Troy Wiipongwii
Assignment 3
Georgia Tech University

Abstract: For assignment three I have narrowed down to two topics that I am interested in. One of them has two paths which can then be argued there are three. The first surrounds memetics, metacognition and social intelligence. The second surrounds building better impact investment models for education. I am interested in both topics from a research and/or content perspective rather than a project perspective in regards to the class. These two topics are of particular interest to me because I have a unique interest in socio-technical issues from a practical perspective, causal inference methods as a methodological means of study and improved financial models and instruments as a way of incentivizing socially optimal behavior while still respecting voluntary participation and market mechanisms. Below I address preliminary thoughts on how the seven categories from the previous assignments will be addressed in my research in the first topic(s) and how my research deviates from those categories in the topic on impact investing.

Memes, Metacognition and Social Intelligence:

The broad idea in this topic is using memetics as a tool to allow learners to think about what **i**nformation is influencing their thoughts and how their thoughts relate to larger communal consciousness and intelligence. Additionally it may be the goal to quantify changes in thought due to metacognition and even shift collective thoughts. Memetics in my research will focus on any mode of propagation of thought and not exclusively on internet culture memes. Memes were originally posed by Richard Dawkins as way of explaining evolutionary components of culture. Below I will attempt connect some of the literature I reviewed to those seven categories. At the end of connecting the literature here I add a slight alternative to the above, where instead of using memes to help study metacognition and social intelligence, they are used as an end in themselves. The idea being that if disparate successful memes can be integrated in carefully delineated groups, once these groups are connected, the new information can be aggregated to solve large social problems in a swarm intelligence manner.

Technology and Sociotechnical Issues:

Technology in this research is looked at from a few different lenses the main ones being technology as medium for conducting research and technology as an issue of research.

I first became interested in the topic of innovation and diffusion of innovation after reading Joseph Schumpter's work on innovation and its role in economic development in undergraduate. Schumpter proposed that innovation provided better outcomes on economy than the idea of the price-competition

itself. Simply put innovation moves the economy better than prices. (I will more concretely put this idea in future papers). I became curious about the idea of why innovation can fail to be adopted. This is leads in to the study of diffusion of innovation and several issues prevent it including the following:

- weakness in innovation
- competition from other innovations
- lack of awareness
- social pressures against it

I am most interested in the last of the four presented reasons above. In my study of why people are against innovations, I stumbled upon a book "Innovations and its Enemies" by Caletious Juma who elegantly outlined from historical to modern times, from technologies such as the printing press to GMO's why people were against new innovations. The major reasons for rejecting were due to lack of understanding and/or cultural bias against change.

In the context of this project the sociotechnical issue I am interested in is researching why people reject technology that can improve their lives, are there legitimate reasons for rejecting, and ultimately is there a way of helping people learn how to tease out those biases that are unhelpful and helpful to better understand new information. This information is necessary for shaping discourse on technology policy, education, environmental policy etc.

Audience

The audience ideally would be all individuals engaged in civic and political activities, however the reality that there are few platforms and incentives available to engage citizens post education, I believe the more likely audience will be school and college aged students.

Content:

The content of this research will focus mainly on technologies that fall roughly into cultural, financial, environmental and health related issues.

Theory:

The theories used in this project will include a metacognition, cultural intelligence, constructionism and community learning.

Methodology:

The methodology used depends ultimately on the final objective of the research and what is being measured. Here is where I am still uncertain on what that is. In terms of understanding explicitly what those biases are, qualitative research using surveys will be the likely choice. If the goal is to quantify the change in thought using this metacognitive method, it is likely necessary to use causal inference methods such as Randomized Control Trials. Within the later is vital that I develop a proper theory of change identifying the intermediate (change in individual thoughts) and long term (change in communal thought and decision making) goals.

Alternative path:

As mentioned in the introduction the other route this research can use memes as an end in themselves rather than a memes to an end. This idea is to use memes successfully created and put into mutually exclusive affinity networks, can provide the opportunity to create swarm intelligence when these groups are put together and asked to solve specific problems such as crime in community or reduction in dropout rates etc.

Audience:

The audience in this path is certainly school age and college aged learners.

SocioTechnical Issues:

The attempt in this path would be to get students involved interacting with institution that impact them, while still learning interdisciplinary skills. In this path, technology does not mean high technology, but rather mechanisms that improve on the delivery of transactions in general. Institutions, such as local governments, criminal justice, recycling companies etc. would operate as a technology. (I have to find more paper, to adequately argue this point, will most likely find it in institutional economics literature.)

Theory:

This path will develop more through the use of social networks and project based learning. The PBL will be the framework in which we can see the success of the disparate memes at play in solving problems. Since the goal is to solve problems that are relevant to the students in particular communities, constructionism plays a big part here as well.

Methodology:

Evidence-based learning will play an important role in accessing the success of this project. Students must be evaluated on the extent to which they successfully completed their projects as well as on their competency on the interdisciplinary subjects at play.

Why memes? isn't that kind of subversive?

Yes and no. We are all bombarded by memes, some good some bad that deeply impact our thinking. PBL requires self-sufficiency and direction. If a student is confronted with a problem in which they have know heuristic to begin the path to study, nothing will get down. The idea of the memes in this context are to provide a heuristic to begin.

References:

Hawkins, Robert J.; Freeman, Barbara. 2017. *Evoke - Developing skills in youth to solve the World's most complex problems : randomized impact evaluation findings (English)*. World Bank Education, Technology and Innovation : SABER-ICT Technical Paper Series; no. 19. Washington, D.C. : World Bank Group.
http://documents.worldbank.org/curated/en/217221515050197490/Evoke-Developing-skills-in-youth-to-solve-the-World-s-most-complex-problems-randomized-impact-evaluation-findings

Kee, K. F. (2017). Adoption and diffusion. In C. Scott, & L. Lewis(Eds.) , international encyclopedia of organizational communication. Hoboken, NJ: Wiley-Blackwell

Susan A. Yoon (2017), Advancing a new perspective on decision-making about socio- scientific issues: the study of memes and memetic processes, ICLS'08 Proceedings of the 8th international conference on International conference for the learning sciences - Volume 2

Kasey Asberry (2009), Intelligent Swarm, a program to improve social learning tools

Chavalarias, David. (2019). Human's Meta-cognitive Capacities and Endogenization of Mimetic Rules in Multi-Agents Models.

Óscar J. Romero López, Angélica de Antonio Jiménez, Hybridization of cognitive models using evolutionary strategies

Barry J. Zimmerman (1995) Self-regulation involves more than metacognition: A social cognitive perspective, Educational Psychologist, 30:4, 217-221, DOI: 10.1207/s15326985ep3004_8

liskala, T., Vauras, M., & Lehtinen, E. (2004). Socially-shared metacognition in peer learning? *Hellenic Journal of Psychology, 1*(2), 147-178.

Impact Investment in Education:

This research topic deviates from the topics of EdTech discussed in the course and while this topic may be rejected or dismissed by my peers, I hope that it at least begins the discussion that how we invest in developing education is actually and important part of the EdTech conversation. Impact investing refers to investing in things that not only provide financial returns to investors, but positive social outcomes as well. In 2014 the Social Impact investor survey that just $3 billion dollars of the $2.5 trillion in education funding is from impact investing. Much of this has to do with the historical notion that the state is responsible for education as well as the perception that their are not many opportunities for returns outside of lending to governments for infrastructure of schools or in technologies largely used and contracted by institutions in developed nations. What happens though when the state is incapable of financing education adequately? Also can we trust that the best technologies or learning methodologies are reaching the market when market mechanisms aren't stamping out bad ideas?

In this research topic, I am interested in learning more about betters ways of designing financial instruments to improve access to capital in education and ultimately improve the quality of.

Audience:
Much of this research will be to develop a proper framework for investor investor sentiment change on how they view educational investments.

Research:
This research largely deviates from much of the EdTech literature so the 7 categories fail to some extent here. However, a few hold. The social issue here is improved access to capital, which requires models that show profit in the investment. There are a few Financial Technologies that immediately stand out as potentials for modes of delivery of lending/investing. These include:

- impact bonds at a state level
- blockchain technology
- crowdfunding

In terms of measuring potential returns, it is necessary to explore the literature on the economic impacts of education which is vast in the economic development literature. Using the literature it may be possible to extract a value for money spent in education that operates as a predictor for financial returns to investor if institutions are designed to allow investors to capture some of those returns. Most of the models in the literature use advanced econometric cross-section and time-series models to tease out the economic impact.

This research has the potential for exploring and developing ML predictive models and causal econometric models for teasing out the proper environment and features to place in the model for investment.

For me it is a cool idea to think about financial models and FinTech itself as a meme capable of challenging our societal thoughts on who we believe are the best capable of delivering public goods or financing them.

The methodology involved in this project requires a deep study of econometrics, financial economics, institutional economics, political economy and machine learning to deliver a proper theory of impact investing in education. In addition, market mechanisms such as profit will be discussed as a method of evidence-based learning. I mean this in the sense that where money goes and stays will be indicative to some degree of which learning methods and modes are delivery are the most effective.

References:

Closing the Gap in Education.
http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079947580/Closing_gap_in_education_and_technology_EN03.pdf

https://www.worldbank.org/en/topic/education

David Wood, Ben Thornley & Katie Grace (2013) Institutional impact investing: practice and policy,Journal of Sustainable Finance & Investment, 3:2, 75-94, DOI: 10.1080/20430795.2013.776256

Edward T. Jackson (2013) Evaluating social impact bonds: questions, challenges, innovations, and possibilities in measuring outcomes in impact investing, Community Development, 44:5, 608-616,DOI: 10.1080/15575330.2013.854258

Edward T. Jackson (2013) Interrogating the theory of change: evaluating impact investing where it matters most, Journal of Sustainable Finance & Investment, 3:2, 95-110, DOI: 10.1080/20430795.2013.776257

Antony Bugg-Levine and Jed Emerson, Impact Investing: Transforming how we make money and make a differences

Javaeria A. Qureshi; Additional Returns to Investing in Girls' Education: Impact on Younger Sibling Human Capital, *The Economic Journal*, Volume 128, Issue 616, 1 December 2018, Pages 3285–3319, https://doi.org/10.1111/ecoj.12571

The Causal Impact of Education on Growth: Evidence from the US