From the Outside Looking In: Reflections and Lessons from the BSU MET Program as a Non-Educator

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Introduction

When I started the MET program I was safely ensconced in a long-term position as an information technology (IT) administrator at a small virtual charter school. Before that position, I had worked in health research for over ten years in Alaska on long-term prospective health studies as well as data analysis on cancer research (Slattery et al., 2007). I was motivated to pursue the BSU MET program because I thought it could help me more effectively collaborate with the faculty at the charter school I was working at as well as increase my skills as an IT administrator. Education is not and has never been, my primary focus in this program because I am not an educator and have no intention to teach. However, while completing this program I have developed an incredible respect for the discipline and professionalism of the educators in the BSU MET program.

Midway through the program, I was faced with a difficult situation. The school I was working at closed and I was forced to find new employment. It was not an easy search but I was able to secure an internship at OnSemi, a semiconductor company, and have since transitioned to a full-time position as a test engineer. My lack of an electrical engineering background has been challenging but my programming skills and data analysis experience have been helpful and I am enjoying my third career.

While the MET program has not been directly applicable to my previous or current career there have still been many valuable lessons learned over the last two years. This document reflects on those lessons.

Reflections on Design & Development

"Make everything as simple as possible, but not simpler." is a saying commonly attributed to Albert Einstein. While there is little evidence he actually uttered those words the principle is apt when reflecting on design and development. Before this program, I was a strict adherent to the principle of simplicity and in almost all tasks followed the traditional approach to design of analyze, develop, and evaluate. And if honesty is valued I should admit that I generally skipped analysis and jumped to the development process. This haphazard approach is useful when attempting to meet a deadline but results in a less-than-ideal end product.

The instructional design course (EDTECH 503) instilled a level of discipline into the design and development process. Specifically, using the ADDIE model of Analyze, Design, Develop, Implement, and Evaluate forced me to slow down and consider my design choices based on what I have learned from the analysis phase of a project. (Brown & Green, 2020). Conducting a thorough user [learner] analysis results in a clear list of requirements that provides a target for the designer. Few things are more frustrating than writing a program or an instructional design and then learning that it solves the wrong problem or that a crucial detail was overlooked. This is where the investment of time and effort in the early stages of the project reaps dividends in time savings later in the project. Using an evidence-based approach from the analysis does more than save time. It results in a better product.

At the other end of the design process is the evaluation phase and this can be a challenge due to time as well. In my opinion, one of the most valuable lessons from

enforcing an evaluation component into the design and development process is that changes my mindset from a "one and done" to a "kaizen" or continuous improvement process. The design of an instructional unit or a software program is never really done. For either to remain relevant and useful they need to be constantly maintained. A formal evaluation process provides an evidence-based approach to that task.

Web design has been a significant part of this program and one of the areas where I have seen the most personal growth. Throughout the program, I have resisted the temptation of the easy path with Google Sites or content management systems (CMS) that make web development easier. While there is a place for those tools I have always wanted to extend my knowledge and using those tools simply does not do it. Before starting the program, I had done some very basic web development but with EDTECH 502 we were tasked with not only creating websites that are functional and accessible but doing so in a visually appealing way. The concept of incorporating contrast, repetition, alignment, and proximity are bedrock concepts that will be applied not only in my designs but are now part of the standards by which I judge other designs (Williams, 2015).

Looking forward two directions interest me and they are at opposite ends of the spectrum in the design and development process. At the micro level, I have been trying to adhere to the guidelines proposed by Guido van Rossum in his Style Guide for Python Code also known as PEP 8 (2013). If I can internalize the lessons therein I will write code that is more maintainable and easily read. David Kelley's writings and talks are also a source of inspiration. Blending the discipline of engineering with empathy for user needs guides my work (Denning, 2013).

The Art & Science of Teaching

At the risk of being redundant, it should be said again that I am not a teacher nor have I ever been one. During this program, I have learned more about teaching and the theoretical foundations of learning than I ever intended or expected. However, the lessons learned about teaching do apply to my current professional practice. When I started as a test engineer I was flabbergasted by the lack of training materials or documentation. Initially, I thought it was a sort of trial by fire in which those materials were withheld but I have since come to realize very few training materials exist and if they do they are completely out of date. There may come a time in the future when I am tasked with developing an updated "Test Engineer Manual" but for now I am keeping copious notes as I learn.

The BSU MET program itself provides an excellent model for how I would develop such training. Asynchronous, online learning that is student-led would be effective and cost-efficient. Like most companies, there are no dedicated trainers, instead, each manager instructs their new hires as they see fit. Yet there is no reason it has to be so haphazard and a well-designed training program would save money and time in short order. All of the instructional designs and projects I have designed in the program were designed for independent adult learners and that focus would apply well.

The exposure to the theories of learning in EDTECH 504 was a completely novel topic in my educational journey. The simplicity in the ideas of Skinner and radical behaviorism in his "teaching machines" appeal to my programmer mindset (1958). The cause and effect are perfectly analogous to an if/else statement in so many of my

programs and it would be wonderful if we all learned in such a concrete manner. Dweck's growth mindset is a wonderful concept and has been very influential to me as an older person returning to graduate school in a program of marginal personal utility (Haimovitz & Dweck, 2017).

In the EDTECH 504 course, I was able to survey many of the general theories (Behaviorism, Cognitivism, and Constructivism) and link them to artificial intelligence in education. This broad overview provided me with a context for learning theories in general which I had previously lacked.

A learning technology that I find particularly exciting is designed based on a specific learning theory, or perhaps more accurately, a cognitive theory. Clark and Chalmers first wrote of Active Externalism in their paper called The Extended Mind (1998). They posit that our minds can extend beyond our physical brains and extend into the tools we use. Obsidian is a notetaking app that allows the user to quickly and easily link notes to each other and is written entirely in Markdown, a lightweight markup language.

Evaluating Learning Experience and Environments

The lessons learned regarding evaluation in EDTECH 505 are closely analogous to the lessons learned from the instructional design course (EDTECH 503). As with design and development, an effective evaluation of a product or program requires a disciplined and structured approach. Before a product's effectiveness can be assessed its goals, inputs, activities, and outputs must be clearly defined (Boulmetis & Dutwin, 2011). Before this course most of my evaluation process consisted of a simple question:

does it work? That process has changed significantly. Before a product can be evaluated it must be carefully defined. The logic model does exactly that in a clear and concise way. Beyond a definition, the logic model provides an overview of the processes inherent in a product or program (Boulmetis & Dutwin, 2011).

Evaluation is not synonymous with comparison. In my evaluation of Thrillshare, an integrated web presence service, I initially felt shackled by the inability to compare the product to its competitors. Comparison is an effective method to differentiate between products but it does not determine if a specific program or product is effective.

I have also learned that evaluation is not synonymous with research. Research is intended to extend knowledge while evaluation seeks to assess. Evaluation is a process, that requires iteration to be effective. Further, it needs to be integrated into the design process to enable continuous improvement. These mental approaches have redefined my approach to evaluation while completing the MET program rather than particular technologies.

Networking and Collaboration

My professional practice, past and present, has limited my ability to network and collaborate in the educational space but that has not hindered the opportunities provided by the MET program in a more general sense. One of the first opportunities for networking and collaboration arose when a fellow student in EDTECH 503 developed a unit on how to craft a professional resume to help applicants stand out in a competitive job market. I jumped at the opportunity to peer review that unit and used what I learned to improve my resume which I was using daily to apply to myriad positions. Mentoring

was provided by Professor Hung who taught EDTECH 597: Machine Learning and I hope to continue that relationship after graduation from the program. Most recently in EDTECH 538, I was invited to present during an Hour of Code event in a fellow student's second-grade classroom this fall and eagerly accepted.

During my internship, I was tasked with developing and maintaining software with a team of fellow test engineers using a tool called git. Git is a version control tool that interfaces with online repository services such as GitLab and GitHub (Blischak et al., 2106) Git allows multiple software developers to collaborate on the same code base while maintaining detailed records of changes and preventing conflicts. GitLab provides more than repository hosting, it also allows the team to create and track issues that can be assigned to individuals as well as enforces rules that code has to be reviewed by others and approved before it is deployed. Before this internship, I had little experience with the tool but by developing a unit to train future interns I was able to train myself on the basics with feedback from colleagues. I was able to provide a secondary benefit to my employer by sharing the completed unit to be used with future interns. Git has applications far beyond software development and has been used to develop learning objectives in statistics and data science courses (Beckman et al., 2021). The tool can be used in any document or project where careful documentation of changes and contributors is required. I am excited about the capabilities of git and learning how to use it more effectively to collaborate with colleagues.

Ethical Dimensions of Practice in Ed Tech

The course that had one of the clearest connections to ethics in the MET program was EDTECH 502: Creating Educational Websites. While developing websites we touched on important issues of ethical concern including civil discourse, accessibility, and copyrights. These are of course important considerations as educators develop instructional websites or materials and moderate online courses. However, that is not what has changed the most during my tenure in the MET program. Generative AI and large language models such as chatGPT have exploded into the public sphere and have had an incredible impact in the educational space already. The phenomenon is so new that the effects of generative AI on education have not been rigorously measured. The ethical principles and transparent use of generative AI in research are still being considered (Graf & Bernardi, 2023). While others are considering carefully if chatGPT should be credited as a co-author in publications (Rahimi & Abadi, 2023). Educators are of course concerned as well and opinions are varied regarding how ethical it is to use chatGPT. I have found chatGPT to be nearly useless in writing tasks but wonderfully helpful in correcting syntax errors in the code that I write.

Another ethical concern that I have considered during the MET program is another subset of artificial intelligence, machine learning. Machine learning is used in learning analytics to provide insights into student success/risk, adaptive learning, and curriculum design (Sclater, 2017). To obtain these insights a large amount of student data must be obtained and analyzed to develop predictive models. Students have a legally protected right to privacy provided by the Family Educational Rights and Privacy

Act. Even if the data used is sufficiently anonymized there are other ethical considerations including an inaccurate model that erroneously categorizes a student as high risk due to biases inherent in the model. Balancing these risks with the benefits they can provide is a difficult task when my fascination with data and the educational insights they contain are within reach.

Leadership in Ed Tech

What defines a leader in educational technology? That is an excellent question; when I consider it another question comes to mind. In a room full of educators what distinguishes between the average teacher and a leader in educational technology? I would argue it is technological skill rather than knowledge of education. It is in that realm that I strive to lead. I have consistently sought challenges and opportunities to extend my technical knowledge and expose others to the results. From Team Coding using git in EDTECH 503, to the Beginning Python course in EDTECH 512, to the Simple Circuit project using Arduino in EDTECH 538, I have attempted to learn and share that knowledge with others in the program.

In my professional career, the situation is almost inverted. I work with electrical engineers with decades of experience and PhD-level physicists. It is a struggle to keep up with the breadth of knowledge and experience they bring to my current professional practice. In this field, it is the experience I have gained in the MET program and the evidence-based approach to developing training tools that I have learned that provide a unique insight to design meetings. I have been able to speak up and ask clearly, "What do you mean exactly? And how should we know this?" when my fellow junior engineers

are completely lost. I plan to utilize the education I have obtained in the BSU MET program to influence and assist in the design of training materials at my work to assist others in the future.

Closing Thoughts

When I started the BSU MET program I was in a tangential role to the focus of the program. During the course of study, my career has taken a turn even further away, to a pure software engineering role. However, I do feel that I have learned valuable lessons that are applicable no matter what my career would be. Learning how to learn more efficiently and helping others learn more effectively are universal skills.

References

Beckman, M. D., Çetinkaya-Rundel, M., Horton, N. J., Rundel, C. W., Sullivan, A. J., & Tackett, M. (2021). Implementing version control with git and github as a learning objective in statistics and data science courses. *Journal of Statistics & Data Science Education*, *29*, S132–S144. https://doi.org/10.1080/10691898.2020.1848485

Blischak, J. D., Davenport, E. R., & Wilson, G. (2016). A quick introduction to version control with git and github. *PLoS Computational Biology*, *12*(1), 1–18. https://doi.org/10.1371/journal.pcbi.1004668

Boulmetis, J., & Dutwin, P. (2011). *The ABCs of evaluation: timeless techniques for program and project managers*. (Third edition, 1–1 online resource (xvi, 288 pages): illustrations). Jossey-Bass. https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=876157

Brown, A., & Green, T. D. (2020). *The essentials of instructional design: connecting fundamental principles with process and practice*. (4th edition). Routledge.

Clark, A., & Chalmers, D. (1998). The extended mind. *Analysis*, *58*(1), 7–19.

Denning, P. J. (2013). Design thinking. *Communications of the ACM*, *56*(12), 29–31. https://doi.org/10.1145/2535915

Graf, A., & Bernardi, R. E. (2023). ChatGPT in research: balancing ethics, transparency, and advancement. *Neuroscience*, *515*, 71–73. https://doi.org/10.1016/j.neuroscience.2023.02.008

Haimovitz, K., & Dweck, C. S. (2017). The origins of children's growth and fixed mindsets: new research and a new proposal. *Child Development*, *88*(6), 1849–1859. https://doi.org/10.1111/cdev.12955

ML Slattery, MC Schumacher, AP Lanier, S Edwards, R Edwards, MA Murtaugh, J Sandidge, GE Day, D Kaufman, S Kanekar, L Tom-Orme, & JA Henderson. (2007). A prospective cohort of American Indian and Alaska Native people: study design, methods, and implementation. *American Journal of Epidemiology*, *166*(5), 606–606. https://doi.org/10.1093/aje/kwm109

Rahimi, F., & Talebi Bezmin Abadi, A. (2023). ChatGPT and publication ethics. *Archives of Medical Research*, *54*(3), 272–274. https://doi.org/10.1016/j.arcmed.2023.03.004

Rossum, G. van. (2001, July 5). *PEP 8 – Style Guide for Python Code | peps.python.org*. https://peps.python.org/pep-0008/

Sclater, N. (2017). *Learning analytics explained*. Routledge.

Skinner, B. F. (1958). Teaching machines. *Science*, *128*(3330), 969–977.

Tamayo Avila, D., Van Petegem, W., & Snoeck, M. (2022). Improving Teamwork in Agile Software Engineering Education: The ASEST+ Framework. *IEEE Transactions on Education*, *65*(1), 18–29. https://doi.org/10.1109/TE.2021.3084095

Williams, R. (2015). *The non-designer's design book: Design and typographic principles for the visual novice* (Fourth edition). Peachpit Press.