Raising Deforestation Awareness through Online Education

(Technical Paper)

Comparison of Crowd Sourcing and Venture Capitalists / Investment Institutions for Startup Seed Funding

(STS Paper)

A Thesis Prospectus Submitted to the

Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements of the Degree
Bachelor of Science, School of Engineering

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Fall 2019

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignment

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General Research Problem: Understanding the new Technological Capabilities Provided by the Internet

How can the connectivity of the internet be used to provide more opportunities and spread awareness about important issues?

Before the founding of the Internet, the available resources and information a person had access to was limited to that which he or she could physically reach. However, since the late 80's, when the internet as we know it began to develop, people have had access to more information and resources than even before. Now, with ease, a single person can post information and have it immediately accessible by millions or even billions of others around the world. Whether it is a website aimed at education about issues important to that person or an advertisement for his or her small business, anyone around the globe looking for it can find it. With global issues such as deforestation, climate change, plastic pollution, the Internet has been vital in spreading awareness and understanding of the issues. Additionally, through its ability to connect people all across the world regardless of distance, the Internet has also created a new financial ecosystem powered by individuals willing to pool resources to support projects or ideas they care about. With the number of successful projects funded through this method increasing every day, the question we are faced with is how this new type of investing will change the market and create new opportunities for entrepreneurs.

Raising Deforestation Awareness through Online Education

DuPont and the rest of Amazon Aid aims to put pressure on politically and economically powerful organizations because many continue to operate without any environmental accountability. E. Pereira, Ferreira, Ribeiro, Carvalho, and H. Pereira, experts in resource conservation and computational modeling, recorded the series of anti-environmentalist policies enacted by Brazilian politicians linked to the country's agribusiness since 2016. President Michel Temer eliminated multiple construction licenses previously required for companies cutting down the rainforest, and enacted other policies reducing the public's ability to oversee those construction projects. After deforestation rates increased in 2016, Temer's administration cut the Brazilian Ministry of Environment's budget in half, then froze the budget at that level for a twenty year period beginning in 2018. His successor Jair Bolsonaro promised to continue increasing access to the Amazon's resources (p. 8, 2019). Though not elected, consumer facing companies depend equally on their buyers' sentiments, and in some cases their buyer's ignorance toward irresponsible environmental practices. Because illegal gold mining motivates much of the Amazon's deforestation, New Yorker writer Stephanie Boyd wrote that members of the jewelry industry created the Responsible Jewellry Council in 2012, promising to trace gold from its customers to its original origins. Within a year, Peruvian reporters caught a council member buying illegal Peruvian gold. Yet, with no punishments set in place by the voluntary council, that company, PAMP, continued its business and still successfully operates today (para. 20, 2012).

With an improved design, Amazon Aid's learning modules could begin educating the next generation of environmentalists to boycott politicians and companies who choose to ignore the deforestation problem. In the two semester capstone course led by Computer Science

professor Ahmed Ibrahim, undergraduate Computer Scientists Trevor Bedsaul, Henry Clabby, Ryan Coulter, Sam Hecht, Dylan Peters, Rob Wallace, and Teddy Vallar will work with Amazon Aid Communications Specialist Ben Eppard to make the website's necessary changes. Within the first semester, the capstone team will solve the accessibility and navigational problems.

Though targeted toward middle school classrooms, the learning modules currently require a password protected account to track progress between logins. Public middle school teachers require special administrative permission to use any sites which require student passwords. To eliminate this barrier to entry, the capstone team will restructure the student login process to use a classwide code, distributed by the teacher, followed by a personalized four digit code so that each student may track their progress without the need for a password. Once inside the site, users currently have no way of returning to previously completed "levels" within the learning progression, shown in Figure 1 as different strata of each tree, making classwide discussion about specific aspects of the curriculum unnecessarily difficult. Simply making those previous levels clickable will allow intuitive backwards navigation for students and teachers, and this user experience will be tested with real students to ensure ease of use.

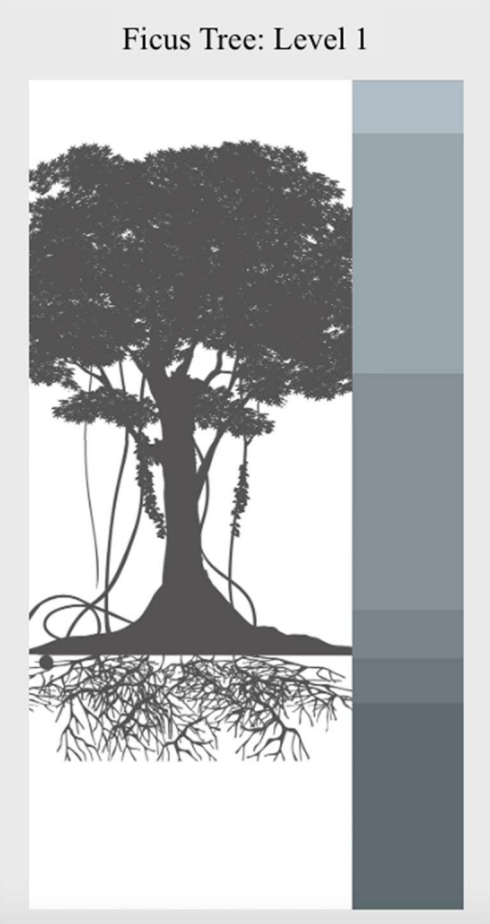
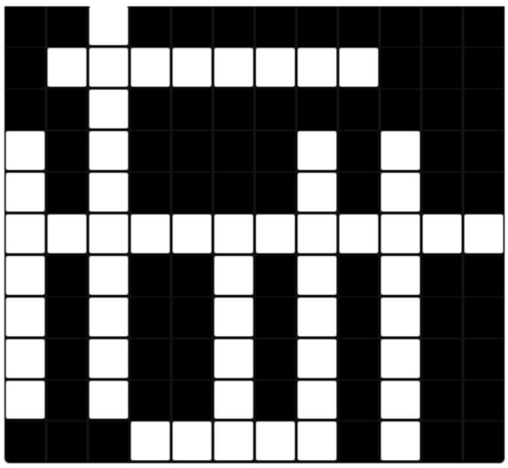


Figure 1: The silhouette of a Ficus tree shows the progress of a particular learning module in the Amazon Aid site, but features no navigation functionality, and fails to make clear the user's current level. (Adapted by Henry Clabby from "My trees" 2019)

In the second semester of the course, the capstone team will make the learning activities more engaging through improved gamification of the material. While the site currently features small games throughout the curriculum, an example of which is shown in Figure 2, they display multiple common pitfalls of serious games, games designed for something other than pure entertainment, explained by Wim Westera, an expert in learning media. Emphasis on rote memorization without contextual framing, such as a crossword with eight discrete questions and answers, aid in knowledge reproduction but fail to support deeper comprehension and general content understanding. Apparently, games employing only extrinsic motivators like rewards or certificates suffer the same disadvantage when compared to games using intrinsic motivators, such as enjoyment of the game itself (pp. 61-64, 2019). Though moderately enjoyable, the crossword shown in Figure 2 simply uses the password to the following level as an incentive. By installing games that require deeper understanding, such as designing hypothetical ecosystems of plants and animals, the capstone team will make the learning modules more effective as well as engaging. These improvements to the system are summarized as follows:



ACROSS

2. A majority of the water in the Amazonia Rivers is attributed to rains created by the great missing of trees and melt from:

DOWN

1. What butterfly's wings are so iridescent that they can be viewed up to one-half mile away?
3. Each species no matter how large

Figure 2: One mini game embedded in the learning modules features an eight question crossword puzzle. (Adapted by Henry Clabby from "Ficus Tree" 2019)

MINIMUM REQUIREMENTS

- As a USER I should be able to go back to previously completed levels within each "tree" when using the online learning platform.

- As a USER I should be able to enter the learning platform through a single teacher login.
- As a USER I should be able to enter the learning platform using a teacher's login information as well as a personal avatar, so that each student doesn't have to create an account.

DESIRED REQUIREMENTS

- As an ADMIN I should be able to add images that are persisted in a database, so that content can be added and served reliably.
- As a USER I should be able to bypass the integrated minigames in order to move onto more content.

OPTIONAL REQUIREMENTS

- As a USER I should be able to access and play a variety of minigames which are native to the web app while progressing through learning content.

The new and improved learning modules on Amazon Aid's website will be publicly released for use in middle schools and for independent learners who come across it online. Along with the site gaining popularity, Amazon Aid's ideals will begin spreading throughout the world, promoting concern for the Amazon and encouraging citizens and consumers to pressure politicians and businesses to adopt practices protecting the rainforest.

Comparison of Crowd Sourcing and Venture Capitalists / Investment Institutions for Startup Seed Funding

How has policy around crowdfunding changed the Venture Capital market and financial system as a whole?

Introduction:

The internet has brought about an age of connected-ness, where individuals around the globe can connect and communicate instantly. One of the many sociotechnical systems spawned

by this advancement is internet crowdfunding, where an entrepreneur or artist can post their idea online and collect money from investors or backers from anywhere around the world. Traditionally, a person looking for funding for their business would have to go to friends and family or institutional routes like Venture Capital firms or Angel Investors to get the capital they need. While these institutions have been the main driver of innovation and business development for many years, analysis of venture capital investment patters has shown a bias has formed that has led to over 77% of VC investments occurring within the top ten metro areas (Florida, 2016). Given the high risk nature of these investments and the policy that requires these investors hold the equity they purchased until either the company is acquired or goes public, it is understandable that the investors would want to focus on enterprises within a reasonable distance to their firm or home. However, when comparing this to equity crowdfunding, which lacks many restrictions on reselling equity and other risk mitigating actions that affect venture capitalists and angel investors, just 46% of the total investment has gone to the same top ten metros since equity crowdfunding was formalized through the JOBS act in 2015 (Marks, 2018). Crowdfunding has managed to break down a geographical divide that was limiting the economic opportunity of many outside of the top metro areas and for a those interested in understanding the market as a whole, it is important to understand how this change happened. This paper hopes to understand how the introduction of policy legitimizing crowdfunding and lowering barriers to entry has opened the venture capital market geographically as to inform lawmakers how to best use the new financial system.

Background:

For a Venture Capital Firm or Angel Investor investing in a startup, the rules and regulations around how the equity they purchase can be used plays a large role in whether the

VC's will invest in the idea. When purchasing equity in a company, in the majority of cases the Venture Capital firm will receive the equity in a Regulation D security. Unlike public securities and crowdfunding securities, Regulation D securities are limited to "accredited investors", meaning they can only be bought by someone who has been certified by the SEC. Additionally, Regulation D securities cannot be sold or traded until they are both registered with the SEC and they have permission from the issuer ("SEC.gov | Rule 506 of Regulation D," n.d.). Rarely will an issuer, the company that was invested in, give permission to their backers to sell the equity since it could harm the public image in a time when confidence is key. Thus when making an investment, VC's and Angel investors are making a typically 4 to 7 year, high risk for potentially zero reward bet. The investors have to form relationships with their companies and long distance is not beneficial in that respect. This preference is very clear when looking at the data, which show that the average distance between the lead VC and the firm targeted for investment is 70 miles and that Angel Investors locate close to the entrepreneurs they finance, with more than 50% being within half a day of travel (Agrawal, Catalini, & Goldfarb, 2010). The Venture Capital investment structure, while effective, emphasizes physical proximity to its disadvantage because of the risk brought on by how the investments can be handled.

Unlike VC, crowdfunding does not have many of those limitations. While there are many types of crowdfunding investment, such as reward based crowdfunding, donation crowdfunding, and equity crowdfunding, the type that has been legitimized most recently and has caused the most disruption is equity crowdfunding. In 2015, the JOBS act was signed into law that streamlined the equity crowdfunding process as to encourage growth (Jumpstart Our Business Startups [JOBS] Act, 2012). The most important of the changes introduced in this law are the creation of a new type of security called a Regulation Crowd-Funding security, or Regulation

CF, and removal of the "accredited investor" requirement. The regulation crowdfunding security is different from Regulation D types because it can be transferred or resold on a secondary platform after one year of ownership. Additionally, these securities can be bought by anyone who meets the minimum asset requirement, not just accredited investors ("SEC.gov | Regulation Crowdfunding: A Small Entity Compliance Guide for Issuers[1]," n.d.). These changes not only open the pool of potential investors by removing the accredited investor requirement but also radically widen the scope of which companies are viable investments. For an investment to be viable, there must be some way to get the money out within a roughly guaranteed time frame if the investment is a success. Originally the VC's and Angel Investors would have to wait for the company to be acquired or offer itself on the public market before any return on investment could be seen, but with crowdfunding the equity can be sold in as little as a year. Considering that the amount of businesses in the US numbers over six million but there were only 160 IPO's and 11,000 mergers or acquisitions in 2017, the number of companies that see a return on investment to the investors each year is small compared to the total number of enterprises. The pool of companies that fit the criteria of VC and Angel Investors is incredibly limited, but the number of companies now viable to crowdfunding investment that did not meet the criteria of VC or Angel Investing is massive. The new opportunities for previously non-viable companies do not only apply to companies that are located in dense population centers either, as analysis of equity crowdfunding for musicians found that the average distance between artist and investor was 3000 miles (Agrawal, Catalini, & Goldfarb, 2010). This is far larger than any distance than any VC or Angel Investor would be comfortable with and suggests the investors view the securities more like public stocks than equity in a company they are helping to found.

Crowdfunding has created large scale changes in the Venture Capital market mainly thanks to the policy implemented to support it. The JOBS act policy created new routes for Venture Capital which has opened the market to lower risk and lower cost securities. To understand the market as a whole, understanding how the creation of the new type of securities has opened the market geographically and change industry investment trends is vital.

Evidence and Data Collection:

The data on the companies that are funded through equity crowdfunding will be obtained in part from the sites/markets where they found their funding. Sites such as Angel.co contain publicly searchable databases of companies that found capital and include information such as location of the company, what market/industry the company is a part of, the number of employees, and how much was raised ("AngelList," n.d.).

Additional data on companies that were funded through crowdfunding will be obtained through the SEC official website, where information on crowdfunding offerings is released in quarterly updates. These datasets contain offer statements, quarterly updates, and terminations filed with the Commission ("SEC.gov | Crowdfunding Offerings Data Sets," n.d.).

Data on geographical dispersion of backers through equity crowdfunding platforms will be obtained through already published analyses like the artist backing site information analyzed in the Agrawal, Catalini, & Goldfarb paper referenced above. Additionally, efforts will be made to contact the crowdfunding sites themselves if the data freely available is not sufficient.

Data Analysis:

The data will be analyzed in multiple ways. The information on how much capital companies are raising and the locations they are based will be used to get an understanding of

how capital is being dispersed throughout the country in comparison to Venture Capital. Additionally, the backer data will be analyzed to inform as to whether backers make any preference for distance based on type of company or location.

STS Conclusion:

The goal of this research project is to understand how the market has been shaped geographically after the introduction of the 2015 JOBS act which opened many new doors to Venture Capital investment. The policy removed longstanding barriers into the Venture Capital market and opened the door for many who were unable to get into the VC market beforehand. Through understanding the result of the policy changes, the lawmakers and others in government will be able to better enable the economic benefits of this policy.

Overall Conclusion:

The connectivity of the Internet provides the tools for transfer of resources and information globally on scales never seen before. Through the technical and STS research described above, this paper hopes to expand the understanding of how to harness the globally connectivity as efficiently and effectively as possible. By researching how to best keep children and teens interested in educational content through gamification, the effectiveness of awareness and educational campaigns can be more effective. Understanding the how the market adapted to new policy will allow entrepreneurs and others to better harness the financial opportunities presented by global connectivity. Both of these further the understanding of how to best use the internet's connectivity to create more opportunities and spread information.

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