *- Candidates demonstrate ethical behavior within the applicable cultural context during all aspects of their work and with respect for the diversity of learners in each setting.*

Artifact: [EDTECH 502-Accessability Hot Links](#)

In the interest of full disclosure, I must admit that I never thought about web accessibility prior to this program. To be sure, I tailored my message to the audience I wanted to reach, but never once did I give consideration to those who may have been different from me. Since this program, I have been very careful with my lesson development so that I would be able to achieve the maximum knowledge transfer. The difference in computer users was truly illustrated to me by, of all people, my step mother. She and my father are in their seventies and last year, I purchased a tablet computer for them. Last month I noticed her using a different tablet. When I asked her why she replied that this tablet was one she could use and understand and was given to her by AARP. To my surprise, she had the identical tablet, but AARP had set it up so that all the apps were on a single page. With the previous tablet, they were not. That single difference made all the difference in the world for her and it dawned on me that the same held true for website design. The differences between a good website and a great one are small, but important.

The artifact submitted for this indicator is a web accessibility page I designed for EDTECH 502. It outlines some important considerations to consider when designing websites. In my mind, however, the most important consideration is the fact that, as an Instructional Designer, one needs to consider the diversity of the possible audience. The growth in online education has also seen a number of older individuals return to school. These individuals may not always have the advanced computer skills of their younger peers. It is vital that all lessons and material be accessible and clearly marked. Learning new things while working full time is a difficult enough task. The designer should ensure that the learning curve for accessing the material doesn't exceed the curve of the course itself.

STANDARD 5 – RESEARCH - Candidates design, develop, implement, and evaluate technology-rich learning environments within a supportive community of practice.

***Indicator: Theoretical Foundations** - Candidates demonstrate foundational knowledge of the contribution of research to the past and current theory of educational communications and technology.*

Artifact: EDTECH 504-Annotated Bibliography

Oftentimes in education, it is difficult to distinguish between knowledge and belief (Nespor, 1987). What we think we know inherently may directly contradict what someone has learned empirically. Thus it becomes vital that we as educators validate our assumptions and beliefs against the cold light of day of empirical facts. The artifact submitted demonstrates part of the research I used as I delved into as part of my research into game based learning.

The annotated bibliography is a useful tool. Beyond indicating that actual research was performed, it provides a glimpse into the mind of the writer as to what they consider the important contribution of each source to their overall end product. At the start of my research, I believed that game based learning could be a useful tool; if only the games were better constructed. My research into the writings of those listed in my bibliography confirmed that belief, and in the case of Marc Prensky, has led to deeper research and respect. In fact I plan on

volunteering for his new curriculum project following my receipt of this degree. One thing that particularly pleased me during my research was the ability of educators as an institution to turn a critical eye on themselves and admit that they may not have the answer to everything. Research for research sake, in my mind, wastes both time and resources. There should be an end goal in any research undertaking, a desire to make things better.

Indicator: Method - *Candidates apply research methodologies to solve problems and enhance practice.*

Artifact: [EDTECH 504-Learning Theories Paper](#)

Research is the key to learning. In fact, to me, online learning is all about research and the ability to chase an information trail and discover all a topic has to offer. I will confess up front that I'm a lousy student. If I were forced to attend a brick and mortar university to obtain my degree, this paper would not be written, but I love the learning environment that online classes create. Students are given a few key clues in the form of class materials and should they limit themselves to these lessons, no doubt they would pass the course with the minimum standards, but those who follow those clues laid out by the material are the ones who are truly successful. In an odd way, the lack of a formal class schedule and set hours sets those students free.

I have always seem myself as an autodidact. Given the nature of the things I've learned, I've had to be. One of my hobbies and great joys is the brewing and distillation of whiskey. As can be imagined, ten years ago, there was not a great deal of printed material available on the subject. The advent of the micro-distillery revolution has changed that, but when I was learning, the information was limited to forums and obscure websites where people of like interest gathered together. In order to learn, I was forced to scour question and answer threads. By combining this research with a healthy dose of trial and error, I was able to teach myself the craft. When human curiosity and the desire to learn is combined with the technology of hyperlinks, the sky is truly the limit.

The artifact submitted for this indicator is a learning theories paper written for EDTECH 504. A brief perusal of my portfolio will reveal to any observer that I enjoy combining knowledge with illustration and animation. I believe it works best, and this belief is buttressed by some of the best minds in the field of Educational Technology. It is a practice that I've applied in my career. A number of my peers create their presentation with the written material on the slide and then read those slides to students. Any combination of words and images are frivolous at best. I've spent the last two years preaching Mayer's Redundancy Principle to my peers. Slides of a presentation should be infographics accompanied by narration (Mayer, 2001). While creating the right image is not always easy, my research has shown me that it is the best way to help students learn.

Indicator: Assessing/Evaluating - *Candidates apply formal inquiry strategies in assessing and evaluating processes and resources for learning and performance.*

Artifact: [EDTECH 501-Technology Use Plan](#)

Technology is not always the answer. I suppose that sentence seems sacrilegious coming from an Education Technology candidate, but the sad fact is that throwing the wrong technology at a problem in order to solve it is worse than no technology at all. The quantity and quality of technology in a classroom is not as important as how that technology is integrated into the day to day activities of the students (Bennett & Everhart, 2003). At work, I recently experienced the "Ready, Fire, Aim" approach I outline in the artifact. My Training Manager came to me with a proposal to purchase a large number of tablets for our classrooms. He had the allotted funds and thought tablet computers would be the sort of whiz bang example he could present to auditors to show that we were a cutting edge training program. I inquired of him how he thought we could incorporate the devices into our classroom environment. In short, how would we use them? He walked away. To date, the tablets haven't arrived.

As the artifact lays out, incorporating should be a systematic process of analyzing needs, developing solutions and then implementing those solutions in the classroom environment. It is ironic to me that those who readily preach a systematic approach to training for curriculum and lesson development lose sight of that approach when confronted with a case of shiny new i-Pads. If my time in this program has shown me nothing else, it's shown me that today's educators need much more training in the use of technology. If candidates in this program struggle with some of what I would consider rudimentary software, I can only imagine how their counterparts with less of a desire to learn and less training are faring. I've begun implementing the plan I've laid out in the artifact. The technical section of training at the power station recently held continuing training for all disciplines on plant troubleshooting. I developed a software exercise to aid this endeavor and rather than just simply showing my fellow instructors where to find it, I actually spent four hours with them showing them how it was developed and more importantly, how to use it. The results were well received, as I knew they would be. The instructors were comfortable with the technology and used it to great effect in the classroom. This is how a problem should always be approached rather than throwing Chromebooks at an issue in hopes that it disappears.

Indicator: Ethics - *Candidates conduct research and practice using accepted professional and institutional guidelines and procedures.*

Artifact: [EDTECH 504-Final Synthesis Paper](#)

The last artifact is the most traditional of my work in the program. It is the traditional research paper that every university student either enjoys or dreads. I fall into the former category, especially given the topic I was researching. Educational Technology presents great opportunities in the field of educational gaming. The advantages to creating a clever educational

game is that it promotes learning outside the classroom. A typical student spends at least 10 hours per week playing video games (Rideout, Foehr & Roberts, 2010). Imagine if this time spent learning to storm an abandoned building in Battlefield 3 was instead spent learning about the historical events leading to the Civil War. Instead of learning to smash buttons in the correct sequence to launch and anti-matter grenade, that same brain power was focused on solving binomial equations. A well designed game could make this all possible.

The research conducted for this artifact dealt with those issues that make gaming an effective learning tool, and compared those issues with the arguments of the naysayers of game based learning. Further, I examined the naysayer's arguments through the prism of Dr. Youngkyun Baek's research of why teachers are resistant to game based learning in the classroom. Lastly, I overlaid Prensky's Digital Immigrant/Digital Native definitions. While some may refute Prensky's theories due to lack of proper research (Rikhye, Cook & Berge, 2009), one only need compare the texting ability of a thirteen year old with a forty year old to understand that the abilities of the new generation is different than our own. The conclusions drawn in the artifact are based on a careful evaluation of the facts, research and writings combined with an understanding of the topic and the ramifications of the results.

Conclusion:

Standards are necessary in education. We create objectives based on standards. We teach to standards, and lastly, we use these standards for evaluation. While standards are necessary, they do not always paint the entire picture of the learning that has taken place. The best classes are those where the student takes away more than the standardized knowledge.

This program, for me, has been such an experience. I have indeed learned everything required by the AECT standards, but in point of fact, I've learned so much more. I began the program with the intent on bringing technical education into the twenty first century. What I've taken away from the course is the understanding that there is a far greater need.

From what I've observed in my classes, I now see that there is an even greater need in the education community at large. Teachers need to be taught technology. Administrators need to be convinced that this training is actually more important than equipping classrooms with the latest technological bells and whistles. Until those in charge realize this is the case, technology in the classroom will fall short of its infinite possibilities. Providing teachers with tablet computers and omitting teaching them to fully utilize the potential of device is akin to providing a digital milling machine to a journeyman machinist. The journeyman will certainly be able to use the machine to construct the most rudimentary of components, but they will never be able to create the intricate designs of which the machine is capable. In the end, without training, even the best technology is a waste of resources. It is a waste that our children cannot afford.

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