Understanding the Effects of Crowdfunding on Entrepreneurial Self-Efficacy

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ABSTRACT

Crowdfunding is emerging as a new socio-technical system that is changing how entrepreneurs interact with their community of financial supporters. While computer supported cooperative work (CSCW) researchers have begun to explore how this new type of system influences entrepreneurial work, less is understood about how the system influences their psychological experience—specifically self-efficacy, or belief in one's own ability to succeed at a task, which affects persistence, learning, and performance. Drawing on Bandura's Social Cognitive Theory, we conducted a qualitative study of 53 entrepreneurs using crowdfunding and found that crowdfunding can influence self-efficacy through (1) social validation, (2) role modeling, (3) mastery, and (4) physiological states supported by socio-technical features, such as displaying a concrete goal, examples of other's work, or public feedback. Results suggest how socio-technical systems can be designed to help entrepreneurs perform to enhance our economic and social prosperity.

Author Keywords

Crowdfunding, Self-Efficacy, Social Cognitive Theory, entrepreneurship, public validation, modeling, mastery

ACM Classification Keywords

H.5.3 [Group & Organization Interfaces]: Computer-supported cooperative work, Web-based interaction

INTRODUCTION

Crowdfunding—raising funds from online crowds typically in exchange for an award [11]—has been particularly attractive to entrepreneurs who lack equity and access to traditional sources of funding [12]. Rather than asking for funds from venture capitalists, banks, or foundations, entrepreneurs can seek contributions from thousands of people through crowdfunding platforms, like Kickstarter [21] (see Figure 1). Crowdfunding platforms have raised more than 1 billion dollars for thousands of entrepreneurs in the past five years [44].
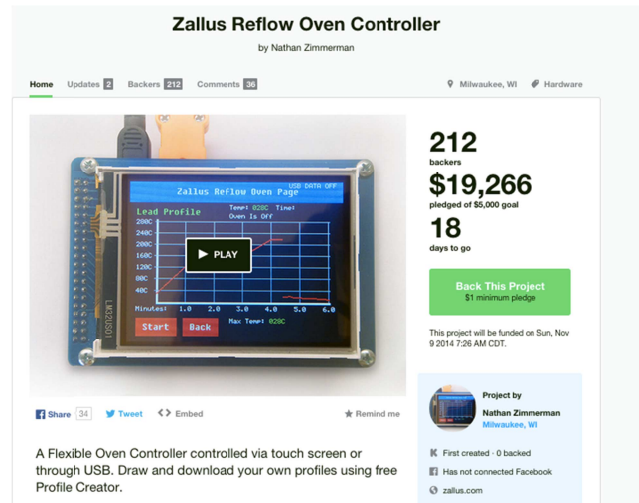
Figure 1: An entrepreneur from Wisconsin showcases his oven controller product on Kickstarter, a crowdfunding platform.

As CSCW researchers investigate the crowdfunding ecosystem as a new form of computer supported cooperative work, we are learning how the tools in the crowdfunding ecosystem support not just the exchange of funds, but also the exchange of ideas and instruction ranging from programming and manufacturing to marketing and project management [31][12]. For example, entrepreneurs share instructional YouTube videos and use Facebook and Twitter to spread their ideas.

While we are coming to understand how the socio-technical system supports the work of an entrepreneur, we know little about how people feel when engaged in this work. Understanding what work is accomplished using socio-technical systems and how workers feel about the work is critical for societies that rely on motivated entrepreneurs to start new ventures and create new jobs [16,17]. The psychological experience of entrepreneurs – particularly novice entrepreneurs – is critical as it influences their motivation to overcome the inevitable obstacles associated with entrepreneurship, such as doubt in their idea, lack of role models, or uncertainty about next steps [36].

Entrepreneurial self-efficacy (ESE) describes the belief one has in their ability to succeed at tasks critical for entrepreneurship [4]. Higher levels of self-efficacy are associated with greater levels of success and motivation in entrepreneurs [36].

Recent CSCW research suggests that online communities, such as Wikipedia or Dribble, may be particularly well suited to support increased levels of self-efficacy through providing a community of support, role models, and feedback to participants. While researchers understand that online communities can be effective in helping users feel supported, little has been explored regarding how the crowdfunding experience specifically influences the self-efficacy of entrepreneurs [19]. Crowdfunding provides a unique avenue to study entrepreneurial self-efficacy given its role as a space for entrepreneurs – often novices— to seek financial and emotional backing for their work. Through this research, we seek to answer:

- *How does the community and public aspect of crowdfunding affect entrepreneurial self-efficacy?*

- *How do the socio-technical features of crowdfunding systems affect entrepreneurial self-efficacy?*

By understanding these questions, we can identify opportunities to refine and redesign crowdfunding platforms to improve the user psychological experience and ultimately learning and performance [24].

RELATED WORK
We ground our study in research on entrepreneurship, social cognitive theory, and online communities in order to better understand how performing entrepreneurship publicly and in an online community develop self-efficacy in entrepreneurs.

Entrepreneurial Self-efficacy
The uncertain nature of entrepreneurial work, defined as the discovery and creation of a new venture [36], requires that entrepreneurs believe in their own abilities sufficiently to take action [29]. Entrepreneurial self-efficacy, or belief in one's own abilities to succeed at entrepreneurial tasks, positively influences performance as well as the goals entrepreneurs set [8]. Tasks include networking, marketing, managing, and risk-taking. Further, ESE influences persistence in working towards these goals, creativity, and the ability to recover from failure [14]. In this way, self-efficacy can significantly influence entrepreneurial intentions and performance. An entrepreneur who lacks self-efficacy is unlikely to pursue new ventures and believe in their own abilities [8].

Bandura's Social Cognitive Theory suggests that self-efficacy can be developed in four ways: experience of mastery (seeing oneself succeed at tasks), modeling (seeing examples of similar others succeeding at tasks), social persuasion (getting feedback and encouragement from others), and physiological states (physical and emotional response to various situations) [4]. While we understand how self-efficacy develops in face-to-face contexts, we know less about how entrepreneurial self-efficacy develops in a computer-mediated experience, specifically through crowdfunding. The purpose of this research is to explore how crowdfunding platforms and experiences influence self-efficacy development in entrepreneurs so that we can create better socio-technical interfaces to support entrepreneurs as they engage in their work.

Computer-Supported Entrepreneurship
CSCW researchers have begun to explore the role of computer-supported tools in entrepreneurial development. For example, research suggests that entrepreneurs use social media to communicate ideas to potential consumers [13], websites to request and manage resources among collaborators [31], and networking tools to reach out to peers [18]. Online communities of practice, or groups bounded together by a shared passion or expertise, have been shown to help develop user's sense of professional identity [37]. Online platforms, like Dribble, were shown to help users build their reputation in a transparent setting, as well as to draw inspiration from others' work [28]. Research on the online Do-It-Yourself (DIY) craft community found that skill development increased motivation for users to participate in communities, as well as the opportunity to getting project feedback [27]. In addition, online communities like GitHub encourage transparency, which has been shown to increase collaboration and learning among users doing complex activities [9].

Crowdfunding offers a platform where entrepreneurs can display their work to a global community [12]. Research suggests that entrepreneurs report finding value in aspects of crowdfunding beyond financial support, such as the community that forms around them during the process of a campaign [19]. Research also suggests that crowdfunding can lead entrepreneurs to develop new professional connections with their colleagues through sharing their crowdfunding work [31]. In addition, crowdfunding can be used as a way to help entrepreneurs reach new business markets that they could not access offline [1], as well to better understand their market [41], and how much potential customers would be willing to pay [5]. Furthermore, research demonstrates that even when crowdfunding campaigns fail, entrepreneurs still find it to be a positive experience and can pick themselves back up, as 43% of those who relaunch their projects went on to succeed [15]. This suggests that crowdfunding may influence not just the way entrepreneurs work but also how they feel about their own abilities and the way they react to failure.

Self-Efficacy Development in Online Communities
Research in online communities has begun to examine ways that these spaces can be used motivate and develop self-efficacy in users. For example, signals of social support or approval, such as personal tokens of appreciation, were shown to increase user participation on Wikipedia by 60% [34]. In addition, 78% of Wikipedians agreed that "having others compliment you on your edits/articles" is the primary reason why people decide to make more edits on Wikipedia [45]. Participating in such community supportive platforms has shown to help confirm one's self-image of being an efficacious person [33]. As such, the simple act of participating on a platform can improve user's sense of self-efficacy around their ability to perform and contribute [23]. Participation in social media communities, such as Facebook or MySpace, has also been shown to heighten user self-efficacy. Research suggests that some users go on Facebook to find greater purpose,

to affiliate with others, to receive social support, to feel less uncertain about oneself, and to find a greater sense of self-efficacy [11]. In addition, research suggests that MySpace and Facebook support sociability as they allow youth to connect with others who are unable to connect in offline spaces [7].

Online learning communities have also been shown to heighten self-efficacy around task performance [38]. For instance, studies have shown that online learning communities increased student participation and provided a space where users felt less intimidated and pressured [42]. Online learning communities also offer users the ability to collaborate with a large number of people that might be typically inaccessible offline [35]. Large online community size has been shown to have a positive association with user self-efficacy and motivation to contribute [23]. Crowdfunding communities are in part effective because they allow users to draw from a large collective group with similar interests to receive feedback and pool resources [19].

While online communities may often be effective at building self-efficacy and drawing from the strength of a crowd, they also have the potential to negatively impact self-efficacy. One's self-efficacy has been shown to decrease when people fail publicly or engage in upward social comparison [4]. For instance, when users within online communities, like Kickstarter, make mistakes, their errors are more visible which can lead to more embarrassment than when mistakes are made privately [19]. Research suggests that competition with large audiences can make it harder for users – particularly novices – to stand out as they compete with others in the community [28]. In addition, users report feeling more intimidated when they see a competitive landscape online or that their domain is full of others [24].

Building from this research, we are interested in how social cognitive theory applies to crowdfunding communities. We know little about how participating in crowdfunding influences the psychological experience of entrepreneurs and the impact that this process has on self-efficacy. The crowdfunding platform provides an ideal context for us to better understand what does and doesn't work in an online environment. By doing so, we will be able to better design interactive systems that support engagement as well as performance.

METHODS

Interview Participants
To understand how participation in the crowdfunding community affects self-efficacy, we conducted a qualitative study of 53 entrepreneurs on crowdfunding over three years, interviewing them about their experiences during the crowdfunding process. Interviews followed a semi-structured protocol, focusing on the project creators' experience with their campaign. Like previous CSCW researchers interested in developing an initial understanding of an emerging phenomenon [32], we chose this method of semi-structured interviews because it allowed us the opportunity to ask questions directly of entrepreneurs and to evaluate what key themes arose. In addi-

tion, previous CSCW researchers [19] used this methodology to study self-efficacy and found this to be an accurate measure of assessment[1]. This data has been used to inform previous studies on the role of community in crowdfunding [19], motivations and deterrents to crowdfund [12], the affect of public failure [15] , and the role of social networks in campaign publicity [18]. In this study, we focus on a previously uncovered emergent theme of how project creators build entrepreneurial self-efficacy.

Participants used three different platforms—Kickstarter, IndieGoGo, and Rockethub—the most popular and successful platforms in the US [2]. Project types varied including Art (7), Comics (3), Dance (1), Design (16), Education (1), Fashion (2), Film & Video (8), Food (4), Games (10), Music (3), Photography (3), Publishing (7), Science (4), Technology (3), and Theater (3). Approximately 50% of project creators met their fundraising goal on at least one of their projects, which is similar to the success rate of Kickstarter, the largest crowdfunding platform [44]. Most creators maintained full time day jobs – spending between 30 minutes and 7 hours a day on weeknights or weekends working on their crowdfunding project. Three informants relied on crowdfunding as their primary source of income. Participant ages ranged from 20 to 65 years old and raised between $41 and $433,365. Fourteen creators launched more than one campaign, ranging between one to nine campaigns per creator interviewed. Interviewees were not compensated for their participation.

Procedure
We recruited interview participants through random and snowball sampling, which allowed us to identify typical and atypical participants from the crowdfunding population. We divided our semi-structured interview protocol into two sections. In the first section, we asked participants about their professional background and how they learned about and became engaged in crowdfunding. During the second phase, we asked participants to describe the work involved—both collaborative and independent. Average interview length was 30 minutes. Interviews were conducted over video conferencing, phone, and in person. Interviews were conducted during and after the creators' campaigns. Advantages of this research approach include collecting both reflective and in situ data. Disadvantages include biases from self-report [39].

Analysis
Following grounded theory, we used selective coding and analysis [39] to understand how crowdfunding effected entrepreneurial self-efficacy. First, we flagged each instance related to self-efficacy and collected them in an Excel spreadsheet. We then clustered the instances into the conceptual categories of public validation, social modeling, mastery, and physiological factors, dropping those for which there was insufficient

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[1] See Future Work section to see limitations of this methodology and possible avenues to move to in future research

Mechanisms	Socio-technical Features	Self-Efficacy Effects & Examples
1. Public Validation	- Public and permanent display of contributions - Project pages accessible to global online audience	**Positive Self-Efficacy**: Entrepreneurs feel validated, connected, and encouraged by support. (Ex: *"It felt good to know that people wanted my product."*) **Negative Self-Efficacy**: Entrepreneurs feel lack of support and validation from others. (Ex: *"No one was supportive… It brings up all kinds of doubts, you think – is this project any good, is there a market out there for it?"*)
2. Modeling	- Project pages capture entrepreneurs' project themes, goals, success, and failures - Search tool affords shadowing of similar others	**Positive Self-Efficacy**: Entrepreneurs feel encouraged by seeing examples of others succeeding; learn from failure examples. (Ex: *"Seeing projects was really helpful and it was cool to see that people buy things—it doesn't have to be professional."*) **Negative Self-Efficacy**: Entrepreneurs feel discouraged by seeing examples of others failing; overwhelmed by pressure of seeing what it takes to succeed. (Ex: *"I don't do well modeling off other people."*)
3. Mastery	- Project pages show funds raised and progress toward goal - Video and site showing skills and number of page views	**Positive Self-Efficacy**: Entrepreneurs feel like they've gained skills through visible progress (*Ex: "I think that this [crowdfunding] is a really doable way to really practice and hone those [business] skills."*) **Negative Self-Efficacy**: Entrepreneurs feel down after seeing selves not achieve set goal. (Ex: *"It was a little depressing. I was defeated."*)
4. Physiological States	- Project pages show regular updates, days remaining, and funding goals - Project pages display to public success or failure of project	**Positive Self-Efficacy:** Entrepreneurs feel physically and emotionally energized by crowdfunding process. (*Ex: "I was so excited when results came in. I reached a goal and then I was like 'okay, keep going!')* **Negative Self-Efficacy:** Entrepreneurs feel physically and emotionally exhausted by crowdfunding process. (Ex: *"15 days of hell—I couldn't sleep it was awful. It'd get little dings thinking it was a donation, but it was not. It was torture."*)

Table 1. Mechanisms and Socio-Technical System Features of Crowdfunding Influencing Entrepreneurial Self-efficacy

evidence. Initial data analysis for the semi-structured interviews began after 10 interviews, while the remaining interviews were used to gather data pertaining to emergent themes [30].

RESULTS
Our findings suggest that crowdfunding communities can both increase and decrease self-efficacy levels in entrepreneurs through socio-technical features on the site. Supporting Bandura's Social Cognitive Theory, we found that crowdfunding sites influenced helped build self-efficacy through facilitating (1) public validation, (2) modeling, (3) mastery experiences, and (4) physiological states [4]. Entrepreneurs expressed gains in self-efficacy through the following platform features: the ability to receive feedback and the number of backers supporting their work, seeing examples of others succeeding on crowdfunding to serve as role models, or having their percent funded and financial progress publicly showcased. However, our results also suggest that self-efficacy can be decreased when entrepreneurs lack public validation for their work, when they feel daunted by their work, and when their failed project is publicly visible to others. We summarize the key mechanisms and socio-technical features that influence entrepreneurial self-efficacy in Table 1. The following sections will go through these findings in greater detail, with quotes from our interviews with entrepreneurs to support each claim.

1. Public Validation
Entrepreneurs report building self-efficacy through public validation, or the process of a group verifying their work which in turn shapes their own opinions about themselves [3].

The crowdfunding process allows entrepreneurs to be able to receive support from a wide audience of strangers and offers others a tangible way to support them in their work.

1.1 Public Validation Legitimizes Work
By receiving positive feedback, encouragement, and financial support, entrepreneurs report feeling their ideas are valued and legitimate. One entrepreneur crowdfunding his scientific research explained that having others express interest in his work and offer financial support boosted his self-efficacy in his own abilities to pursue his work:

"For any project you sort of wonder if people are going to like you and like your [work] ...so I definitely got more confident once people were clearly interested in it, and clearly engaging in the dialogue and supporting me financially."

Entrepreneurs report that public validation through crowdfunding, via platform features such as comments and dollars pledged, makes them feel more confident that their work is something that others desire. One entrepreneur of a board game project explained that after his successful crowdfunding campaign, he felt that he could demonstrate to a publisher that he has a strong audience of support for his work. In turn, this allowed him to confidently show that he could be successful professionally and it legitimized his product to others:

"Now there's actually real hard numbers showing, 'Hey, there's an interested audience in this enough to get this number of orders um, now are you interested?' … So I can go in there [to speak with a publisher] with much more confidence

... I can license that game to a publisher, which I've done twice...actually three times now."

1.2 Public Validation Motivates Effort
Entrepreneurs also report feeling more motivated and excited about their work through engaging with the public online. Crowdfunding comment boards allow entrepreneurs to receive feedback on their ideas. As an entrepreneur working on a photography project explained:

"People talking about and people helping you get your ideas together and.... commenting kind of inspires you to add more and more to the idea and make it more successful."

Receiving feedback and support from the public motivated this entrepreneur to pursue and improve upon his photography work. In addition, positive feedback can motivate users to feel like their work is desired.

Another entrepreneur building a consumer product venture reported that the process of going through crowdfunding helped him confirm that he could be successful if he tried and that he should follow his intuition, as he stated:

"It was awesome. It was 100% confirming. It gave me tons of confidence. That's part of why I asked for so little. There wasn't a sense that I was a surefire winner. It was hugely helpful to my confidence and it encouraged me to follow my instincts."

Though he had at first doubted his abilities to raise money and asked for little at the start to protect himself and have a higher chance of winning, he felt a renewed sense of confidence about his decisions after seeing the support of others through the crowdfunding process.

1.3 Public Validation Helps Entrepreneurs Overcome Obstacles
The supportive relationship developed between entrepreneurs and funders can also lead them to seek new opportunities after crowdfunding. For example, one entrepreneur expressed how, after failing his crowdfunding campaign, his team went on to sell their product on eBay because of the encouragement of their Kickstarter backers. This suggests that supportive relationships developed with their funders through crowdfunding can lead them to effectively sell their work on other online platforms. One entrepreneur went on to sell over 7,000 copies of his game on Amazon, thus making the leap into the mainstream product market [46].

Entrepreneurs express that the support of others helps them believe that they can do their work. This can influence what entrepreneurs tell themselves about their performance abilities. For example, a photographer who raised $2,000 to finance a community venture to raise awareness of homelessness discussed how the feeling of having many people supporting his work made him feel that he had to have more optimistic self-talk. He explained:

"You have to tell yourself the entire time, `Hey, this is going to happen, this is going to get funded, and this is going to be an awesome project because you have all these people backing you up the entire way.'"

This entrepreneur shows how having the support of a crowd backing up his work throughout the 30 day campaign made him feel that he needed to push himself and change his beliefs about the project. Thus, crowdfunding platforms offer a unique setting where entrepreneurs can put their work out to the public for recognition, comments, and financial support. If the support is there, this validation can help entrepreneurs change their perception of self-efficacy.

When crowdfunding entrepreneurs fail to reach their funding goals, continued validation of their work by the public encourages them to persevere. For example, one independent comic book artist expressed how after failing his first campaign, he and his team cut all communication with their supporters for two weeks. Yet their supporters still checked in to ask how things were going and to offer their support. In turn he expressed that the process of failing helped to strengthen him as an entrepreneur as learned many lessons from his first failure:

"I don't want to be cheesy but [failing] made me stronger... I mean, by going dark for two weeks, people literally wrote me 'Hey are you guys still around? ... Then if you saw the latest Kickstarter [campaign], ... first thing we said is we failed, we didn't do it, we wanted to raise seven grand, now we're back, we're smarter, and we're redoing it."

By showing their interest in the entrepreneurs' work even after a failed campaign, public validation helped the entrepreneur to recover quickly and return to work.

1.4 Public Validation from Strangers Creates Feeling of Impact
Participants also gained confidence in their abilities to succeed at their projects through receiving the support of people outside of their personal network. One entrepreneur of a photography franchise explained:

"Some of my biggest pledges are from people that I've never known, so it's really cool to see that other people are inspired by it… There is one woman who's pledged on my project and we constantly talk… she kind of helps me with coming up with new things and she's been sharing the page and she's been contacting news outlets around here to kind of tell them about the project."

This entrepreneur found it motivating and surprising that his supporters came from all over the globe and were willing to offer their suggestions and financial support. The crowdfunding process allows for the chance to seek support from a wider audience and motivation from outside of the typical network they can access offline. He was unsure that his project would have been possible without a crowdfunding platform, like Kickstarter:

"It would have been a lot tougher [without Kickstarter] and it would have been more selective of people, a more select group of funders. It's just cool that people from California have pledged for my project and I'm in Detroit. And it's just like a whole different experience that Kickstarter offers."

Being able to receive validation from a geographically diverse audience online allows them to see the positive impact of their work on a larger scale. As one entrepreneur seeking funding for a DNA project explained:

"I've gotten dozens of emails from people around the world who are really interested in the project, and who want to help on the scientific end or telling their friends and family, or a documentary TV producer contacted me, so I mean these are things that don't normally happen if you just have a grant proposal… so putting it out the public has been really great for me."

Many entrepreneurs reported being encouraged by the inflow of support and positive attention that was drawn to their projects through the crowdfunding process.

1.5 A New Avenue for Public Validation
Crowdfunding also provides a unique community where the public can offer support through an easier-to-access medium. For example, on Kickstarter, supporters can quickly donate through Amazon payments. Given that the crowdfunding process takes place online, funders from around the world can easily offer their support and funding. An owner of a dance studio described how the dance community was more likely to donate money to support her dance shows through Kickstarter than through traditional donation methods, such as in person:

"I have people that have been fans of mine for a long time who had never donated and when we did it on Kickstarter they did."

This entrepreneur suggests that the set-up of crowdfunding platforms made it more feasible or appealing for the public (and "long-time" fans) to actually be able to support her financially.

Entrepreneurs also expressed that crowdfunding allowed them to give others a technological platform to support their work:

"And it turns out that there were a lot of friends and family that wanted to support what I was doing and didn't have an avenue to do so. And [crowdfunding] provided an avenue."

Crowdfunding allows a communal space for entrepreneurs to have new opportunities for gaining public awareness and receive funding for their work. In addition, entrepreneurs reported that crowdfunding provides a unique (and unparalleled) space for them to actually see "followers turn into real dollars" and provides a way to "monetize social media".

1.6 Visualization of Feedback Boosts Self-Efficacy
Crowdfunding platforms also offer the unique ability of viewing the validation of others in a public setting. Entrepreneurs can receive quantitative data through number of comments, e-mail notifications, numbers of funders, and financial support. These features can help to increase the self-efficacy of entrepreneurs.

Many entrepreneurs expressed how much they enjoyed seeing "likes" for their crowdfunding projects and doing so helped them understand the number of people they are reaching and the quantity of people who recognize their work. This visual demonstration of public support can increase their self-efficacy and belief in their ability to succeed at their work.

"It's absolutely amazing that you can come up with an idea and have the whole world sit there and pledge for your idea to actually happen, you know? And all that excitement that I get every day that I see so and so pledged $20 so and so pledged $200, all that excitement I owe to everybody else, and…it kind of gives you a lot of faith in the world and faith in you know the project itself because it's not just you that is so excited about it…You have people on a daily basis pledging for your project and commenting and messaging, and it's an ego boost."

The visualization of success for an entrepreneur through e-mails, likes, commenting, messaging, and financial pledges can help boost their sense of efficacy and make them feel that others are excited about the work that they are doing.

1.7 Negative Self-Efficacy through Public Validation
While some entrepreneurs felt highly supported through their campaign, others expressed that the lack of support in crowdfunding led them to feel unvalued in their work. Some entrepreneurs expressed that they received little to no support throughout the entirety of their campaigns. For example, one entrepreneur working on a video project spent over $200 advertising for his project and still received no support or financial backers. As he stated:

"Support? Not at all. I didn't receive any contact from anyone in those 10 days. Went in without any expectations as it was my first attempt. People have such low attention spans that they probably don't read the text… I have done enough sales, I am tired of selling myself."

This entrepreneur decided after the campaign that moving forward he would not turn to the crowd for help, but keep things more private.

Another entrepreneur hoping to publish her first book described her shift in self-efficacy after people didn't support her work:

"Oh my god, I lost confidence in myself…I was hurt by some of the people who didn't kick in, it was … harmful to my ego."

Entrepreneurs expressed the challenge of having people they thought would support them not do so. One entrepreneur reported that she expected her friends to contribute, but their lack of support made her feel less confident in her ability to succeed and made her discount the support of others who have already backed her project. She continued:

"So that was hard, you know, 'cause I do have a lot of friends, and I do a lot of stuff for my friends, and when I was in the black, believe me they were all getting stuff from me. And it's kinda hard when the shoes on the other foot and you hope people will support you, and they don't."

The lack of public support made the entrepreneur feel abandoned and she realized that she had less support for her work than anticipated. Another entrepreneur expressed a similar sentiment after not receiving the expected support from friends:

"I networked on Facebook and on social media but there has been no interest or support for it yet- closest friends are the least supportive when you try to do something different."

In addition, some entrepreneurs struggled with getting feedback that they disagreed with or was negative from the public. This was particularly offensive as it was from people they did not know and thus seemed more critical. As one entrepreneur working on selling hooks explained after receiving critical design feedback on crowdfunding:

"It's a little bit of an insult for people to say you know you can do this better. There were also some moderately negative [points of feedback]. When someone criticizes, it's hard."

The lack of support from others or negative feedback led some entrepreneurs to feel depressed and more critical of their work. Entrepreneur's perspective can change as they realize that there might be less support for their idea than they expected, given the expansive nature of the Internet and the large number of projects that are available for funders to support. This is consistent with research suggesting that users can become disillusioned when they see the competitive space they are entering [24].

2. Modeling
Our interviews suggest that crowdfunding platforms provide a unique opportunity for role modeling, or seeing examples of similar others as motivation for self, which can boost self-efficacy [4]. This is done through entrepreneurs being able to view others' project profiles via the crowdfunding platform. For example, a film director described that after seeing one of his peers raise money for a film through crowdfunding, he started using social media to build an audience to finance his own short film. He eventually raised over $15,000 from 314 people:

"I was baffled by the idea that the guy just, in like a 24-hour period, used Twitter to raise like thousands of...And it really flipped a switch for me, and I realized social networking and stuff is really going to change the way creative people can get things done... I can get on Twitter today and raise money for a movie tomorrow. Like I've been cultivating my Twitter circle, my twitter network for like 5 years now."

This entrepreneur saw the benefits of using a social media tool, like Twitter, to raise support for his idea. Seeing this example motivated him to begin building his network for his own campaign.

2.1 Learning From the Lessons of Others
In addition, entrepreneurs report learning from others, which can shape their own behavior. As one entrepreneur said,

"I tried to read what some of the other people had done and pay attention to the people who were successful and tried to learn from them because I think some of the things about it were potentially counter intuitive. For example, ... my initial inclination was to make the time frame as long as possible, thinking that that would help me to raise more money. But, the advice I seem to get from reading about other people's experience was that having a shorter campaign was actually more beneficial."

This entrepreneur succeeded his funding goal and raised $4,741 for his photography program. Seeing examples of others gives entrepreneurs the confidence to try it themselves. For example, a 40-year-old man described how he was motivated to pursue his long-time dream of starting a food truck business after seeing other novice entrepreneurs succeed through crowdfunding:

"The guy that did one on Kickstarter two weeks ago ... it was essentially a little frame that you would sit a cell phone on top of... This is essentially a cardboard box with a hole in it! [laugh] It is! ... It was just unbelievable how much money he raised."

By seeing the example of others with similar skill levels succeeding, he said he realized that he was capable of doing the same. Entrepreneurs find role models by browsing crowdfunding project pages and learning from how others presented and approached their work. In addition they report using the way others manage their projects to help guide how theirs are managed. Entrepreneurs express learning from others on crowdfunding platforms regarding organization about deliverables and using social media to market their products.

2.2 Learning From Others' Mistakes & Failures
Entrepreneurs also report learning from the mistakes of others and hope to avoid the same pitfalls themselves. One game designer explained how he noticed that many projects would show a similar pattern where they would generate a lot of enthusiasm on Kickstarter and then show no activity for months after the campaign, causing much of the enthusiasm to burn off. He described how he did not want to make the same mistake:

"I wanted to do ... an instant gratification thing... with the first novel as quickly as possible, which is why we didn't start a Kickstarter until we actually [were] well under way, editing and layout was happening."

Surprisingly entrepreneurs did not report being frustrated by seeing the failures of others, but encouraged and inspired to not make the same mistakes.

2.3 Learning From Apprenticeship Model

Entrepreneurs expressed how working beside others helped them learn and gain confidence in running their own crowdfunding project. One entrepreneur working in the tabletop gaming community explained his process of shadowing a fellow entrepreneur on their crowdfunding campaign before trying it out for himself:

"I rode shotgun on a couple of Kickstarters ... so I kind of got to see someone else running a Kickstarter, but with the ultimate thing being a product that got added in my catalogue... [laugh] that was a nice dip the toe in way of approaching it."

This entrepreneur highlights the benefits of learning through apprenticeship, which is a crucial element within communities of practice [25]. He went on to lead four successful crowdfunding campaigns selling his board games after this experience. Another entrepreneur shadowed a friend who was also raising funds for a game design:

"I kind of rode on [a fellow entrepreneur's] coattails a bit when he was developing a little matrix game ... and that was what initially exposed me to kind of the versatility of crowdfunding, that you can actually get small print runs done for a committed and really strong fan base."

The crowdfunding platform provides a unique place for entrepreneurs to draw inspiration from others through seeing sample projects or serving as an apprentice. In turn, many entrepreneurs reported feeling greater belief in their own abilities.

2.4 Negative Self-Efficacy through Modeling

While some entrepreneurs found inspiration looking at entrepreneur examples online, others found this process to be demotivating and stifling. Some entrepreneurs expressed that seeing examples made them feel that all of the good ideas had already been taken or that only people with an established reputation succeed. One entrepreneur working on selling CD's explained:

"I spent about a week reading the Kickstarter website -- I looked at projects and what kinds of things had gotten sold and action. It seem that the best things have already gotten a following..."

Seeing that others were ahead of where they were or had a seemingly unfair advantage was demotivating to some entrepreneurs. This is consistent with Bandura's theory that even the mere sight of a formidable looking opponent can lower self-efficacy more than when someone is faced with an opponent that looks less impressive [4]. Several entrepreneurs also commented that with so much content on the Internet they felt that people could not see their projects and that their ideas were more hidden online.

Entrepreneurs also expressed frustration by the misconception that crowdfunding was easy. Many saw examples of crowdfunding projects online and anticipated that they would be able to mirror their success, only to find that it was more difficult that they thought, consistent with CSCW research on the role of community in crowdfunding [19]. One entrepreneur who worked on a CD campaign explained this realization:

"I've noticed that it's a lot more competitive to get your idea out there than it sounds... it sounds really easy to be like, "Ok, I'm going to come up with this project and post it all over the internet, and people are going to love it!" and it's not that easy because... the internet is full of endless possibilities and...They're so overwhelmed by everything else that you see and hear and watch on a daily basis."

Other entrepreneurs expressed that it was a lot more difficult than it had seemed, as one voiced: *"I've realized that it's not as easy as Kickstarter would say that it is."*

Another entrepreneur expressed how he looked at examples of other projects and tried to model his after theirs, but was unsuccessful.

"I wrote mine in the same format of someone who raised a couple thousands. People said to lower the amount you are asking for, now asking for more specific things, but haven't been successful yet. Even though I advertised everywhere-every group or social media."

Although the entrepreneur modeled the behavior of others, they didn't find the same level of success. Our research demonstrated that some entrepreneurs draw great inspiration from others within the community, yet some can develop unrealistic expectations or fail to pursue their own strategies as they attempt to follow the example of others.

3. Mastery

The crowdfunding experience can also influence entrepreneur's sense of mastery, or seeing oneself succeed or fail at a task [4]. The platform allows entrepreneurs to gain concrete skills and observe their success as well as their failures displayed in a public setting. This can both increase and decrease self-efficacy. The entrepreneurs we interviewed reported gaining skills in things like management, communication and marketing, as well as social networking to advance their work.

3.1 Project Management Skills

Entrepreneurs reported that working on crowdfunding projects helped them improve their management of large-scale projects. As one entrepreneur working on an art crowdfunding project reported:

"It was a very sort of complicated thing to pull off and doing it really gave me a lot of confidence in myself and my team on how we can pull off large-scale projects."

This entrepreneur showed that her confidence in herself and her team was strengthened through feeling a sense of mastery after succeeding at the task. Many entrepreneurs expressed feeling a sense of accomplishment and mastery as they succeeded what they had set out to do.

3.2 Communication Skills

Crowdfunding platforms provide a space where entrepreneurs can jump into their work and take risks. It also provides the chance for entrepreneurs to practice communicating their work to others. One entrepreneur described how she had to learn how to explain her work in a way that would inspire others who knew little about the subject:

"To be able to communicate with people who aren't scientifically minded takes a skill and a realm of comfort, so making the video was key. And being able to come up with something inspiring and understandable to the general public… definitely requires a set of skills that writing a grant to NSF would never call upon."

By learning how to communicate their work to a broader audience on crowdfunding platforms, participants found that they were able to reach many more people than they would typically reach offline. In turn, this process pushed them to become skilled at different communication styles. Entrepreneurs also report learning how to communicate different messages to different audiences depending on what they need to hear:

"It's very different to pitch your project to the public than it is to pitch it to a grant organization and you know it may seem like there's two divergent streams, like two very different ways of presenting your project… and trying to convince the public that I'm not just this person in my ivory tower, and thinking thoughts that don't mean anything to anyone but myself and so it's really sort of pairing those two together is what I'm learning how to do."

Entrepreneurs build skills in communicating to new audiences and presenting their work in a way that makes sense to novices in order to garner their support. Entrepreneurs also reported learning how to make a convincing video for their project that others would want to watch:

"I've been surprised by some of the stuff I've learned about the utility of the video in the project, but also about it's length, like you lose most of your viewers of the video by the 90 second mark, unless you've really hooked them. And many don't watch past the first 30 seconds, so like you have to really up front deliver the reason to buy."

3.3 Social Networking Skills

Entrepreneurs reported improving their social networking skills through publicizing their work on crowdfunding platforms. As one entrepreneur pursuing a photography crowdfunding campaign remarked:

"*I've gotten better at probably you know, being more confident in the way that I social network, and knowing that I'm not looking as terrible as I think I look***."*

Crowdfunding provides a space where entrepreneurs can get noticed by a large crowd of people from around the world and develop a reputation for their work that is not feasible offline. This allows entrepreneurs who may not have been known

before, to develop a sense of professionalism for their work. As one game designer described how he built a stronger following with each successive crowdfunding project he launched:

"I had built up enough of an audience that people were interested in my first commercial game, and then my second commercial game, and then my third commercial game. And so gradually I found myself becoming a professional game designer, totally by this totally weird roundabout way that's sort of a new model compared to what used to be the norm."

Entrepreneurs reported that opportunities arose through the crowdfunding process that helped build up their professional reputation. This is consistent with Weick's theory of "small wins," suggesting that in order to accomplish a larger task, they need to first have a smaller accomplishment [43]. One entrepreneur explained some of the new opportunities that arose from her crowdfunding campaign:

"Well, I got a book deal, that was the biggest thing. My book… is coming out at the end of March. I also got to be on CNN, which was great. I spoke about the project at the Museum of Contemporary Art in Chicago…Having $25,000, a chunk of capital, that gave me a lot more financial security than I've ever really had."

3.4 Professional Development Skills

Through developing their reputation as experts on crowdfunding platforms, entrepreneurs reported that they felt like they could mentor and support others in developing their work. Entrepreneurs explained that after going through the crowdfunding process they felt confident sharing their lessons learned with others. As one entrepreneur described:

"I still am learning it…it's a fun experience, um, and now I feel much more confident in offering advice to people [compared to] where I was five years ago."

Entrepreneurs reported that as they went through the crowdfunding process, they found themselves being able to speak in conferences and public platforms about their expertise. One entrepreneur who was new to business explained how after participating in crowdfunding, someone asked him to speak on a panel about his experience

"Suddenly I found myself like talking for 5 minutes straight about like the business elements going into it and why you want to try to launch your project on a Tuesday because you know marketing research has shown people tend to interact more with social media and read blog posts and maybe hop over to Kickstarter page on Tuesdays."

The entrepreneur surprised himself by how articulate he was on this issue and how he was able to teach others after going through the process himself. He also reported feeling able to more confidently speak on the topic, via blogs and other platforms, like Pinterest:

"I think have culled you know that… advice down to a few links of interest that I've put on a Pinterest board that I try to

share out to people when people come to me now and ask, "How do, how do I do a Kickstarter?" I'm like well go read all these first, and then come back… I've ended up being a guy who knows a lot about Kickstarter."

Entrepreneurs explained that they were able to offer insights and their developed expertise with others after working on crowdfunding platforms. An entrepreneur explained how he mentored a couple dozen people on crowdfunding platforms after going through the experience himself. The crowdfunding process allows entrepreneurs to develop their expertise in the field and develop themselves as professionals.

3.5 Negative Self-Efficacy through Mastery
While many entrepreneurs expressed feeling a positive sense of mastery through crowdfunding, others expressed that not achieving their goal led them to doubt their work and belief in themselves. As one entrepreneur working on selling his music said,

"It was very hard [when I didn't make the goal], it brings up all kinds of doubts, you think -- is this project any good, is there a market out there for it?"

Others expressed that in the process of the campaign they realized their weaknesses as entrepreneurs or lack of skills. One entrepreneur said that he wished he had the skills to put up a video and felt that it negatively influenced his project not having one on his project page. Another entrepreneur working on raising funds for a building expressed: *"[I gained] no skills, but it highlighted a shortcoming that I lack which is clarity and communication."*

Other entrepreneurs expressed that the process of not accomplishing the goal they set for themselves was defeating. The nature of their failure being so public and obvious from the website caused additional grief. As one filmmaker entrepreneur remarked:

"It was a little depressing. It was obvious that it was going to fail. I was defeated but trying to find other ways to get it funded."

Having campaign failure publicly displayed permanently on the crowdfunding website also negatively impacted entrepreneurs. One entrepreneur working on a crowdfunding project raising money to remodel a home ended up deactivating his Facebook account and not wanting to go on the Internet after his project failed.

Failing at a personal goal can be defeating, yet having this failure publicly displayed for the world to see can lead some entrepreneurs to retreat and decrease self-efficacy.

4. Physiological States
Our results also demonstrated that some entrepreneurs found the process of running a crowdfunding campaign physically and emotionally exhilarating. Many expressed the thrill of having a specific time pressure on themselves to raise the funds and that this energy pushed them forward. One entre-

preneur working on developing a game for female scientists described how the process was similar to the exhilaration of running in a marathon. As she described:

"The emotional involvement was like running in a race and having people cheer for you. Relying on so many people made it seem realistic for me… It was so cool because we set a goal, and to see us actually hit it,.. It gives you confidence to see that it actually happened and if you did it then you'd do it again. It gives you a feeling of "Damn!"

Entrepreneurs expressed the excitement of getting to watch their product be released to the world and the emotional thrill of seeing how people responded to their work. As entrepreneur described:

"To me, it wasn't so much the amount of money, it was more of just the fun of seeing my product in the world."

Many expressed that it was much more the funding and more so about the emotional energy that they received. One entrepreneur working on publicizing his music told about the calls and e-mails he received during the campaign, which gave him greater meaning and value to his work. As he said,

"Anyone that I met or saw knew about it [my crowdfunding project] and it was all they talked about…. To see how many people responded and engaged in the process was really exciting and made me appreciate what I do. I realized that there is a place for what I do."

Many entrepreneurs found great energy and exhilaration from the crowdfunding campaign and from the short process of asking for funds from others. One entrepreneur described the enthusiasm he feels when receiving emails from those who support his projects:

"My favorite thing is waking up in the morning and looking at my email saying, "So-and-so pledged!" You know and it's like you get those Kickstarter emails and I'm just like, "Ooh!" like all excited and I'm constantly refreshing it."

E-mail notifications as well as social media "likes" and "comments" about one's crowdfunding project uplifted the spirits of entrepreneurs and boosted their self-efficacy.

4.1 Negative Self-Efficacy through Physiological States
Yet while some found the crowdfunding project exciting and exhilarating, others found it incredibly demanding and emotionally stressful. As one entrepreneur working on selling a rap CD stated about the campaign,

"It was 15 days of hell -- I couldn't sleep it was awful. I'd get little dings thinking it was a donation, but it was torture. Really stressful because you're trying with everything you have to raise money and spending everything you did. If money's not coming in, you're trying to think about what you are doing wrong."

Another said how the campaign changed while they were working on it, but tried to brush things off after failing to get the funding they had requested:

"I started out really confident, I just wanted to get a sense of how much people connected with the music and if the quality was better and if they felt more confident in donating.. I was really excited putting it up, but I was really down..."

Some entrepreneurs mentioned how the process affected them physically and emotionally and the stress that was involved with pushing an idea forward and not receiving the support they expected. This negative physiological response led to decreased levels of self-efficacy in entrepreneurs.

Entrepreneurs expressed how the process of asking for money was physically and emotionally daunting for them. As one entrepreneur working on a music campaign said:

"It's a scary thing asking everyone for all of that and to be honest it still weighs on me because I still have to give back the rewards, even $20 is a lot to ask. Now I make a concerted effort to help and I understand how hard it is to raise money, and it was scary. And it walks this fine line of remembering that you're raising money for a good thing and being conscious."

The entrepreneur demonstrates the physical and emotional weight that the process can have on entrepreneurs. Others report of the endurance needed for this type of emotionally exhausting task. One entrepreneur reported the process of sticking with their goal and the physical trials of the process and making oneself vulnerable:

"When I launched the campaign, I remember pressing "Launch!" – and feeling so good… But really it was just beginning… it was like an endurance task – how many people we can get… It was the worst feeling, like check your pride at the door. Even going back looking at Facebook I want to go back to people and say "oh god, I'm so sorry that I asked money of you"… This is a bit ridiculous."

Entrepreneurs mention the "endurance" and the effort needed to do this type of work and the physical and emotional exhaustion that the trying process of a campaign can have on entrepreneurs that can decrease self-efficacy.

DISCUSSION
Through a qualitative study of 53 entrepreneurs, we find that crowdfunding can provide a highly unique opportunity to influence the self-efficacy of entrepreneurs as they pursue their work. Our results suggest that crowdfunding platforms have the potential to support interpersonal interactions that motivate entrepreneurial work more efficiently and at a large scale. For example, users report gaining confidence in their work through features such as: positive affirmation and visual support from the crowd; seeing successful examples or shadowing others; mastering skills such as learning to communicate their projects; and gaining motivation to succeed through having a timeline for their project during the campaign. Yet we find that the same principles that can build self-efficacy in entrepreneurs can also sometimes make it weaker. Several socio-technical features of the crowdfunding interface that were shown to negatively influence self-efficacy included:

negative feedback from backers, permanent public display of failed projects, the misconception around the ease of crowdfunding, and the time intensive nature of campaigns which left some entrepreneurs exhausted and stressed. These features played a role in developing negative self-efficacy in some entrepreneurs.

Contributions to Social Cognitive Theory
This work builds on social cognitive theory in several key ways. At a high level, it suggests that self-efficacy can be developed in crowdfunding spaces through public validation, modeling, mastery, and physiological states, four features that support self-efficacy based on social cognitive theory [4].

Public Validation
Our results suggest that audience size and social anonymity can impact self-efficacy on crowdfunding platforms. Entrepreneurs reported feeling increased confidence after receiving feedback from those they did not know as it felt as though their work was more valid. In addition, the large audience size made entrepreneurs feel like a large crowd was watching them, which is not always as accessible in offline environments. While research argues that online communities can offer a safe space for users [42], our data demonstrates that crowdfunding platforms can be risky, challenging spaces where users receive harsh criticism, praise, or both, from the public. Thus our research demonstrated that entrepreneurs can both increase or decrease self-efficacy quite severely given the validation (or lack there of) of their online audience.

Modeling
This research adds complexity to social cognitive theory around modeling by suggesting that even when entrepreneurs see examples of others failing, they can still develop self-efficacy for their work. Though past research argued that self-efficacy can be decreased through social comparison [4], our results suggest that social comparison and watching the failures or successes of others on crowdfunding can increase ones learning and self-efficacy towards their work. This points to the value of entrepreneurs shadowing others and learning from their experiences to gain heightened self-efficacy for their work.

Mastery
This work also builds on social cognitive theory through demonstrating how mastery in an online setting can impact self-efficacy, particularly given the audience size. Crowdfunding platforms create a space where it is very obvious if entrepreneur achieve or fail to reach their goal. Our results suggest that this public display of mastery or failure can influence an entrepreneur's perceptions of their own abilities. Given the large audience size online, entrepreneurs can feel higher or lower levels of mastery depending on their results, which can influence their entrepreneurial self-efficacy.

Physiological State
Furthermore, this research builds on social cognitive theory around physiological factors through demonstrating that with an emotionally taxing process like crowdfunding—where stakes are high, deadlines are short, and members feel accountable, vulnerable to their supporters – higher stress can be deduced. Entrepreneurs who were most successful were those who had a plan ahead of time and knew what to expect. Thus, greater counseling of entrepreneurs before entering the process could be helpful.

Contributions to Computer-Supported Entrepreneurship
This research builds on previous computer-supported entrepreneurship research by showing how crowdfunding experiences online support or hinder self-efficacy in entrepreneurs. While entrepreneurs reported gaining skills and boosts in their confidence through using crowdfunding sites, our results also showed that even experience failure in crowdfunding could sometimes build self-efficacy. This boost came from online social support, people continuing to encourage them in their work, which put the entrepreneurs on track to try again. Previous research pointed at how some sites have used badging to motivate and reward users [26]. Our research suggests that that social support for entrepreneurs on crowdfunding platforms may be stronger than financial benefits alone. Many respondents reported that this social support was more important than the money and why they did it. However, while the public experience of crowdfunding engaged more people in social support, it also exposed entrepreneurs to public experiences of criticism. While receiving feedback can support improved work quality [40], excess criticism and failure can be detrimental for one's self-efficacy [4].

Opportunities for Entrepreneurs in Online Communities
Our findings suggest that crowdfunding has the potential to change how novice entrepreneurs view their work and build their careers moving forward after the campaign. Currently opportunities for novice entrepreneurs to build self-efficacy are often competitive and limited to a few selected entrepreneurs, such as Tech Stars [47]. In addition, novices typically don't have an established following to provide support [28]. Yet crowdfunding allows them to not only get financial support, but also the psychological support needed to perform their work. In addition, it provides an opportunity for any entrepreneur to submit their idea and call on a large audience of people from around the world to support them.

More entrepreneurs are now beginning their careers through crowdfunding because working on these platforms provides them with possible support, mentoring, and training that are less available offline. Some design instructors have already begun to teach students to crowdfund as part of their course projects [10]. Since anyone with Internet access can crowdfund, entrepreneurs from underserved communities or with few connections to angel investors or venture capitalists have the same opportunities as those surrounded by traditional funding opportunities. This empowering experience can allow people of all ages, ethnicities, and genders to initiate and make progress on their projects at a speed and scale that is not available to all offline [22].

DESIGN IMPLICATIONS
This study points to several design principles that we recommend for future systems including: (1) the importance of providing public validation to entrepreneurs throughout the crowdfunding process, (2) showcasing mastery and skills gained on the site rather than failure, and (3) providing ways for entrepreneurs to learn from the failures and successes of others through the crowdfunding process and combat fatigue.

To begin, we recommend that crowdfunding platforms provide an online space where entrepreneurs can receive positive support and encouragement from others in the community. This is consistent with empirical research of online communities that rely on reputation systems and badges [26] to promote participation and better work. For example, Wikipedia started WikiLove, which allows users to get notes and images of encouragement from fellow users in the community. Providing tools for entrepreneurs to receive positive affirmation, such as "barnstars" on Wikipedia or "likes" on Facebook, could be helpful in building self-efficacy [6]. We also recommend providing more ways to see the level of public support or people who have viewed their page. Currently crowdfunding platforms provide badges for supporters every time they fund a new type of project, but there is no equivalent badge system for entrepreneurs. Allowing entrepreneurs to see their funding progress in ways other than the dollar amount could help to boost self-efficacy.

It can be helpful to facilitate the realization of skill mastery by entrepreneurs, as well as encouraging them to gain more skills. This might be done through a badge system that depicts different skills learned, such as a communication badge if you send a certain number of updates or a funding badge when you hit a certain target financial goal by an early period of time. For example, Codeacademy depicts user success on user pages with stars and checks of success. This allows users to feel a sense of pride for what they have accomplished thus far. Displaying these badges will also allow others to identify experts with certain skills, thus promoting the culture of mentorship in crowdfunding communities.

However, we also find that for those who don't reach their financial goals, the visual display of their failure can be quite demotivating. We recommend providing a way for those to manage the failure experience [15]. For example, entrepreneurs could pick what data is shown depending on how their campaign is progressing or have the option to remove failed crowdfunding projects to reduce feelings of failure. In addition, we recommend a way to notify others in the community if you are struggling and need support. Building on Bandura's theory of public validation and our findings, we suggest providing ways for people to feel supported despite failure. For example, crowdfunding platforms could encourage supporters of failed projects to send encouraging notes to entre-

preneurs post-failure to boost self-efficacy and help people bounce back.

Entrepreneurs can discover new ways to conduct their work, as well as how to avoid common mistakes through seeing the examples of others. Thus, we recommend providing a tool to allow people to shadow others doing crowdfunding projects in similar spaces. For example, entrepreneurs could list the skills that they need help with and be matched with other entrepreneurs who have experience with these skills. We learned that it is helpful to "ride shotgun" with others through an apprenticeship model, building on research in communities of practices describing the importance of apprenticeships in learning new skills. For example, IndieGoGo labels each crowdfunding team member with a "user role," [20] which could help novice entrepreneurs to identify who to ask for help. We recommend allowing a user resource exchange [15] that helps find role models depending on what specific skills are needed (ex: combatting failure, advertising, etc.). Building on social cognitive theory of role modeling and our findings, we also recommend showing some role models of people failing and coming back to succeed at a crowdfunding campaign [4].

FUTURE WORK
Entrepreneurial work can be daunting [36]. Understanding how to best support entrepreneurs as they work via online tools could shape the way people pursue their work. Future work will involve developing our understanding of what specific parts of the campaign affect self-efficacy most and how to enhance these features to build self-confidence. We plan to conduct greater experimental work to measure the impact of crowdfunding on entrepreneurial self-efficacy [8] in order to better disaggregate specific platform features from entrepreneur experiences.

For instance, we could use self-efficacy survey to measure changes before and after running a crowdfunding campaign. While our qualitative methodology was effective for identifying early patterns and creating a baseline understanding what is occurring within the development of self-efficacy in crowdfunding, this methodology had its limits in allowing us to pull apart specific effects on entrepreneurial self-efficacy. In the future we will run a regression analysis of what factors are most impactful in entrepreneurs with higher levels of self-efficacy, comparing features such as age, business experience, and product type. This study will illuminate individual characteristics and the experience of social technical systems. Additionally, we plan to run a controlled experiment where a set of entrepreneurs are given self-efficacy enhancing sociotechnical features while working on their crowdfunding project (ex: being sent positive feedback and being shown examples of positive role models throughout their work on the project) and compare the self-efficacy levels and results of those not using the tool. The control would allow us to understand the impact of self-efficacy tools on performance and retention.

CONCLUSION
Crowdfunding provides a new avenue for entrepreneurs to increase their self-efficacy through (1) public validation, via public financial and emotional support from an audience, (2) modeling, via entrepreneurs access to examples and lessons of other entrepreneurs, (3) mastery, via the development of concrete new skills as a result of publishing on the site, and (4) physiological states, via the way entrepreneurs can feel energized during crowdfunding campaigns. Yet not everyone receives these benefits. Our results demonstrate that crowdfunding can also decrease entrepreneurial self-efficacy from these very same features. These results point to ways sociotechnical systems can be improved to develop the self-efficacy of entrepreneurs. Crowdfunding provides hope for a future where entrepreneurs can go to crowdfunding platforms to receive support and boost their self-efficacy for their work. In doing so, we can broaden participation in entrepreneurial work by emphasizing the supportive aspects of crowdfunding.

ACKNOWLEDGEMENTS

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