

The Social Mechanism of Supporting Entrepreneurial Projects Beyond the Classroom

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Abstract

There are now 2,100 colleges and universities in the US that have entrepreneurship programs, yet the number of new businesses per capita being created, especially those by persons aged 20-34, is at its all time lowest points in 2014-2015, since the Kauffman Center began gathering data in 1996. At the University of Virginia (UVA), the Entrepreneurship wave came and we now offer most of the programs that peer institutions offer; however, there was no real evidence that any more student entrepreneurial projects were moving forward than before. It begged the question, was there a huge blind spot in actually cultivating a Founder's mindset?

Here, we have done an extensive literature review of the shortcomings of current entrepreneurial education paradigms and have identified an opportunity to apply the well-researched effects of social contextual factors within a practical application to address these shortcomings. As we have begun to explore the entrepreneurial education landscape from the perspective of UVA students, we found parallel findings as the broader literature and began to implement initiatives to address the shortcomings of our entrepreneurial education offerings at UVA toward the goal of new venture creation.

Works in Progress is a community of practice for dedicated, passionate student founders across the University. It is not a club or class, it is a peer-driven community. The main purpose of Works in Progress is to build an effective support system within the University for its most advanced student entrepreneurs, who inherently possess the strongest entrepreneurial mindset and culture within the University community. At this time, last year, there were 10 known student entrepreneurial projects that were being worked on, and the majority of them were on the verge of quitting due to other priorities. A year later, we have pulled together 26 active projects into an active community. This paper has larger implications to activate many of the entrepreneurial education offerings at many institutions of higher education to increase their output of successful new ventures

Motivation

At the University of Virginia (UVA), the number of undergraduate entrepreneurship courses has steadily increased each year since 2006. Entrepreneurial offerings beyond the classroom have sharply increased as well, such as events, competitions, and rapidly growing student entrepreneurial clubs. However, the output of entrepreneurial projects that continued into new ventures seemed to be stagnant. In the spring of 2015, less than ten student entrepreneurial projects active outside of any formal programs could be identified, and there were only a couple per year that had actually launched into full-time ventures. These students who did continue ventures largely did not participate in many of the entrepreneurial program offerings, curricular or otherwise.

In spurring new venture creation, the increased institutional efforts seemed to be in vain. Yet, the programs available to students clearly developed the skills and knowledge necessary for venture creation. There seemed to be a gap between the cultivation of skills and knowledge for new venture creation and the engagement of students in actual new venture creation.

Looking more broadly, this phenomenon does not seem to be limited to the University of Virginia. According to data, the number of entrepreneurship programs offered at institutions of higher education has been skyrocketing since the 1970's [1–3]. However, there has been insufficient evidence to support that an increase in traditional curricular entrepreneurship education leads to an increase in venture creation [4,5]. As of 2012, approximately 2,100 colleges and universities in the United States had entrepreneurship programs, yet the number of new businesses per capita being created, especially those by persons between the ages of 20 to 34 years old, hit its all time lowest points in 2014 to 2015, since the Kauffman Center began gathering data in 1997 [4,5].

Importance of reconciling this disparity

Entrepreneurship and innovation are widely perceived as significant contributors to economic prosperity [1,6]. The emphasis on entrepreneurship as the silver bullet to economic problems has been on the rise since the 1970's. Some have attributed this to David Birch's 1979 longitudinal study of new small companies that indicated they were major source of job creation and economic growth, the results of which reverberated around the public sphere [7,8]. This finding makes sense intuitively because new ventures often create new markets and drive innovation, as more established businesses have more to gain from sustaining existing products and services [9].

Across the nation, colleges and universities have responded to the rising importance of entrepreneurship in popular culture. In 1975, colleges and universities offered around a hundred majors, minors, or certificates in entrepreneurship [10]. By the middle of the first decade of the 2000s, 1,600 institutions offered 500 entrepreneurship programs and a total of 2,200 entrepreneurship courses [2,10]. In 2012, over 2,100 colleges and universities in the U.S. had added an entrepreneurship curriculum. According to a 2015 survey of 300 colleges and universities, almost half of them offered either a minor or a major in entrepreneurship, and 25 percent offered a major [1]. Programs have been growing and evolving to keep up with the introduction of new technologies and market trends, and have made significant expansion to other areas of campus outside the business schools [1,4].

Given the massive amount of support for entrepreneurship education programs at colleges and universities, it is critical to assess their value against their original purposes. It has been argued for at least the past twenty years that allocating exorbitant amounts of money and efforts to subsidize more new entrepreneurs is "socially wasteful" [11]. Universities play a critical role in preparing the future workforce and discovering the knowledge that entrepreneurs eventually need to act upon high quality opportunities [6]. The constant churning of new ideas against old ones within the university environment, the honing of specialized skills, the rapid sharing of information, the aggregation of resources, and the potential for high quality social capital all combine to create the perfect conditions for creating high quality ventures. Considering the great

potential that the fertile university setting has to offer for new venture creation, it certainly seems wasteful to not optimize university programs according to new venture creation metrics.

Much of the anticipation for colleges and universities to catalyze new venture creation has come from the ecosystems of successful institutions like MIT and Stanford, which have been doing this since the 1950s [3]. As entrepreneurship has become more prominent in popular culture, the rest of the higher education institutions have striven to copy the idiosyncrasies of these outliers. The lack of significant outcomes regarding venture creation in most university institutions has fueled a longstanding debate on this elusive task of adequate entrepreneurship education [6]. Almost half a century later, it is time to critically measure these programs against the goals of new venture creation.

To this end, it will be important to define the necessary outcomes of a successful program aimed at increasing new venture creation, measure the kinds of support for entrepreneurship that colleges and universities typically offer against these outcomes, and assess whether it is possible to address any shortcomings.

Focus on developing founders for new venture creation

First, we must define the kind of entrepreneurial student to which entrepreneurial education programs seeking new venture creation are aimed. Regarding those who want to be an entrepreneur, an important but often overlooked distinction must be made between those who want to found a company (a future founder) and those who just want to work at a startup (a future joiner) [12]. We believe that the target student population for an entrepreneurial education program seeking new venture creation would be those whose objectives are to found a company: a future founder. How do we define a future founder? A future founder is someone who has the intention and competencies to build a new venture upon a new opportunity and sustain it to a given commercial goal.

The three key parts of identifying and developing a successful founder are entrepreneurial intention, entrepreneurial competencies, and a high quality opportunity to act upon. These three parts influence each other in different ways, which are also discussed in the following sections. We will be using the word entrepreneur moving forward in place of founder to make it align with the literature.

Entrepreneurial intention is the desire to engage in entrepreneurship. Researchers have based concepts of entrepreneurial intention on Ajzen's theory of planned behavior, and found that entrepreneurial intention is a strong predictor of entrepreneurial behavior [13]. There are three main factors that affect behavioral intention within Ajzen's theory of planned behavior: behavioral beliefs, normative beliefs, and control beliefs [14]. Behavioral beliefs are the expectations an individual has if a certain behavior is performed, normative beliefs are those regarding what other people think about something, and control beliefs are those around the difficulty of the behavior itself [14]. These beliefs can be influenced by aspects of both the individual, like their traits and previous experiences, and the institution, like resource availability and social pressures [15,16].

The behavioral beliefs have also been described as self-efficacy, which is “task-specific self-confidence” [17]. As an entrepreneur’s belief in their performance in a certain skill area increases, they are more likely to have greater entrepreneurial intention [14,18]. The normative beliefs are those that are affected by social and environmental factors.

Entrepreneurial competencies of a founder can be further roughly separated, but not properly disentangled, into traits, skills, and knowledge [19,20]. There seems to be an ever-expanding list of these competencies required of an entrepreneur. One recent review compiled 82 different competencies [21], with the majority of these falling under the category of personality traits.

These traits make up what is the “essence” of an entrepreneur [6], for it is these traits that allow them to acquire any skills or knowledge needed on their path to creating their new venture [17,18,22]. Due to their prominence, early research in entrepreneurship began by identifying these traits [23]. Some examples of these traits include proactivity, tenacity, achievement motivation, need for autonomy, internal locus of control, and self-efficacy [17,24]. Traits are easily the most important part of developing a student into a founder. Traits modulate a founder’s drive to find resources, especially people that can help them [25]. While having discovered a high quality opportunity is important for an entrepreneur, it has not been found to be necessary to developing an intention to become a founder [26]. Traits also modulate the entrepreneur’s rate of acquiring new skills and knowledge and they guide the entrepreneur through the failures of which the road to success is composed [19,27].

The second entrepreneurial competency is a set of skills. Skills can be defined as the efficiency of enacting a process towards an individual’s goals. Entrepreneurs need skills to develop new services and products, assess new opportunities, clearly and persuasively communicate ideas to stakeholders, sell to customers, develop and manage functional groups of people, acquire and allocate scarce resources, and to perform many other functions [18,19,25,27]. The honing of these entrepreneurial skills also leads to self-efficacy, which as described before increases entrepreneurial intention [14,18].

The final entrepreneurial competency is knowledge. There are two kinds of knowledge an entrepreneur needs: business knowledge of starting and sustaining a new venture, and specialized knowledge in the field of the product or service offered. This dual requirement means that entrepreneurs tend to be T-shaped individuals [28]. On one hand, founders must have the knowledge of a wide range of disciplines, including business, in order to assess market potential and act commercially upon the opportunity [6]. Knowledge related to the business world and the laws governing it is valuable in that it allows the entrepreneur to navigate the growth of the company around the high quality opportunity [19]. On the other hand, they must possess the specialized knowledge in a field in order to discover and assess higher quality opportunities within the field itself. The specialized knowledge allows for an entrepreneur to discover a new opportunity; the more specialized the knowledge, the higher quality the opportunity discovered, and the better able the entrepreneur is to evaluate the quality and feasibility of the opportunity [19]. But knowledge is not enough by itself. An entrepreneur needs the traits and the skills related to knowledge in order to implement in the real world [19].

An important part of entrepreneurship is the identification of a new opportunity that has the potential to meet a previously unmet need [29]. Some argue that an entrepreneur begins their

journey by finding a high quality opportunity, which has a significant impact on their founding intention, even if they didn't have any intention before [12]; however, as stated before, the discovery of a high quality opportunity has not been found to be necessary to developing the intention to become a founder [26].

Opportunities discovered through restricted information means they are more rare, which consequently translates to being of a higher quality to an entrepreneur due to the higher economic and social impact of rarer opportunities. If an opportunity can be found by anyone, then chances are it has already been explored and starting a company based upon an opportunity seen by others could lead to a more competitive market. As mentioned above, acquisition of specialized knowledge, given that it provides access to restricted information, leads to discovery of higher quality opportunities [19]. Opportunity identification is predicated on the entrepreneur's traits and skills, but is mainly based on the information an entrepreneur has access to and his or her understanding of it [6,30].

Review of existing entrepreneurship education

The University of Virginia offers entrepreneurship education through a variety of programs across several schools, such as the School of Engineering and Applied Science, the McIntire School of Commerce, and the Batten School of Leadership and Public Policy. UVA offers a pan-university Entrepreneurship Minor, with concentrations in Social Entrepreneurship and Technology Entrepreneurship. Many of the co-curricular and extracurricular entrepreneurial opportunities have been developed and are administered through a collaborative effort between the different schools that make up UVA. UVA's offerings are on par with co-curricular and extracurricular offerings at most institutions. We have our Entrepreneurship Cup competitions, a couple of Centers dedicated to various aspects of entrepreneurship, trips to visit startups, a focus through the Career Center on startups, small business consulting opportunities, and 20+ student organizations devoted to entrepreneurship, who mainly function to host events and guest speakers.

Typical entrepreneurship education programs at other institutions of higher education, on the curricular side, can, at its most basic, take the form of single courses, and becomes more robust with certificates, minors, and undergraduate and graduate degree programs [1]. These are still largely classroom based, incorporating lectures, guest speakers, case studies, and group discussion [31,32]. The curricular programs expose students to a wide range of subjects an entrepreneur may need, mainly focused around business education, so they may develop as a business generalist [1,33,34]. Many other places outside of business schools are offering entrepreneurship education, most prevalently in the engineering schools [1].

Educating the entrepreneur to be a generalist probably comes from the notion that entrepreneurs need to be able to cut across several disciplines to mobilize resources toward an end goal [6]. It also may be based off of models that show entrepreneurs generally have a more varied employment history [33], and some evidence that the entrepreneur is only as good as their lowest skill proficiency [34].

Outside the traditional classroom, there is usually a wide variety of co-curricular and extracurricular offerings within the college and university environment that complement the

traditional classroom-based programs. These include competitions (from elevator pitch to concept to full business plan), organized field trips to visit startups, mentorship programs, opportunities to consult for small businesses, internships with startups, networking events, and student organizations devoted to entrepreneurship [1]. Many of these also incorporate experiential learning elements, which research has been found to be more effective than curricular offerings alone at encouraging entrepreneurial activity [14].

Shortcomings of current entrepreneurship education

Surprisingly, in one of the largest studies of the effectiveness of entrepreneurship education on entrepreneurial motivation, it was found that having more entrepreneurship extracurricular offerings was not related to an increase in these entrepreneurial motivation constructs, and was even negatively correlated in North American colleges and universities [35]. This comes in sharp contrast to the belief that extracurricular activities are where student entrepreneurs can apply what they learn in curricular programs, but in line with anecdotal evidence we have seen at UVA.

Many believe the necessary competencies for being a founder cannot be taught; only how to work for an entrepreneur can be taught [27,36–38]. Entrepreneurship education does positively impact students' entrepreneurial activity, but this effect is largely modulated by the particular student's entrepreneurial traits [14,35]. While mandatory entrepreneurship courses can increase entrepreneurial skills and self-confidence, multiple studies have found either insignificant or negative effects of entrepreneurship courses on entrepreneurial intention [11,14,39].

The ineffectiveness of entrepreneurship courses at teaching anything other than hard skills and explicit knowledge has been attributed to the widespread use of traditional teaching methods of classroom-based lectures, guest speakers, case studies, and group discussions [31,32,40]. This educational style does not address the needs of developing future founders, and instead train students to be employed by someone else [31].

Entrepreneurship education toward the goal of new venture creation is further impaired by the confounding of many different educational objectives combined into the same programs [6,31]. There are three categories of objectives for which postsecondary entrepreneurship education aims: about, for, and in entrepreneurship [31]. These categories cater to the many types of students for whom there are different reasons for why entrepreneurship education is of interest [31]. Added to this, the definition of entrepreneurship is increasingly being broadened from the operational definition of new venture creation to the abstract concept of just someone who changes the status quo [1,31,41]. Therefore, there have been moves to encourage students of any discipline and career goal to partake in entrepreneurship education. Because of this, the effectiveness of entrepreneurship education for any one type of student's goals becomes further diluted, especially for aspiring future founders [6,31].

Many of the elements that differentiate entrepreneurship education from other education is in the tacit knowledge and experiential learning that is necessary [6]. It is nearly impossible to teach this tacit knowledge using the conventional teaching styles, described before, that still pervade the majority of entrepreneurship education [25,27,31,40,42]. This kind of knowledge is

universally accepted as being best taught by a practitioner of the field, in this case an experienced entrepreneur, a teaching paradigm that resembles an apprenticeship [27,31]

To address the problems with entrepreneurship education, experiential learning has been heralded as the panacea for entrepreneurship education, as it has the potential to fill the gaps found in classroom-based programs [43]. It has been shown that experiential learning in particular has a strong effect on entrepreneurial engagement, which is defined as entrepreneurial intention plus steps taken toward founding a new company [14]. In a recent review of the experiential learning offerings of the top undergraduate entrepreneurship programs, it was found that there are many practical constraints, such as hiring of qualified full-time faculty, funding of these programs that are more expensive per student than traditional offerings, and the continued pressure from institutions for larger class sizes that bring it further away from the ideal apprenticeship model [44]. However, even close mentorship cannot induce founding intention in those students who lack entrepreneurial traits and intentions [25]

Entrepreneurship education does not significantly affect self-evaluations of entrepreneurial traits [6,39]. These traits are so difficult to cultivate because of the exact reason why they are valuable: they give a competitive advantage to the entrepreneur to do things that are not easily imitated [19]. Many have dismissed the ineffectiveness of teaching traits through entrepreneurial education to the assumption that entrepreneurs are just born with them [6,38]. However, none of these programs truly account for the social atmosphere of the students.

Within an entrepreneurship program, the motivations for each student participant vary greatly. This could be in their predisposition for entrepreneurial behavior (depending on their existing traits), motivations, previous knowledge, experiences, and paradigms of entrepreneurship [14,31]. For example, you have students who want to become a founder mixed in with students on the other end who heard that this program was an easy A or think the entrepreneurship buzzword might look good on their resume [31]. Regarding those who want to pursue entrepreneurship as a career, a further important distinction can be made between those who want to found a company and those who just want to work at a startup [12]. Even among the students who do want to be founders, there are important differences between those who want to create small businesses for income versus those who want to create high growth startups [27].

Another area where most programs fail to see where the social dynamics come into play is in how we encourage team formation. Many programs and extracurricular activities aim to create their startup teams via personality tests or through mixer events to bring together functional diversity [45]. While this sounds ideal, this does not mimic natural team formation tendencies that value trust and familiarity over functional diversity [18].

Measuring against the goals of an ideal entrepreneurship education program for new venture creation, we see that existing programs foster entrepreneurial skills, knowledge, and allow for discovery of a high quality opportunity. Yet, the key shortcoming of all of these current paradigms is that they fail to effectively induce or develop entrepreneurial traits and intentions. Many institutions seem to be trying to develop founders assuming students are blank slates onto which knowledge and skills must be carved through formal programming. While they effectively teach entrepreneurial skills and knowledge, these two competencies cannot be applied effectively to new venture creation without possession of entrepreneurial traits and intention [18,19].

Peers greatly influence traits and intention

There is a considerable body of research that has investigated the effects of contextual influences on the development of entrepreneurs [29,46,47]. These entrepreneurial traits are not fixed in an individual, and can be changed by contextual factors in the environment over time [48]. Much of the research suggests that instead of focusing on these dispositional entrepreneurial traits in an individual, it is more important to consider the effects of the environment in which the individual exists [49]. Indeed, entrepreneurs are organizational products [50], and Sørensen argues, “social context shapes the likelihood of entrepreneurial activity, above and beyond any effects of individual characteristics” [48]. Up until college, the largest influence in a student’s life will have been their parents, and it is well established that having a parent who is an entrepreneur positively affects a person’s propensity for being an entrepreneur themselves [51]. But when a student moves away to a postsecondary institution, their most frequent close contact comes from their peers, both inside and outside the classroom.

Some of the greatest effects on an individual’s identity come from their peers [49,52–54]. Peers include those who are in the “immediate social context of similar rank and similar attributes to the focal individual” [54]. An individual’s peers comprise what is known in sociology as a reference group, which is a “group of people that individuals elect as a benchmark for their ambitions and to measure their progress” [54]. Individuals are constantly self-evaluating by comparing themselves to others around them, especially in times of uncertainty, which leads to a tendency for imitation of others, and a person is more likely to measure themselves against those they perceive to be similar to them in mindset and aptitude [55]. The principle of homophily indicates that individuals are most likely to associate with those who are similar to themselves in groups around social foci, which have a tendency to bring homogenous sets of people together [56]. Peers whom the individual is closer to in relationship and physical proximity exert a larger influence, because socially proximate individuals have more frequent interactions [29]. For younger members of a group, the effect of peers is more pronounced [57].

Reference groups, of which peer groups are only one instance, also provide an individual with a set of norms, which are “transmitted through socialization of newcomers to the principles held by those who are influential within a group” [58]. The influences and local social norms of a peer group can even override social norms of a larger institution (another reference group) in which the individual participates [52,57]. In fact, local social norms have been seen as a better indicator of entrepreneurial engagement than the traits of an individual [59]. Another concept to possibly explain the strong influence of peers is imprinting, which is the process by which “an individual develops persistent characteristics that mirror central features of the environment” [60].

Peer effects on identity have been demonstrated in a variety of settings. There is an old saying that you are the average of the five people you spend the most time with, and there are many examples in which this seems to be the case. Many traits that make up an identity of an individual have been shown to be significantly affected by other people, such as risk-taking behavior [61]. One striking example is the degree to which a person is more likely to be obese, depending on how many and to what degree their peers are obese [62]. The identities of the students within the undergraduate population are in a constant state of flux, and many identifying characteristics about an individual are likely to greatly change over time due to social influences, which makes them hard to measure at any fixed point [31].

Peer effects are also responsible for increased entrepreneurial motivation [29], as peers can impact the decision to act on an entrepreneurial opportunity by emphasizing entrepreneurial traits and establishing local norms around entrepreneurship [49,53,58]. The prevalence of entrepreneurs within the peer group population of an individual was found to correlate with an individual's rate of entry into entrepreneurship [49]. It is believed that the mechanism by which entrepreneurial peers influence an individual's founding intention is by decreasing the uncertainty and thus improving confidence around entrepreneurial activity as well as demonstrating the entrepreneurial traits [29,49,53,58]. Nanda and Sørensen found that peer influences were "strongest for those who have less exposure to entrepreneurship in other aspects of their lives" [49]. Peers who already have some experience in entrepreneurship act as part of the role model reference group [63]. According to social comparison theory, individuals tend to emulate observed peer behavior [55]; therefore, the more peers with entrepreneurial experience that a focal individual interacts with, the more able that that individual would then see themselves regarding entrepreneurial activity [54].

One example of an approach that could harness peer effects is to foster a community of practice, as defined by Etienne Wenger. Communities of practice, defined by Wenger & Snyder, are "groups of people informally bound together by shared expertise and passion for a joint enterprise" [64]. Information is shared freely and collaboration is encouraged in order to troubleshoot new issues. At their core, they are informal and organize themselves, but they can be cultivated. Part of the benefit that communities of practice provide is that they offer an educational avenue for knowledge and skills development that a classroom cannot provide. Members of a certain community self-select in, and know when they should join, rather than being put together. When adding new members, the existing members intuitively know whether or not someone belongs [64].

These communities of practice can be difficult to build and maintain. They are built upon the relationships between individuals around a common skill or field, they are natural and informal, and must be cultivated rather than designed. For a college or university to cultivate a thriving community of practice, they need to identify and gather the right kind of students and provide just enough infrastructure to sustain the community. One of the contradictory elements here is that while they are informal, it takes specific attention to details to cultivate these communities of practice.

As a final thought in this section, it must be noted that there are important differences between communities of practice and informal networks. A community of practice has more closure in its social structure, which helps to develop a sense of identity in the community. In contrast, an informal network, which has little closure, only exists for the purpose of sharing relevant information and do not need to develop a strong community identity [64].

Entrepreneurship education should harness peer effects

Because being a founder is a greater deviation from the norms of the wider culture regarding careers, it might require stronger influences to develop an effective social norm for it [12,25]. One of the reasons why attempts to foster entrepreneurial traits and intentions in entrepreneurship education have not been successful is could be attributed to the neglect of the intentional design of social influences.

Unfortunately, due to the mixed objectives of instructors and the varied motives of students enrolling in entrepreneurship programs (including experiential learning programs), these social influence effects may even be negative on a particular student's development as a founder [6]. This is important because this heterogeneous set of students may cause unintended consequences due to "informal interaction networks," as there are many different social exchanges that cannot be planned by formal structures [65]. When there are multiple forces at work imprinting upon an individual at the same time, like in the case of an entrepreneurship education program where the population of students is heterogeneous in terms of traits and educational objectives, it is nearly impossible to predict the final set of individual characteristics with which a particular student will end the semester or degree program [46,60].

Given that a college or university environment provides students with multiple years of socialization from their peers, this represents a window of opportunity for educators to harness peer influences to increase effectiveness of developing a student's entrepreneurial traits. Added to this is the fact that undergraduates are significantly more affected than older groups by socialization, which is the process where "individuals learn to play appropriate roles in society," and is most acutely experienced up until early adulthood [63]. The degree to which a professor or mentor of a class affects a student is not as strong as their peers' effects; it has been shown that while having a mentor who is an entrepreneur does affect a student's decision to join an early-stage venture, it has no effect on their founding intention [25]. Indeed, the degree to which a student is affected socially is proportional to the strength and frequency of exposure [25,46], and there are usually significantly more and interactions with peers in the programs than with the instructor or mentor.

Even if the pool of students in a particular program with the dedicated educational objective of new venture creation already possessed strong entrepreneurial traits and intention, strong norms do not just emerge when people gather together—the social structure must have something called "closure," which is where multiple actors exert external effects on another [66]. In order for norms to be effective, they must be enforced by sanctions from multiple others. Closure comes from those who interact more frequently and who are closer in age [66]. With closure also comes trustworthiness of a group, and from that a reputation can arise and with it the desire to maintain it [66]. A group focusing on entrepreneurship with no closure is ineffective at enforcing these norms against negative external influences against it.

Potential Solution

It has been suggested that instead of a shotgun approach to entrepreneurial educational for anyone willing to sign up for a class, the university should focus on providing specific programs that are valuable to just those who want to be founders [14]. We believe it may be important to consider the traits and intention of the individual students and allocating resources to those most receptive to entrepreneurial education first [12].

Making these distinctions between applicants would be difficult to incorporate into an admissions process for a formal program, because of the time investment it takes to understand each individual student over a considerable amount of time in ways that cannot be misleading on an admissions application [31]. Fortunately, a functional community of practice actually requires informal structure because a healthy community of practice cannot be completely controlled and

must be given room to breathe [64]. It must be cultivated by designing with the particular individuals in mind who comprise the membership [64,65].

Works in Progress: social mechanism for supporting entrepreneurial projects

At the University of Virginia, we have been developing an informal experimental initiative that focuses on harnessing these peer effects through a community of practice, and have already seen some successes with only a small staff. We noticed the aforementioned gap between the increase of entrepreneurial education programs on par with other institution's offerings and the unaffected output of successful founders. Having added to our staff a recent graduate of the Engineering program who had pursued a technology entrepreneurship project after graduation, we had direct insight that there was something missing in the student body's traits and intentions of continuing entrepreneurship projects.

Taking an entrepreneurial approach to understanding this disparity, we conducted informal student interviews. Students were selected based on demonstrated interest in entrepreneurial behavior by attending our Entrepreneurship Cup Competition Kickoff event in the beginning of the 2015-2016 academic year, combined with the list of current students who had submitted to the entrepreneurship competition in the past. We interviewed the 300 students on this initial lead list in order to get an understanding of their motivations, whether they were working on a project idea, and getting their thoughts about the university's ability to support entrepreneurial activity. By asking for recommendations of other students who are doing entrepreneurial activity, the lead list grew to close to 500 students.

We noticed that students could be segmented into five "target markets" based on their level of activity pursuing an entrepreneurial project, anywhere from exploring project ideas to running a full-time venture. The sentiment that the University was providing help toward an entrepreneurial activity dropped off at the point where a student had moved past having a project idea and tried to take steps to move the project toward becoming an active venture. For the students just beginning their entrepreneurship journey (Tiers 1, 2, and 3), the current entrepreneurship programs and extracurricular activities were more than enough. However, once a student continued a project outside the conventional project-based courses (Tiers 4 and 5), the current offerings were not helping to move them forward. The students felt unsupported by the University (Figure 1). This was a major red flag.

Tiers of Student Entrepreneur

5	Have a project, make sure they prioritize their time to work on it, and they seek solutions to obstacles in their way even without guidance.
4	Have a project idea, little time prioritized for it. Desire to continue project is there. They will continue with next steps and maybe even beyond but then get stuck.
3	Have a project idea, but no time prioritized for it, no real motivation. Desire to continue project is there.
2	No project, no time prioritized for it, no real motivation. But the desire to create or join a project is there.
1	Not interested in doing a project, but interested in the entrepreneurial space.

Figure 1. Tiers of Student Entrepreneur.

Upon subsequent, deeper interviews with students identified in the Tier 5, we discovered that they felt culturally isolated at the University. They wished for the support of a community of student entrepreneurs like themselves, because they were feeling the negative peer effects from the larger student body. The majority of students the University were steeped into a culture of overstretching commitments and fearing failure. Because of this cultural isolation, these Tier 5 student entrepreneurs were difficult to identify because they rarely talked about their projects with others. Tier 5's were frankly tired of encountering "wantrepreneurs," who they defined as students who are very involved and active participants in entrepreneurship offerings, yet never seem to be prioritizing their work on their own entrepreneurial project. Tier 5's were treated more like celebrities than peers just because they had actually taken significant action toward their entrepreneurial goals. Due to the time constraints of juggling both full-time commitments as a UVA student and an entrepreneur with a project, it was extremely hard for them to find other student entrepreneurs, like themselves, who went against the cultural grain and who also were seriously pursuing a project outside of external motivations.

The effects of time constraints and cultural isolation made them highly averse to attending events promoting entrepreneurship, except for the rare event directly related to direct benefit to their project at the point when they needed it. The large majority did not even go to meetings of student organizations devoted to entrepreneurship, and of the ones who did, they did not have time to be active club participants, let alone lead the student organization. The absence of student members actively pursuing entrepreneurial projects served to reinforced the club leadership's focus on accommodation for the interests of "wantrepreneurs."

Time constraints and cultural isolation also made it extremely difficult to find all of the Tier 5's. Many were frustrated by previous fruitless attempts to find the support that they needed. Fortunately, we had an advantage: on our small staff was a recent UVA alumnus and a student

entrepreneur, who was a lot like them, but with more experience. With just a half-hour conversation, he ignited their interest to the possibility of growing a community that worked in their interest. If you were going to try this at your institution, it would be helpful to enlist the help of a homegrown youth leader for founders.

As we began to meet more of these Tier 5's, we realized that they did not know one another, due to the time constraints and cultural isolation described above. We began to introduce them to each other by encouraging them to do one-on-one lunch or coffee meetings. This laid the foundations of community by strengthening dyadic relations, an important part of a community of practice with strong peer effects due to higher relational embeddedness [18].

We began to experiment with larger, informal community formation based on Napoleon Hill's 1937 concept of the Mastermind Principle and its evolution in the self-help literature as the Mastermind Group [67]. According to Jim Rohn's famous quote, "You are the average of the 5 people you spend the most time with," these weekly one-hour meeting groups are designed to provide the mutual support, a sense of shared endeavor, access to diverse skill sets, perspectives, resources, group troubleshooting, and most importantly, accountability to peers (as in, local social norms) through closure.

The first Mastermind group was formed in October of 2015, and since the first meeting, they have been meeting almost every week up until the present. The projects involved are heterogeneous, ranging from software, hardware to health, and biotech. Some of the resulting phenomena we have seen from this group include: aiding in preparation for competitions, pitches, and grants; sharing of best practices around selling, pitching, local resources, founder agreements, hiring; real empathy for victories and failures; pooling of strong social capital; high level discussion of future industry trends; encouraging each other to take slightly greater risks that ultimately accelerated their company; a commitment to helping younger student entrepreneurs. We also saw them collaborate on each other's projects using complementary skill sets, and even take steps to found new ventures together. Most importantly, as these students have graduated, they have influenced one another to stay in Charlottesville, VA, the relatively small city surrounding the University, to build their businesses alongside one another.

But it is not just about bringing students with project ideas together. The second attempt to start a group, in February 2016, failed spectacularly, as they could not find the time to meet regularly. The major differences between this first and second group is that the second group did not prioritize their project highly in their life, as a couple were casually working on it with greater intentions to work for a larger company in the summer. The lesson here is not to hastily design a new Mastermind group, but rather to make the best effort to find those who strongly prioritize their entrepreneurial project.

We then developed a third group in the summer of 2016, which has been meeting almost every week up until the present. Similar outcomes as the first group were seen, but one to note again is that the founders of two different projects decided to start a new project upon a new idea expressed after about four months of continued meeting.

Works in Progress has evolved as the aggregate of these few Mastermind groups, in conjunction with the spectrum of students at different stages of their project that will eventually be new

Mastermind groups. The benefit of this informal, loose structure is that the strength of the interaction in this community is determined only by the student's level of existing entrepreneurial traits and intentions, and serves to build the entrepreneurial traits and intentions of less frequent members by establishing local social norms.

The community serves to draw out and encourage entrepreneurial activity at the University of Virginia. The community in Spring 2015 started with 10 student entrepreneurial projects spanning tiers 3 through 5; in Spring 2016 there were 26 active student teams, and now there are 74 student entrepreneurial projects being pursued outside of any formal programs.

Our operation providing the infrastructure for this is extremely small, with two full-time staff that only work on supporting this community part of the time, and we operate using lean startup methodology. We rely on the informal structure of community and alumni mentors and the curricular and extracurricular resources around the University. We focus on linking student entrepreneurs to the appropriate resources at the University, and the natural evolution of the community of practice has led to the community of peers itself largely performing this function for us.

We support all student entrepreneurs (not just Engineering students) by offering personalized help in competition and grant preparation, we send personalized recommendations for opportunities that come our way to the students that need them rather than relying on them to parse through listservs of information, we seek new student entrepreneurial candidates for the community, and we cultivate the community by introducing to the community only those who have shown project dedication.

The screening process is not a formalized application program, but rather a longer, multi-meeting process in which student responses to feedback are taken into consideration. Upon meeting with a student for the first time, we inevitably provide feedback and next steps (usually, customer discovery, and introductions to key people who can also provide help). In the follow-up meeting, usually two to four weeks later, a student will have one of the following responses: 1) "Sorry, I was busy with X, I wasn't able to do anything;" 2) "Yes, I did what you recommended and I met the people you introduced me to. What should I do next?;" 3) "I did what you recommended and I met the people introduced me to, and I met these other people and found these other resources and I have the following questions!" The first response indicates Tier 3 or below; the second response indicates Tier 4; the third response indicates Tier 5. Over the course of a couple of follow-up meetings over a semester, it is easily determined where this student is in terms of entrepreneurial traits and intentions.

Not long into the program, we settled into the common trajectory of thought that we needed a dedicated physical space for the community. We hypothesized that in order to grow the community to link the Mastermind groups together, Tier 5's would need a dedicated collaborative physical space to call home, in which they would be able to find others like them. But it was clearly not just about having an "innovation space." UVA already had about five separate "entrepreneurial physical spaces" around Grounds. The key piece of feedback we received from the Tier 5's is that "it's all about which people" are inside of it. Tier 5's unanimously said variations of the following: "I will only go there if there is the correct culture and people like me in this space."

Upon piloting a space in which to physically manifest the Founder's culture, we had mixed results. The commitment from students with such time constraints was impressive in the beginning: Tier 5s spent an average of 4.5 hours per student per day in the space working on their projects and helping each other. But after a couple of weeks, it died down. Students preferred to work by themselves and operate out in the world beyond, and only come by periodically to touch base with other founders to get feedback on their prototypes and customer interviews, discuss industry trends, share victories, commiserate on obstacles, and share helpful resources and connections. The Mastermind groups were already doing this, so the question of the necessity of space is still being explored. We believe the space more acts as a touch point for potential new members, connection to partners in the community and mentors, and an anchor for publicity for the University to attract more student entrepreneurs.

While it is difficult to empirically measure the specific effects of these contextual factors on individual traits and intention [48,57], we have anecdotal evidence that this approach to harnessing peer effects has increased entrepreneurial traits and intention. We instead measure our success by the number of student projects that receive significant funding, incubator/accelerator acceptance, and grants or competition awards. It seems to take about two years for students who we find to get to this point, but we have seen large successes with the students we have been working with for two years. For example, we have placed second in the 2016 ACC Inventure Prize competition, first place in the 2016 Collegiate Inventor's Competition, have two teams in the Venturewell E-Team system, and have sent two student teams to Y Combinator in the last two years.

The Works in Progress community embodies some of the benefits that Wenger and Snyder detail in their work on Communities of Practice [64]. These include the shared teaching of skills and knowledge between members of the community. We have also seen the effects of a hybrid role model peer reference group within the community. Our recent alumni include a 2014 alumnus who recently raised close to \$2 million for an app, a 2010 alumnus whose consumer gadget company just closed their third successful Kickstarter for close to \$250,000, a 2015 alumnus whose biotechnology company that raised \$750,000 and was part of the Y Combinator program within a year out of graduation, and two 2015 UVA alumni who were also part of Y Combinator. These alumni frequently interact in our community and are seen more peers than as renowned guest speakers, a dynamic which has solidified the notion inside of Works in Progress students, who have remarked on this topic, "If they can do it, I can do it, too."

In summary, Works in Progress is a community of dedicated, passionate student founders from across the University. It is not a formal structured program, but rather an informal structure akin to a community of practice. The focus of the community is to build an effective support system within the University for its most advanced student entrepreneurs, and there is early evidence that it is meeting its objectives. To emphasize, the existing programs that UVA and many other institutions of higher education have are critical resources for student entrepreneurs; our community of practice acts as the cohesive unit that activates these resources towards new venture creation for early stage projects.

Discussion

Conducting a literature search through the lens of trying to address this unmet need at our institution coupled with a unique perspective analysis led us down a path to discovering new insight to how to potentially address filling the gap for filling the support needs of our student entrepreneurs. What we found is that in terms of developing students into successful founders, current programs fall short of providing students with proper structures that will induce entrepreneurial traits and intention within them, or help them keep these in the face of the culture of the wider student body that may discourage entrepreneurial behavior. If universities were to offer a thriving community of practice around entrepreneurial traits and intention, there is potential to complement and activate the existing offerings that provide entrepreneurial skills and knowledge.

Developing a peer-driven student community with a focus around entrepreneurial traits and intention seems to be an important element in fostering students who wish to become founders. These peer effects, when designed to create strong local social norms encourage entrepreneurial traits and intention through a community of practice and act to develop a counterculture within the institution. What we have found at UVA is that the entrepreneurial traits and intentions are caught through culture, not taught through formal structures. Culture develops through a larger active peer community of shared values, and with community comes the positive peer pressure for perseverance.

As supported by the sociological investigations of entrepreneurship research, this approach to focusing on culture has massive potential for producing more successful founders. Relationships built between members of a community of shared values last for life, especially at an academic institution. Academic institutions create stronger social ties between graduates, and this augments the power of a community of practice around entrepreneurship in increasing the quality of the social capital related to career advancement as a founder [29]. It has been shown that graduates continue to benefit from social support from friends made during their academic studies for at least a decade post-graduation [68].

This idea of propagating founders through a community of practice at a university is unprecedented. A community of practice does more than produce more dedicated founders; it equips them with increased social capital to help them continue with entrepreneurial activity far beyond graduation. This social capital increases exponentially every year the program is thriving, as the more experienced entrepreneurs build their companies to greater heights within the same geographic and social community, and new younger entrepreneurs begin and are pulled to greater heights. A positive feedback loop like this of more and higher quality entrepreneurs coming through an institution has been demonstrated at places like Stanford and MIT [69], and is a critical component of any community that as aspirations for a thriving startup ecosystem.

Further, these entrepreneurial traits are those that are the essence of the more abstract definitions of entrepreneurship that all educational disciplines are trying to adapt from the traditional narrow definition of entrepreneurship. Instead of only affecting a certain small demographic of student (the founder), this peer-driven community of practice, which safeguards the entrepreneurial traits, can have an effect on the wider institution. First, a strong initial community of Tier 5's will act as a role model in their persevering entrepreneurial mindset for the next tier, Tier 4's, who require a little more structured support for continuing their project. Access to a strong community of Tier 5's ensures that these students will evolve their entrepreneurial mindset and

persevere with a project, acquiring the Tier 5 entrepreneurial traits and intentions in order to sustain projects that would have died otherwise. To invoke a viral analogy, the founders are the patient zero of what could be the key to infection of the larger demographic with entrepreneurial traits. These individual intangible aspects represent a potent communicable virus that must first be incubated between those who already possess it before it can develop into an infectious culture. It's something very delicate in a single person against the larger social norms, but, when strong in many people, is highly infectious through social interactions between peers. We look forward to when this sense of empowerment will soon become the mainstream culture of UVA.

We are currently in the process of designing research projects that include doing a longitudinal study with more quantitative measurements of the students within our Works in Progress community to assess the strength of the network and the effects on entrepreneurial traits and intentions. These longitudinal studies will most likely include a social network analysis to understand how the different aspects of the community impact outcomes. The results of these will elucidate program strengths, best practices, an understanding of a hierarchy of most important factors, and will offer insight when designing new program opportunities, especially when we expand the program to include more graduate and faculty entrepreneurs.

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