Memorandum

To Kathryn Hoene
From Nicholas Messenger
Date March 2, 2017

Subject Progress Report and Annotated Bibliography – The Education of and with Computers

Introduction

This research project aims to look at how education is evolving with the increasing use of computers and technology in modern families. The project will look at research from the past and present, as well as look into the expectations and beliefs of how technology will be in the future. Using this information will allow for a deeper look into how computers are changing the way we learn as well as how we are learning about computers at an earlier age. This project will also briefly look into the computer based careers that are being studied and how that goes into play with education of newer generations in general. This report expands on the time from February 1 through February 27.

Past Work

Most of the past work on this project has been focused on looking at present states of Computer Science with some small amounts of research into the past and how people were beginning to learn about computers. Finding information on the past in this subject is a little harder than originally thought and more extensive research will have to be done. Past research has led to some great information from the present though including two articles describing former President Obama's CSForAll act and how schools will slowly be trying to adapt to this act. A study on Computer Science students both male and female was also found during research and contains many reliable sources that will be

further looked into for future research. Research is on schedule and work will continue at a steady pace so that submission of the completion report will be on time.

Future Work

Extensive reading of found research articles will be done throughout the next few weeks, on a daily basis or every two days. This will ensure that there will be good discussion in the final form of this research project, including good quotes and ideas from authors. Reading of research has been done already but not as extensively, resulting in great understanding of the articles and what they address as well as some possible quotes from authors. Along with the extensive reading, there will be further observation into sources within the research articles found at this time. There are many reliable sources found in these articles that could be used for more research material. Finally, more research will be done with a new mindset after having read current research and sources.

Conclusion and Plan to Proceed

Great progress has been made in this project and the research done so far has been very successful and will lead to deeper thought and research for the future of this project. The feedback and comments you have given in the past have been very helpful and much appreciated. Taking this project in chunks and completing tasks over time will ensure that sufficient research and content is achieved. Your continued input would help greatly in ensuring that overall quality of this project is maintaining and/or improving.

Annotated Bibliography

Brown, E. (2016, April 26). Top business leaders, 27 governors, urge Congress to boost computer science education. Retrieved February 23, 2017, from https://www.washingtonpost.com/local/education/top-business-leaders-27-governors-urge-congress-to-boost-computer-science-education/2016/04/25/f161cbde-0ae7-11e6-bfa1-4efa856caf2a_story.html?utm_term=.d4667f7e5c5b

1. Summary of Source

This website article discusses how high schools are beginning to look at computer science and programming options for students to learn about computers before college. The article also discusses the state of the job market as well as how computers and technology fit into the job market. Further details and discussion is made on how the government and congress leaders are looking into pushing towards computer-learning in high schools more. This article has a great quote in it that could lead into great discussion with Obama's Computer Science for All initiative: "An estimated 500,000 unfilled U.S. jobs require some level of computer-science understanding, yet three-quarters of the nation's public schools do not offer any computer science courses, often sending companies turning to foreign workers for specialized skills. The federal government isn't doing much to help: Virtually no federal funding is dedicated to enhancing computer science offerings in K-12 schools" (Brown, 2016).

2. Evaluation of Credibility

There are many great quotes from high-speaking people within the article such as people from committees and congress. The source is the Washington Post which has been known for great articles for many years. At the end of the article there is a long list of all the big business leaders to help emphasize all of the important people related to the article. The article is well-written and contains accurate information as well as photos with proper titles describing what they are.

3. Explanation of Relevance

Throughout this web article, the author explains the importance of growing education in computer science. There are quotes from intelligent business leaders saying that it is obvious that we should have computers play a bigger part in schooling. The article also explains about the job market and how focused it is on computers in today's time. I can use the information from this article to further discuss and analyze the importance of learning computer science before college and how it will affect students in the future as well as how it will help the job market.

Hoske, M. T. (2013). Hot technology jobs: Computers, telecommunications, biotechnology, artificial intelligence, robotics. *Control Engineering,* Retrieved from http://ezproxy.olympic.edu:2048/login?url=http://search.proquest.com/docview/1313785054?accountid=2203

1. **Summary of Source**

This article by Mark T. Hoske looks at engineering and computer innovations and how they affect the economy. The article also looks into jobs, and the future of technology and innovations in technology. This article has good insight and discussion into how technology is advancing as well as how it affects the job market.

"In 20 more years, computer chips will cost a penny and will be like electricity is now, everywhere and nowhere. No one even says the word 'electricity' anymore. Similarly, the word 'computer' will disappear. All computing results will be stored in the cloud someplace. Computing will be everywhere and nowhere. In the future, people will wear glasses that will recognize faces and show subtitles for Chinese speakers. If you forget, they will identify the person. You'll know exactly who to suck up to at any party" (Hoske 2013).

2. **Evaluation of Credibility**

The article is very credible. It is a peer reviewed scholarly journal that provides links to respective sources as well as how to gain more knowledge from the article itself. The article was also written in 2013 which is still fairly relevant since technology is advancing quickly and the observations made in this article may actually be true/relevant for further discussion.

3. Explanation of Relevance

This article relates to the research project in terms of economy and how people are affected by computers and technology. The observations and assumptions of the future of technological innovations can be open to further discussion and will be great to include further thought and look into with the future of education of and with computers. This source is not like the other sources where hard data or references are called upon, but rather, this source is more open to interpretation and discussion. Having more open discussion and analysis of thoughts on the possible future of computers and technology will be beneficial to the research project for it will include more perspectives this way.

Ladner, R. E., & Israel, M. (2016). For All" in "Computer Science For All. ***Communications Of The ACM, 59*****(9), 26-28. doi:10.1145/2971329**

1. Summary of Source

This article by Ladner and Israel briefly describes the “Computer Science For All” initiative and how it is slowly growing. The article also briefly looks into how it might work and be implemented. There is great information on the challenges and issues as well as the pros and cons to this initiative and if it will be successful or not. The best quote from this short article is in the very beginning:

"ON JANUARY 30, 2016, President Obama announced the "Computer Science For All" initiative to expand K–12 computer science education in the United States: $4 billion to prepare teachers, expanding access to materials, and building effective partnerships. The goal of this initiative is: '… to empower all American students from kindergarten through high school to learn computer science and be equipped with the computational thinking skills they need to be creators in the digital economy, not just consumers, and to be active citizens in our technology driven world. Our economy is rapidly shifting, and both educators and business leaders are increasingly recognizing that computer science (CS) is a "new basic" skill necessary for economic opportunity and social mobility'" (Ladner, Israel, 2016).

This is a quote within a quote which will be further looked into. There is another section of this article that may be used in tandem with the original source of the embedded quote.

2. Evaluation of Credibility

This is a well put together article from the Communication of the Associations for Computing Machinery so this is very relevant and accurate in terms of credibility of who the information is coming from. There are three references with proper citation from education and computer related sources as well as information for both of the authors of the article. Both of the authors work in universities, one being a professor in computer science and engineering at the University of Washington and the other is an assistant professor of special education at the University of Illinois.

3. Explanation of Relevance

This article is from September of 2016 and addresses education with computers. This is exactly the type of research I am looking into but at a higher level of discussion. With

this article, present day information can be used along with discussion and analysis of the information in greater detail along with information from the past.

Levy, F., & Murnane, Richard J. (2004). ***The new division of labor : How computers are creating the next job market*****. New York : Princeton, N.J.: Russell Sage Foundation ; Princeton University Press.**

1. Summary of Source

This publication looks at the how computers are changing manual labor and learning in academies and schools. The author has many different sections explaining various aspects of computers and technology in the economy and society as well as how teaching and learning thinking processes can allow for greater work in the future. The main three sections that were most relevant to this research article were Why Jobs Change, Teaching Expert Thinking, and Getting the Right Mix of Teaching Skills. The most informative quote from the author is as follows:

"In October 1997 John Morgridge officially introduced the Cisco Networking Academy_ program. In that month, sixty-four high schools in seven states were teaching the first semester of the Academy curriculum. Over the next six years the program grew extremely rapidly, not only in high schools, but in community colleges, in community-based organizations, and in a variety of other settings in the United States and in other countries. In the fall of 2003, more than a half million students participated in a sequence of sixteen courses in more than 10,000 Cisco Networking Academies located in all fifty states and in 152 countries" (Levy 2004).

2. Evaluation of Credibility

While this source is slightly older, it provides great information on the beginnings of networking and computer-based learning programs in schools and colleges. It also provides many great sources and has very clear and concise data as well as pictures and illustrations to add extra information. The sources and citation is very well organized by chapter and section and also contains a full index at the back of the publication. To add extra clarity, there is even a notes section on certain terms and topics discussed throughout the book.

3. **Explanation of Relevance**

This book provides great information on not only critical thinking and how to teach it, but it offers insight into the past of Cisco Networking and how computer-based classes began growing in schools. The quote given above contains very relevant information that can be used to explain the past of learning with computers and will allow for further discussion of modern day practices and if they have changed at all. This may not be the only quote from this source as there were at least three great ones that were found during reading.

Guzdial, M. (2016). Bringing Computer Science to U.S. Schools, State by State. *Communications Of The ACM*, *59*(5), 24-25. doi:10.1145/2898963

1. **Summary of Source**

This article is much like the article by Ladner and Israel. It describes how the government is working to make computer science more accessible to students so that it can become a bigger and more regular curriculum in all schools. The author also describes the limitations to these plans and how the plans might work as well as how long they might take. This article provides great information on the CS-forAll act with the following quote:

"The ECEP cohort is making strides toward making high school-level CS curricula available in their states and territories: *Exploring Computer Science*, *Computer Science Principles*, and *Advanced Placement CS Level A*, which are being adopted across the U.S. Alabama was the first state to include *CS Principles* in its state curriculum… It is going to take time to reach *CSforAll*. Most of the ECEP cohort expect to offer CS in 30%–50% of all high schools in their state within the next five years. Puerto Rico is just introducing *Exploring CS* into its first schools this year. In several states, the goal is to have a single CS teacher in 50% of schools within five years, which is insufficient to provide access to CS education for all students."

2. Evaluation of Credibility

This article is written for the Communication of the Association for Computing Machinery which is a credible foundation and relevant to computers. The author is a professor at the Georgia Institute of Technology and has had experience with computers and has analyzed the CS-ForAll act. Finding the authors sources is challenging for it is a blog post article. There are some references to URL website links, but no proper citations on the post like in Ladner and Israel's article.

3. Explanation of Relevance

This piece of research is very useful for providing great information on the Computer Science for All initiative/act. The author also has great discussion on the limitations and how it will grow which can be used for further discussion in this research project. The author also explains how teacher go into the mix of things and the growth of teaching computer science which could fit very well into the research project by leading into

today's time, further analyzing the changes that have happened today, and discussing more information on the CS-ForAll act and how it is doing in today's time.

Wiggins, J. B., Grafsgaard, J. F., Boyer, K. E., Wiebe, E. N., & Lester, J. C. (2016). Do You Think You Can? The Influence of Student Self-Efficacy on the Effectiveness of Tutorial Dialogue for Computer Science. ***International Journal of Artificial Intelligence in Education,27*****(1), 130-153. doi:10.1007/s40593-015-0091-7**

1. Summary of Source

This article/study focuses on how students learn with computer science programs. It focuses mainly on self-efficacy and the way of teaching computer science to students. There is a great deal of charts and testing done throughout the article. In the conclusion of the article there is a great quote which sums up what the authors have to say:

"As the computer science education community moves toward adaptive support for individual learners, it is crucial for intelligent learning environments to consider not only students' knowledge and skill, but also motivational factors driven by affect. Self-efficacy, students' beliefs in their own abilities, may have deep and far-reaching implications for computer science learning. Students' level of self-efficacy may, in particular, influence the types of adaptive support that are most effective" (Wiggins, et al., 2016).

2. Evaluation of Credibility

This article/study was written in 2016 so it is very relevant for time. There are many contributors to this article, a total of five which all have experience with universities or higher level learning with computers and technology. There is a good 20-30 properly cited references in this article and they are used very well throughout the article. There

are numerous charts and illustrations helping define a clearer picture of the studies and tests explained and analyzed.

3. Explanation of Relevance

This article analyzes students and how they react to learning with computer science. This is exactly the kind of research that I am looking to analyze in my research project but in a broader scale in terms of where it will go and how it has been until this point. This will help lead into further discussion of how computer science is slowly adapting and how teaching it needs to be just right in order for students to learn effectively. Besides this article, it was hard finding other studies like this one that were relevant to this time and brought together a large amount of smaller cases. There are also many sources throughout the article that could be further looked into for more information on specific ideas within the article.