Ryan Turner's Assignment 1

I picked three papers from the past project archive: Modular Computer Science (Wu 2017), Contextually Correct Scatter Substitution (Whiteman 2017), and Comparison of Virtual Reality Problem Solving to Mathematical Traditional Word Problems. These three papers were selected at random. Overall, I was surprised to see a number of grammatical mistakes in the papers.

Modular Computer Science (Wu 2017) is a publication written about the development of supplemental course content for an introduction to computer science organized in a modular structure. The project and writing were done by David Wu. I found it interesting that the motivation for his project aligned with my prior experiences in edX online classes; in the past I took many online courses, but I often found myself deviating from the learning plan to focus on topics that interested me. I found his conclusions were weak, in that he had no way to quantify the results. I wonder if a modularized approach is a mistake for survey courses and introductory courses, as so much of the material is foundational. It's quite difficult to self select modules if you don't have the familiarity to know what you're deciding. I think it'd work much better in a course like intro to AI, as many of the topics aren't directly related. A way to select for good candidates for modularized teaching may be to find those that have a high variance in the lesson plan across teachers or organizations (if the order can be changed, then most likely there aren't interdependencies across modules).

Comparison of Virtual Reality Problem Solving to Mathematical Traditional Word Problems is a publication about using VR to teach abstract reasoning and problem solving. Some of the situations posed seemed unrealistic (like live theater or VR taking place in the Amazon Rainforest). Before reading the paper, I had not thought much of mathematical word problems and their challenge to learners with language trouble. Based off of the data, I believe that this work shows promise. The author didn't consider the cost to create a word problem vs the cost to create an immersive VR experience. I think that will pose a significant challenge. I think more work can be done to instead find ways to create word problem like scenarios in open game worlds like Half-Life. I don't believe that using VR is critical – it's more about showing them the problem and letting them experience fixing it. So I suggest the more beneficial short-term option as simply finding ways to introduce video games to the classroom.

Contextually Correct Scatter Substitution is a publication covering the use of NLP to create material to teach foreign languages. The author's workflow takes input materials and then creates scatter-substitution learning materials. While I appreciated the material, I thought that the project overall was reasonably small. It seemed like far less material compared to the other two papers I'd read. I think more can be done to strategically change the phrases substituted based off of learning objectives. Also, this would be a good candidate to change in near realtime, taking the learning outcomes as inputs to change difficulty. I think that would then be a very useful tool, maybe even letting individuals incrementally

learn a language by reading a book or article that they're interested in.

In my writing this summer, I'd like to study the impact of hybrid mobile application development technologies: Do engineers learn to write mobile apps faster on those frameworks? Does the simpler framework lead to more maintainable code, or do projects tend to languish as users start development with less experience? I'm a community team member for React Native, and many of the benefits claimed have little backing in reality. I'd like to quantify the benefits.

I then researched three additional areas in Ed Tech from the course library, all centering on research.

Starting with "Values in Science" from *On Being a Scientist: Responsible Conduct in Research*, I learned about the value of a good hypothesis: unifying observations with simplicity and elegance. The discussion of culture, religion, political, and economics impacting ones scientific work was also revealing; it was interesting to read how Einstein and Charles Lyell had their work influenced by this. This was the first I'd heard of the term "collective validation" as well.

Then I reviewed "The Scientist in Society" from *On Being a Scientist: Responsible Conduct in Research*. I found the introduction revealing, because I saw many parallels between the research environment that John Ziman proposed and the values purported in the Agile manifesto for software delivery teams. It was also surprising to learn about the moratorium on recombinant DNA study in response to concerns of the impact. As I read the text discussing the increasing role that science plays on policy and society, I was reminded that this text was over 20 years old; this lead me to wonder how much of this is true still today.

Finally, I reviewed "What is Basic Research?". In this reading, I understood the distinctions of basic research from applied research. It also did a good job of explaining generally what is research – a question that I largely took for granted. In that, it was interesting to read that research can be looked at as a way to develop concepts; I've always looked at it as though research was to develop and prove theories, but this provided numerous good examples where research instead worked to introduce new insights, like in their University of Chicago example.

These readings were helpful research basics. They talked about broader issues of research: values within the work, contributing to society overall, and research different from I've come to expect.