

Assignment 1

Prashant Shinde

pshinde32@gatech.edu

Abstract— This assignment is divided into 2 sections below: Research Log & Activity. In Research Log, I have documented my learnings from 15 academic publications, literatures & articles about Education Technology. I have not decided a specific research topic for summer 2020 semester yet, hence my research topics range from history, progress & applications of EdTech, ethics & bias, current challenges & future opportunities in EdTech. In Activity section, I have picked 5 papers of my interest and summarized need, method, audience & results of each paper.

SECTION A: RESEARCH LOG

I) BACKGROUND

I like building solutions to solve complex real-world problems & creating video content, targeted on use of technology to make human life easier.

Part I: I have interest in application of Machine Learning to ‘solve a problem’ which is repetitive in nature and requires less human intellect. While working in Human Resources domain for Walmart, I have practiced use of technology to improve human life on a large scale. By improve, I mean, saving time by automating processes (e.g. resume selection using algorithm instead of human spending many hours), improve training required for a job (e.g. use of Virtual Reality (VR) devices to train store employees).

Part II: Besides writing algorithms, I enjoy generating content (UGC) on YouTube. Mostly, I make videos about reviewing a tech product and solve general technical issues. Some of my previous content includes, comparing Apple Magic Mouse vs Trackpad which I hope will help many people make a good purchase decision, review of DJI Mavic Drone to spread knowledge on drone piloting skills in general, etc.

In Summer 2020 semester, I plan to do a project around application of technology in content creation topic. Currently, I have not decided a specific topic for research hence in week 1, I spent time reading academic literatures, publications to get a solid grasp of EdTech domain.

Most of my following research mentioned below is focused around hypothesis building, content generation & delivery mechanism using EdTech.

II) LITERATURE

PAPER: 1

Joyner, D. (2018, June). Toward CS1 at scale: building and testing a MOOC-for-credit candidate. In Proceedings of the Fifth Annual ACM Conference on Learning at Scale (pp. 1-10).

<https://dl.acm.org/doi/abs/10.1145/3231644.3231665>

I found this paper in CS6460 assignment 1.

1.1 Summary

MOOCs have gained increasing interest around the world, but they do not carry class credit. To provide a degree credit, a MOOC should have comparable rigor, outcomes & assessment as of on-campus class structure. This paper outlines several experiments conducted to compare educational & attitudinal outcomes between MOOC & on-campus version of the same course.

1.2 Takeaways

Results indicate that MOOC provides comparable learning outcomes & almost similar attitudinal & behavior results as on-campus version. As students self-select into their desired course version, research outcomes should be replicated & validated in controlled environment by doing randomized selection. Similar research should be conducted for a non-neutral subject unlike Computer Science to measure the degree of shift in outcomes.

PAPER: 2

Polonetsky, J., & Tene, O. (2014). The ethics of student privacy: Building trust for ed tech.

SSRN: <https://ssrn.com/abstract=2628902>

I found this paper on Google Scholar.

1.1 Summary

EdTech comprises many technological products like communication platforms, cloud, apps, 3rd part vendors, etc. This research argues over potential misuse of student's (children's) personal data by EdTech vendors if not fully controlled by school which might increase discrimination in society & endanger children's future. Tightened vendor contracts & data governance & new regulatory framework might be solution for these problems.

1.2 Takeaways

With digital content distribution & learning there is emerging need of data governance. Privacy & ethical data use is critical for an individual & also for school. Data driven automated decisions might create more problems in society if ethical issues are not handled properly; also, misuse of data for commercialization might create privacy related.

PAPER: 3

Thomas, D. A., & Nedeva, M. (2018). Broad online learning EdTech and USA universities: symbiotic relationships in a post-MOOC world. *Studies in Higher Education*, 43(10), 1730-1749.

<https://www.tandfonline.com/doi/full/10.1080/03075079.2018.1520415>

I found this paper on Georgia Tech library.

1.1 Summary

This research is about analyzing EdTech/University relationship. It tries to exhibit & explain symbiotic relationship between EdTech private institutes & universities in 3 possible categories: Positive, Negative & Neutral. After 2015, MOOCs has expanded into accredited, paid, full degree version. This research claims that Universities are actively & willingly reshaping the higher education with EdTech.

1.2 Takeaways

The post-MOOC (after 2015) period, EdTech/University relationships have changed. This relationship is currently in 3 different categories (Positive, Negative & neutral) and research proposed that it needs to monitor for more time as there is a potential for shift in relationship in future. Initial results indicated that Universities are reshaping MOOC with EdTech.

PAPER: 4

HOWARD, N. R. (2019). EDTECH LEADERS' BELIEFS: HOW ARE K-5 TEACHERS SUPPORTED WITH THE INTEGRATION OF COMPUTER SCIENCE IN K-5 CLASSROOMS? *TECHNOLOGY, KNOWLEDGE AND LEARNING*, 24(2), 203-217.

<https://link.springer-com.prx.library.gatech.edu/content/pdf/10.1007/s10758-018-9371-2.pdf>

I found this paper on Georgia Tech library.

1.1 Summary

Coding, computational thinking, programming & problem solving is really important STEM skills for an individual's growth & for United States in general. To support this need, computer science has become prevalent in K-5 classrooms. Schools rely on EdTech to support teachers in program implementation. This study focuses primarily on successful practices of implementing CS course in K-5 classrooms for in-school CS programs adopted by districts and school.

1.2 Takeaways

Most likely K-5 teachers will use web-based CS curriculum designed by professionals. K-5 teachers are in need of ongoing professional support and not a one-stop-shop approach. Teachers need more training in CS than just 1day workshop.

PAPER: 5

Michael, C. (2018). ENGLISH FOR THE UNDERSERVED: CLOSING THE DIGITAL DIVIDE. Training, Language and Culture, 2(4).

[https://rudn.tljournal.org/archive/2\(4\)/2\(4\)-01.pdf](https://rudn.tljournal.org/archive/2(4)/2(4)-01.pdf)

I found this paper on Georgia Tech library.

1.1 Summary

This paper explores the problems faced by schools in developing economies worldwide due to multiple local issues. The paper proposes the idea that introduction of EdTech in schools will help solve problem of required skills which people with digital access already have. This paper examines types of educational technology resources and teacher training approaches using case studies.

1.2 Takeaways

The paper really focused on underserved communities needs in terms of knowledge & skills. Setup digital infrastructure using EdTech NGOs funding & use open source language learning content, open source assessments& curricula for delivery. Overall this paper takes a radical view of technology solutions and open source content.

PAPER: 6

Major, L., Warwick, P., Rasmussen, I., Ludvigsen, S., & Cook, V. (2018). Classroom dialogue and digital technologies: A scoping review. Education and Information Technologies, 23(5), 1995-2028.

<https://link-springer-com.prx.library.gatech.edu/content/pdf/10.1007/s10639-018-9701-y.pdf>

I found this paper on Georgia Tech library.

1.1 Summary

This paper investigates role of technology in supporting classroom dialogue using 72 case studies. The central theme is to identify opportunities and challenges in using digital technologies to enhance productive classroom dialogue & support dialogic teaching and learning.

1.2 Takeaways

We need to understand & quantify impact of chat versus face-to-face communication on performances. Focus on how tools are used in human activities, and how humans learn & construct knowledge and understand by the use of tools is central while studying interaction of human and technology in learning process.

PAPER: 7

Waldron, R. (2018). How to Avoid Getting Ripped Off by Ed-Tech Vendors: Ten Tips for School Districts from an Industry Insider. *Education Next*, 18(1), 16-23.
<https://go.gale.com/ps/i.do?p=OVIC&u=gainstoftech&id=GALE|A520581888&v=2.1&it=r>

I found this paper on Georgia Tech library.

1.1 Summary

Digital tools, EdTech software spending is increasing in US. Most of the EdTech vendor products offers an integrated product suit comprising detailed curricula, student's activity tracking, assessments, etc. This paper focuses on 10 tips before making an EdTech purchase.

1.2 Takeaways

Find what problems this tool going to solve. Do audit of current hardware & software to understand real need of tools & to avoid redundancies then create a final tech need/requirements list. Compare vendors offering, support & integration with existing services. On board teachers & students with a training from vendor.

PAPER: 8

Eriksson, T., Adawi, T., & Stöhr, C. (2017). "Time is the bottleneck": a qualitative study exploring why learners drop out of MOOCs. *Journal of Computing in Higher Education*, 29(1), 133-146.
<https://link-springer-com.prx.library.gatech.edu/content/pdf/10.1007/s12528-016-9127-8.pdf>

I found this paper on Georgia Tech library.

1.1 Summary

This paper focuses on learner's experience which taking a MOOC which eventually affect the dropout rate. This paper is based on 34 interview responses.

1.2 Takeaways

Learners time, workload & social situations and course content, course design is some of the factors affecting drop out in MOOC.

PAPER: 9

Reich, J. (2013). Is a MOOC a Textbook or a Course? EdTech researcher.

http://blogs.edweek.org/edweek/edtechresearcher/2013/05/is_a_mooc_a_textbook_or_a_course.html

I found this paper in reference section of ""Time Is the Bottleneck": A Qualitative Study Exploring Why Learners Drop out of MOOCs" paper.

1.1 Summary

This article argues about "What is a "Course" in Massive Open Online Course?". It explains 2 analogies of MOOC: as a textbook & as a course. In few cases, MOOC is perceived as a threat.

1.2 Takeaways

SJSU researcher defined MOOC as a textbook because it's fixed in its boundaries and un-editable. Sometimes MOOC can be a complete substitute for the work of a faculty member or eventually substitute an entire course taught at an institute, which is a real threat.

PAPER: 10

Matyokurehwa, K., Rudhumbu, N., & Mlambo, C. P. (2020). Intentions of First Year University Business Students to use Smartphones as learning tools in Botswana: Issues and challenges. *International Journal of Education and Development using Information and Communication Technology*, 16(1), 27-43.

https://search-proquest-com.prx.library.gatech.edu/docview/2399148460?rfr_id=info%3Axri%2Fsid%3Aprim0

I found this paper on Georgia Tech library.

1.1 Summary

This paper analyses feasibility of smart phone technology in learning. Results indicate mixed reaction based on survey conducted.

1.2 Takeaways

Smart phone technology for learning has many advantages like multi-functionality & ubiquity but it does have some challenges as a pedagogical tool like high cost of device & internet, also limited data storage capacity.

Overall, benefits of using smartphones as learning tools outweighed the disadvantages.

PAPER: 11

O'Reilly, E. (2016). Developing technology needs assessments for educational programs: An analysis of eight key indicators. *International Journal of Education and Development using ICT*, 12(1).

https://search-proquest-com.prx.library.gatech.edu/docview/1792794744?rfr_id=info%3Axri%2Fsid%3Aprimo

I found this paper on Georgia Tech library.

1.1 Summary

Before implementing & start learning any MOOC for individual or at scale in an education institute, some technology knowledge is a pre-requisite.

This research designed a methodology to understand that level of technology preparedness using a survey questionnaire. Results are identified which can be used as a pre-req to MOOC.

1.2 Takeaways

The 8 skills are identified that are indicator of technology preparedness. 8 skills: self-assessed skill level, technology use and integration, teacher beliefs, barriers to access, professional development resources, leadership, needs and wants, and demographics. Depending of application / use case of MOOC, these skills can be analyzed on varying weights and decision can be taken on training, adoption & implementation.

PAPER: 12

Bahadur, G., & Oogarah, D. (2013). Interactive whiteboard for primary schools in Mauritius: An effective tool or just another trend? *International Journal of Education and Development using ICT*, 9(1), 19-35.

https://search-proquest-com.prx.library.gatech.edu/docview/1353086573?rfr_id=info%3Axri%2Fsid%3Aprimo

I found this paper on Georgia Tech library.

1.1 Summary

This study is designed to quantify potential benefits and drawbacks of using interactive whiteboards in both teaching and learning environments.

1.2 Takeaways

Results shows that, interactive whiteboard doesn't necessarily improve / affect grades but definitely improved engagement & enjoyment metrics.

The follow up question is: if teachers are using those interactive digital board effectively?

PAPER: 13

Hildebrandt, C. K. (2019). Whose interest is educational technology serving? Who is included and who is excluded? RIED. Revista Iberoamericana de Educación a Distancia, 22(1).

https://search-proquest-com.prx.library.gatech.edu/docview/1353086573?rfr_id=info%3Axri%2Fsid%3Aprimo

I found this paper on Georgia Tech library.

1.1 Summary

This paper talks about intersection of education & technology. Learn about student's digital practices to make them aware of constraining and/or enabling their practices. This paper talks actions more on a personalization level.

1.2 Takeaways

EdTech mostly focus on scalability but less on micro/student level. MOCCs represents messy and always chaotic present of student's daily entanglements with digital technology. Digital learning requires alternative approach to look at deeper levels of social reality.

PAPER: 14

Wright, N., & Peters, M. (2017). Sell, sell, sell or learn, learn, learn? The EdTech market in New Zealand's education system—privatisation by stealth? Open Review of Educational Research, 4(1), 164-176.

<https://www-tandfonline-com.prx.library.gatech.edu/doi/full/10.1080/23265507.2017.1365623>

I found this paper on Georgia Tech library.

1.1 Summary

This paper talks about growing needs of EdTech especially in assessment & testing subsection of MOOC & also increasing number of vendors trying to sell EdTech products to government state schools mostly for profit. This money-making approach might have impacts of student's learning experience.

1.2 Takeaways

Teachers like to publish their work about specific technological tools or methods rather than the outcomes students experience or the meanings or outcomes arising out their use. EdTech should be student focused and trying to improve knowledge by providing great content.

PAPER: 15

https://www.youtube.com/watch?v=9_4CvRa0hkA&feature=youtu.be

I found this video of ex-6460 class student on Youtube.

1.1 Summary

This video explains application of EdTech to build a tool for kids to learn mathematics.

This is a solid evidence of how EdTech can solve complex problems and also create innovative solution to help solve a problem.

1.2 Takeaways

Design an EdTech system and features by considering audience/end users.

Do not over-engineer an EdTech product but focus on solving a problem.

III) SYNTESIS

I started my research on Educational Technology in general without focusing on any specific track like build, research or content creation. Even if I plan to do research in content creation track, in assignment 1, I tried to explore existing applications of EdTech, current research, challenges & opportunities.

Given current COVID 19 situation in the world, everyone being stuck at home & online, I would imagine huge increase in demand of EdTech products in near future. This has created a unique opportunity for innovation in EdTech & address existing challenges on a faster pace.

After reading 15 papers and watching multiple YouTube videos, I have understood history and transformation of EdTech over years. It was important for me to understand how MOOC was a totally free then became paid and now for-credit version.

Along with innovation & increased adoption, new challenges emerge. It was interesting for me to read about some of those challenges currently faced by educational institutions like teacher training, technical infrastructure, understanding need of new skills, fears among teachers, huge pile of information on students due to digital nature of learning, etc.

There are many EdTech areas where a lot of research still needs to be done; e.g. quantifying comparable outcomes, reducing MOOC course dropout rate, making teacher/student communication seamless, assessment & tests validity, bias in admission process, etc.

My plan is to keep exploring literature until next week and then anchor on a topic of interest.

IV) REFLECTION

The research guide gave huge kick start on 'how to read research papers' along with 'how to find research papers. Most of the times, I used Georgia Tech library to find peer-reviewed academic publications. Also, I used Google Scholar for finding few literatures of mu interest. To get through a paywall, I have used multiple filters while doing search online. Also, I have configured "find it! @ GT" in Google Scholar settings to quickly search Georgia Tech library for publications I am interested in.

Initially it was overwhelming to decide which paper to ready as there are hundreds of publications, articles, newspapers, etc. but eventually it became easy to drill down on what I am interested in what publications I want to read.

I can relate to the 'breadcrumbs' analogy now because the reference section of many literatures helped me find related similar papers.

Some papers were really hard to understand (even abstract!) as the research was more qualitative. A literature with numbers & charts is more intuitive to me.

The hard part was not knowing how to read papers. Earlier this week, I spend reading paper from start to end, trying to understand every single sentence. After skimming through research guide, I found my answer and process of finding a research paper & reading became easy.

I would like to do research on content creation domain of EdTech. I enjoy working on User Generated Contents, editing videos, doing voice overs, etc. so I think this track would be a right pick to do maximum contribution to EdTech.

V) PLANNING

In week 2, I plan to read more research papers related to application of EdTech in User Generated Contents specifically related to YouTube, current challenges & opportunities. I would like to pursue content generation track and I would do research related to that domain. Some of my questions are what topic to pick for generating content? How it will help people? Who should I make this content for? How should I design the structure of content?

One thing I am sure that I will use YouTube as a delivery platform, but my biggest focus next week is to find a problem to solve which adds value to community.

SECTION B: ACTIVITY

PAPER: 1

Eriksson, T., Adawi, T., & Stöhr, C. (2017). "Time is the bottleneck": a qualitative study exploring why learners drop out of MOOCs. *Journal of Computing in Higher Education*, 29(1), 133-146.

Need

It is important to understand why there is a high student dropout rate among MOOC. There could be a number of reasons & this research nails down few primary reasons affecting dropout from MOOC.

Method

A qualitative research was conducted. 34 students from MOOC course were selected for interview. Interviewees were self-selected after receiving an email from researchers (random sample). The interviews were primarily conducted via Skype and lasted about 30 min each.

Audience

34 learners from a MOOC course.

Results

The authors found that the primary factors that influenced the decision to drop out are the learner's perception of the course content, course design, social situation & time management.

PAPER: 2

Joyner, D. A. (2018). Toward CS1 at Scale: Building and Testing a MOOC-for-Credit Candidate. In *Proceedings of the Fifth Annual ACM Conference on Learning at Scale*. London, United Kingdom. ACM Press.

Need

Due to recent growth in content & accessibility of MOOC, there is an increasing interest in using MOOC for degree credit. But, the learning & attitudinal outcome of MOOC should be comparable to on-campus version of the same course. This research outlines methods to quantify the comparison between 2 versions.

Method

A survey and assessment were used as an instrument to compare 2 groups of students. Student can self-enroll in a version they want, so it was not a random experiment.

Audience

The audience for this study was undergraduates at Georgia Tech. Some enrolled in MOOC and some enrolled in on-campus version of same class.

Results

Overall, author found that student enrolled in online version achieved comparable results as on-campus students. Also, this research is proposed to be follow up in a controlled experiment environment & non-neutral course to validate it's results before using it as a benchmark.

PAPER: 3

Bahadur, G., & Oogarah, D. (2013). Interactive whiteboard for primary schools in Mauritius: An effective tool or just another trend? International Journal of Education and Development using ICT, 9(1), 19-35.

Need

Many primary schools in Mauritius have implemented use of interactive digital whiteboard for teaching. The goal of this study was to find out whether the use of interactive whiteboards in primary schools can promote and improve learning and to establish how far teachers were at ease with this new digital tool.

Method

Students Performance: A controlled experiment (A/B Testing) was designed using 40 pupils in controlled group. Student in TEST were taught using interactive white board & students in CONTROL were taught using traditional methods. A pre & post assessment was conducted to measure impact of IWBs.

Audience

Primary school students from 3 different classes from 2 different schools.

Results

Interactive whiteboards did not result in significant impact on assessment results but other metrics like engagement in class & enjoyment are increased. So, it IWBs does have some positive impact in a school environment but it depends on what exactly it is designed to solve.

PAPER: 4

O'Reilly, E. (2016). Developing technology needs assessments for educational programs: An analysis of eight key indicators. *International Journal of Education and Development using ICT*, 12(1).

Need

Access to information using technology is increasing over time. Understanding the challenges teachers face with technology integration is a critical first step to successful adoption and sustained use of technology. But not all teachers are equipped with same skills & knowledge. This research will help address those problems so that solutions can be designed before implementing technology in a school, etc.

Method

Authors developed a Likert survey to capture 8 unique skills for each teacher. There were couple of questions per topic e.g. self-assessed skills questionnaire, barrier to access, demographic, needs & wants, etc.

Audience

Teachers from regional and national primary and secondary schools were selected for survey using internet search & through research database.

Results

A list of common barriers to access like network issues, computer not working, unresponsive technical support was found & reported. Professional development resources identified and proposed.

PAPER: 5

Matyokurehwa, K., Rudhumbu, N., & Mlambo, C. P. (2020). Intentions of First Year University Business Students to use Smartphones as learning tools in Botswana: Issues and challenges. *International Journal of Education and Development using Information and Communication Technology*, 16(1), 27-43.

Need

Study is designed to check intension of using smartphone technology as learning tool. A lot of population in the world owns smartphone but not laptop or tablet. Also, smartphones have advantage of portability and ubiquity over tablets and laptops since they can be carried and used anywhere.

Method

Closed ended survey was designed and using random sampling, 132 students were selected for survey from a population of 200 business students. Psychometric data analysis is conducted to measure mean value of metrics like smartphone for learning, perceived usefulness, perceived ease of use, attitude and behavioral intention metrics.

Audience

The audience for this study is first year business students from Botswana, Africa.

Results

The authors found that low internet connectivity, high internet cost, high smartphone cost & limited storage capacity are major challenges for using smartphones for learning. Also, another problem was students go to social networking which resulted in distraction.