# OUTCOMES REPORT



The Brandeis Innovation Spark Program, 2015 - 2021

## Introduction

This study was conducted to assess the outcomes of the Brandeis Innovation Spark program. It was designed to quantify the impact of the program on participants' attitudes towards entrepreneurship, professional activities and careers.

The study looks at Spark participants' current work, especially as it pertains to entrepreneurship and innovation. It compares these outcomes with the goals of innovation education as identified by experiential researchers over the past decade. Finally, it presents the stories of successful Brandeis innovators, in their own words, and highlights Spark projects that are continuing to make a positive impact.

We would like to thank Alan Hassenfeld and the Hassenfeld Family Foundations for providing the seed funding for Spark, thereby laying the foundation for entrepreneurship and innovation programming throughout the Brandeis community.



INNOVATION

## About the Brandeis University Innovation Center

Brandeis University engages in research and scholarship that push the boundaries of knowledge, discover how the world works, and design innovations that improve society. In support of these endeavors, the University has developed an extremely active and supportive Office of Technology Licensing (OTL) to achieve a full range of competencies in licensing, business development and legal matters for transferring technologies created within Brandeis.

The Brandeis University Innovation Center provides a hub for innovation across the Brandeis campus. The center engages students, faculty, researchers, alumni and staff, promoting collaboration and discovery through research, grants and partnerships, including our funding programs, of which Spark is a cornerstone.

## About the Brandeis Innovation Center Spark Program

Brandeis Innovation's Spark Program is designed to encourage and support entrepreneurial activity within the Brandeis community, including students (graduate and undergraduate), postdocs, faculty and staff. The awards are intended to help bring Brandesians' ideas and entrepreneurial ambitions to life.

Each year, the program awards grants to teams with a project or product that has strong potential for commercial, technological, or social impact. Teams receive training in entrepreneurship, mentorship from industry experts, and visibility opportunities. Successful teams have represented a wide range of sectors, from mobile consumer apps to sustainable agricultural technologies. Throughout its six-year history, Spark has funded 62 teams.

Part of the Brandeis Innovation Program's Virtual Incubator, the program spans the Fall and Spring semesters of a single academic year. In the first semester, any student, faculty, or staff member with an interest in entrepreneurship can participate in trainings, pitch an idea for an innovation to fellow participants, recruit or join a team, and work to refine their idea. In the Spring semester, teams pitch for funding in the annual SparkTank competition, a daylong pitching event modeled after startup industry pitch competitions. Industry expert judges evaluate the teams, awarding funds to those with

the most mature ideas, best-developed business plans, and greatest potential impact. Winners then complete customer discovery, a market evaluation method utilized by the National Science Foundation Innovation Corps and developed by Stanford's Steve Blank. They further refine their ideas, addressing the commercial or social-impact potential of the venture. After completion of the Spring semester work, students may continue to work on the project into the summer. The program lasts one academic year, plus any summer activities. Successful teams have gone on to launch commercial ventures and nonprofits, win places in major accelerators such as MassChallenge, and become independent startups with venture funding.

## Study Methodology

This outcomes study was designed to assess the impact of participation in the Spark program on participants after completion of their academic year-long involvement. Sixty-seven past participants in the program were surveyed about their experience in the program. The survey included both quantitative and qualitative questions, as well as free-response prompts. The survey was distributed via email. Participants received a \$5 gift card to compensate them for their time. The option to forego the gift card and remain anonymous was provided. Thirty-one responses were received.

## Data on Outcomes

The data paints an impressive picture of the impact that Spark has had on participants. The program positively impacted their soft skills, including critical professional metacompetencies such as leadership abilities, creativity, and teamwork. In addition, the program had a lasting impact on participants' career development, including their choices of industry, professional networking, and lifelong learning. Below, we explore the data on specific outcomes of the program on past participants.

Spark gave me my first taste of really starting a startup

BRONTTE HWANG SID/MBA '21, StudyEng



## Continued Entrepreneurial Activity

Most Spark participants (68%) either continued working on their projects after completing the program, or started a new entrepreneurial venture.



#### Figure 1 - Participants who indicated that they are still working on their original project

Of the 68% who continued with entrepreneurship, nearly half are working on the original project with which they participated in the Spark program in some form, with roughly a third persisting with the project in its original form. Sixteen percent of the participants have launched different ventures instead. A minority of teams persisted after the program but eventually moved on from the project.





## Development of Leadership Skills, Creativity, and Technical Proficiency

When asked what impact the Spark program had on them personally, a nuanced picture appears. Most participants agreed with a statement that Spark increased their professional confidence, with significant majorities also feeling that they became more creative, more technically proficient, and better at teamwork after participating in the program.

## Soft Skills Development: A Key Component and Benefit of Involvement in Spark

Programs that are often competency-based have long faced imperatives from professional bodies to shift the focus from strictly competency-based learning (CBL) to a broader focus on meta competencies, defined as the ability to strategize comprehensively in one's field, be adaptable and creative, and use professional "intuition" (Brown & McCartney, 1995). With the rise over the next decade of Artificial Intelligence (AI) and machine learning (ML) that will displace many workers with basic competencies, schools need to do an even better job of shifting from a competency focus to a meta competency alignment as we navigate the 21st century.

The development of cognitive skills is cited frequently as a key benefit of entrepreneurial experiential learning programs, especially undergraduate incubators and accelerators. Interdisciplinary programs, such as Spark, have been cited by researchers including Chan (2012) as leading to greater creative problemsolving, more reflectivity, and more effective application of theory into practice. Participants in the Spark program were asked the extent to which they agreed with statements that their soft skills improved through their participation in the Spark program.

Feelings about improvements in technical proficiency were mixed; this is likely because not all teams were focused on technical projects or had a technical component. Overall, students believed that their proficiency in soft skills required in business, such as teamwork, strategic thinking, leadership, and creativity grew directly because of their experiences as part of Spark.



Spark gave me confidence and knowledgable skills I did not previously have

REBECCA HAYES SID '21, AlgaViva



As noted in the literature discussion below, the development of soft skills is considered to be the key outcome of student entrepreneurship programs by many researchers who study these initiatives. In particular, such programs are thought to be successful if they foster the development of metacompetencies, described by Brown & McCartney (1995) as the "overarching ability" that fosters competence in specific professional domains. Metacompetencies include strategic reasoning skills, leadership, creativity, and flexibility. The study asked participants to reflect on whether their participation in Spark helped them develop specific metacompetencies. As shown, students overwhelmingly felt that their metacompetencies had developed through Spark, while fewer believed that their technical competence grew.



#### Spark increased my professional confidence.

#### Figure 3: Increased professional confidence, percent agreement

The qualitative question responses in the study tell the same story: students felt that Spark provided them with the ability to grow their reasoning, creativity, and networking skills. In addition, the program provided them with something else: direct experience. Spark allowed them to see what the world of business is really like.



I learned a lot about how to begin setting up a business. I think it is one of the most beneficial learning experiences I've ever had.

\_\_\_\_\_ KATY DIX SID '21, AlgaViva



As noted, the chief aim of student entrepreneurial activity is to help students gain soft skills. Additional outcomes include vocational exploration and building professional self-confidence. Nonetheless, some students also found this program to be a driver of their technical skills. Half somewhat felt that their technical proficiency improved, while 29% felt strongly that their technical competence grew in the program. This exceeds expectations for a non-technical program, though it should not be taken as an indicator that more technical training should be part of the program. The focus will remain on the more critical goal of developing **st**rategic, leadership, and creativity competencies.



#### My technical skills improved as a result of my participation in Spark:

#### Figure 4 - Improved technical skills, percent agreement

Soft skills were the skills most consistently seen by participants as having improved after participation. Nearly all felt that their strategic thinking skills were enhanced through participation in the program. This is consistent with studies of other colleges' experiential entrepreneurship programs, which found that outcomes are most often measured as the development of core business skills such as teamwork and leadership.



Spark provided me a platform to work with really smart students that bring various experiences and expertise, coupled with mentors that didn't only prepare us for pitching but also actually help us improve our business model





#### My strategic thinking skills improved as a result of my participation in Spark:



Figure 5 - Increased strategic thinking skills, percent agreement

Indeed, when asked whether their leadership abilities increased, over 84% agreed that they had. This is especially encouraging in the light of Guthrie and Jones' (2012) research findings in a study of university students who participated in experiential learning, that reflective experiential learning is critical to the development of leadership skills. Further, LePointras and Folliard (2018) recommend that student metacompetency outcomes, including leadership development, be a key metric in assessing the effectiveness of experiential learning.



Participants frequently articulated this impact themselves. Several noted that the skills they gained are applicable to a range of professional situations. The data shows that students considered participation in Spark to be a critical, positive booster of their professional development.

#### My leadership skills improved as a result of my participation in Spark:



Figure 6 - Increased leadership skills, percent agreement

Leadership skills are considered to be the gold standard in metacompetencies fostered by innovation programs. Spark participants consistently felt they had gained in leadership skills, with 84% of students feeling that what they learned made them better potential leaders. Creativity, too, is an important learning outcome for an innovation program. Here, too, Spark alumni come out strong:

In keeping with the emphasis on soft skills among students, most students, over 87%, felt that their creativity was enhanced by the program.



#### My creative skills improved as a result of my participation in Spark:



Students in this study were somewhat less likely to indicate that they improved their teamwork skills. This is in keeping with prior research that found that team dynamics are among the most challenging aspects of experiential learning for undergraduate entrepreneurial teams in business programs. Nonetheless, a strong majority, 80%, felt that they did become stronger team players through their involvement in Spark.



#### My teamwork skills improved as part of my participation in Spark:

Figure 8 - Increased teamwork skills, percent agreement

## Outcomes Over the Longer Term

Several projects originating in the Spark program have become startups, including WorkAround, Al Capital Management, and GreenChoice. Social impact endeavors that took part in Spark have also seen ongoing success as part of university and state initiatives, such as the Disabled Parenting Project, which continues to operate within the University. Participating startups have also won acceptance into leading incubators, as well as winning major startup prizes and recognition:

- MassChallenge
- BeanTown Throwdown
- Google Best Apps for Good 2020
- HULT Prize
- One Young World Ambassador Program
- Katapult Accelerator Demo Day
- Venture Cafe Providence Pitch Night First Place



Most undergraduates who explore a startup idea do not make that project their careers. For most students, university accelerators and other hands-on business activities serve as experiential learning that develops their skills and confidence to succeed after graduation, as explored in the section above. Patton & Marlow (2011), considered an incubator successful if its participants developed entrepreneurial skills, while Guthrie & Jones' (2012) view is that experiential business education is successful when it fosters students' leadership skills, as do LePointois and Fouillard (2018).

In addition, this study examined whether participants were likely to remain engaged specifically within entrepreneurial ecosystems. Participation in Spark correlates strongly with future entrepreneurial activity. Most students, 88%, continue to participate in entrepreneurship and innovation activities, even though many of them completed Spark years ago. Among the most popular ways in which students continue to express their interest in innovative activity include studying entrepreneurship, attending social impact events, and reading innovation blogs. Others are pitching at startup events and receiving mentorship. Some students are also mentoring other innovators, passing on the legacy of learning to future innovators. This showcases the long-lasting impact of Spark.



Figure 9 - Past participants' continued innovation-focused activities, percent engaged in each activity



Spark increased my interest in entrepreneurship and helped me think more strategically about business problems





Occupationally, participation in a startup or nonprofit project in an industry may also inspire future vocational interest in the same industry. This was found to be the case among Spark alumni. Participants who said they are currently employed are often employed in the education and healthcare sectors, both of which industries are heavily represented among each typical year's Spark teams (See section on Diversity of Spark Participants)



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Most of the participants are still students, however, so future longitudinal studies will trace the impact of Spark on graduates' careers. Fully 46% of Spark participants are currently full-time students.



Figure 10 - Past participants' current occupation. percent engaged in each activity

# Student Perspectives: Impact of the Program on Participants

"It prepared me with the basic skills and confidence to start my business."

"It was an eye-opening experience that allowed me to learn how to work in a startup environment."

"I learned a lot about how to begin setting up a business. I think it is one of the most beneficial learning experiences I've ever had."

"Grew my network, taught me valuable skills."

## Spark Projects Actively Making an Impact

Since establishing Spark in 2015, over 50 projects have participated in Brandeis Innovation's virtual incubator. Below outlines the projects and startups that are continuing to make a social and/or financial impact locally, nationally, and internationally.



## Disabled Parenting Project

#### Team Lead: Robyn Powell, PhD '20

The Disabled Parenting Project (DPP), which is part of the **National Research Center for Parents with Disabilities**, is an online space for sharing experiences, advice, and conversations among disabled parents as well as those considering parenthood. Launched in 2015, the DPP also serves as an information clearinghouse and interactive space for discussion and connection. The DPP hopes to inform social policy concerning this underserved population through the development of scholarly research, fact sheets, and training resources, as created by and for the community, and will set the stage for additional research and social action to address the important issues of discrimination and disparities.



## CalcU

#### Team Lead: Grady Ward, BS '16

CalcU thinks that educational technology means the deliberate and careful implementation of tools for learning, rather than simply throwing technology in the classroom. Learning calculus is hard, and it will always be, regardless of the course aids that are used to teach it. Since starting in 2015, CalcU has been making it easier for learners of all abilities, backgrounds, and ages to pursue understanding and excellence in the cornerstone of mathematics. Their database of over ten thousand practice problems is not only vast, it adapts to the way that students learn, and what students want to learn. There is a sea of information on the internet on how to learn mathematics. CalcU separates out the noise, and curates personalized resources to fit each individual's needs.



## Discovery Teaching

#### Team Lead: William Tarimo, MS '14, PhD '16

Founded in 2017, Discovery Teaching Is an in-class web application providing an efficient standard platform for students and instructors to actively engage and interact during learning and teaching activities in the class. The application and this study are part of the research of Prof. William Tarimo and Prof. Timothy Hickey, of the Computer Science departments at Connecticut College and Brandeis University, respectively.

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#### WorkAround

#### Team Lead: Wafaa Arbash, MS '16

Humanitarian aid can no longer keep up with the refugee crisis. That's why founder and CEO Wafaa Arbash started WorkAround in 2017 - a sustainable solution to the challenges faced by displaced people. While writing her Master's thesis on the barriers to employment for displaced people, Wafaa saw a way to bring economic opportunities to the highly-educated and internet-connected Syrian refugee.By engaging in "micro-work", highly skilled displaced people could have fair, dignified work while also serving the growing need of companies to prepare data for machine learning algorithms. Wafaa believes that economic opportunity is the key to helping those displaced by conflict regain their lives, and bring them back into the centerfold of the global community. Wafaa and WorkAround have won numerous awards, including the BeanTown Throwdown and the Florence G. Heller Alumni Award.

## A.I. Capital Management

#### AI Capital Management

#### Team Lead: Marshall Chang, BA/MA '17

Founded in 2018, AI Capital aims to change investing. It's a well known fact that humans can be trained to be great traders in a simulation setting, but fail terribly when trading with real money. Emotions and doubts are evolution's gift to humankind, but only those who are deprived of it can execute risk management calmly and reasonably in a consistent manner. Such traits are by design the most capable for computers. Now coupled with non-linearity provided by deep neural networks, the machine can do better what we cannot do. AI Capital's models are designed from the ground up with open source Machine Learning libraries such as Keras, Tensorflow and OpenAI gym. They are easily scalable to trading stocks, futures and other financial securities. They have an active model training platform that can plug in different formats of data, assign multiple trading time scales, and optimize customized reward functions in regard to risk measurement metrics. They have been a MassChallenge Finalist.



#### GreenChoice Team Lead: Galen Karlan-Mason, MBA '18

MassChallenge Rhode Island finalist.

# GreenChoice's purpose is to empower people to foster a healthier, more just, and sustainable world through their daily food choices. GreenChoice is not a calorie counter, diet pusher, or quick fix weight loss app. Launched in 2018, GreenChoice lets users search and scan thousands of products to immediately discover what's in and behind your food, all in one place. Users of the app can filter their dietary needs, get personalized recommendations, create healthy carts, track their impact, and learn how to improve their daily food choices. The app won Google Play's Best Apps for Good in 2020. The team was also a



#### SySTEMic Flow Team Lead: Jessica Sanon, MBA '18

SySTEMic Flow is dedicated to inspiring, motivating, and building the next generation of STEM leaders by supporting students' fundamental learning in math. It sees math as the gateway subject that will enhance students' knowledge through their STEM journey. Their programs and activities are designed to guide self-development, growth, and foster a love of learning. SySTEMic Flow is prioritizing its educational resources to students who identify as Black, Indigneous, and/or Women of Color so that they have the ability to become the next generation of STEM leaders. Since their inception in 2018, they have aimed to bridge the gap from the time students are graduating high school and transitioning to post secondary education with access to advanced math courses so that they have the ability to earn a STEM-related degree. sySTEMic Flow won First Plan in 2019 in the Venture Cafe Providence Pitch Night competition.



## Polify

#### Team Leads: Jacob Radparvar, MBA '22, Benjamin Pockros, MBA '22

Polify is an application that helps university students understand their health benefits and connect with local providers. Piloted in 2020, the application will inform students of their copay, coinsurance, and contribution towards deductibles in a friendly, digestible format. Polify will be a tool for students to identify local providers, learn about covered services, and read reviews about providers from other students on campus. Polify can also be a tool for university health centers to send out notifications about flu-shots, blood drives, and campus wellness events. Polify has the potential to become a student's all-encompassing portal for managing their health.



#### Beacon Be With You

#### Team Leads: Xiaotian Zhou, Xin Yao Lin MA '19, PhD Candidate

Beacon (Be with You) is a startup team working on building an online therapy service for Chinese International Students (CIS) in the U.S. Two main areas of service are planned to be covered: 1) connect international students to therapists/active listeners from their own backgrounds; 2) provide educational trainings/resources/workshops for those who have friends with behavioral health concerns. Besides the targeted benefits to CIS, services are also expected to provide opportunities for non-licensed psychology students interested in interning to practice their skills and learn from this experience. In 2021, the team decided to focus on providing high-quality active listening sessions for each potential client in the future, and focused their efforts on developing their own Training Manual for active listeners, as well as an 8 Week Training Session. They started in 2020, and currently have 10 active listeners under training and will start to provide services to Chinese International Students by September 2021.

## Diversity of Participants

As is the case with Brandeis University itself, Spark participants represent a diverse group. Participation was equal between those identifying as female and those as male. A majority, 46%, are Asian, Black, Hispanic, or Pacific Islander, or identify as an ethnicity other than white.



Figure 12 - Ethnicity of Spark Participants

Equally diverse are the industries and perspectives represented by the group. While many self-report careers in education (29%) or healthcare (21%), significant groups of participants engage in other occupations, from the arts to finance. This diversity, both of people and perspectives, is critical to the success of the teams.



Figure 13 - Self-reported occupation

#### References

Patton, D., & Marlow, S. (2011). University Technology Business Incubators: Helping New Entrepreneurial Firms to Learn to Grow. Environment and Planning C: Government and Policy, 29(5), 911–926. https://doi.org/10.1068/c10198b

Guthrie, K. L., & Jones, T. B. (2012). Teaching and Learning: Using Experiential Learning and Reflection for Leadership Education. New Directions for Student Services, 2012(140), 53–63. https://doi.org/10.1002/ss.20031

LePointois, S., & Foliard, S. (2018). Dynamics of student entrepreneurial teams: understanding individual coping strategies to build efficient teams. in Ferierra, J.J., Fayolle, A., Ratten, V., & Raposo, M. (Eds.), Entrepreneurial Universities: Collaboration, Education and Policies. Edward Elgar Pub.



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Our faculty are leaders in their fields, as passionate about teaching and mentorship as they are about pushing the boundaries of knowledge. Our students are motivated, compassionate, curious and open to exploring new and challenging experiences.

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