

# **The SOUP Spoon: An Entrepreneurship Experience of Two Engineering Students**

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## **Abstract**

As a concept, the SOUP spoon was developed to help persons with hand tremors eat liquid foods such as soups and cereals. Its genesis dates back to an interdisciplinary team of mechanical engineering and nursing students, enrolled in the ME senior design course in 2011. In 2012, the authors, both mechanical engineering juniors at the time, embarked on a journey to transform the technology concept behind the SOUP Spoon into a market-ready business. One particularly important element of that journey was TechTown's Detroit Technology Exchange (DTX) Launch Detroit program, which is a ten-week summer program with an intense focus on customer discovery and business model generation. This article documents this journey in terms of the Accelerator and other important milestones such as intellectual property protection, prototyping and production. The perceived value to the student author's engineering education is discussed along with lesson learned.

## **Introduction**

The authors are two mechanical engineering students who came together in 2012 to adopt and improve the SOUP Spoon. The SOUP Spoon is originally a senior design project completed in 2011 with the aim to help persons with hand tremors eat liquid foods such as soups and cereals. What started out as a junior level course project in the summer of 2012, subsequently became a commercialization effort and ultimately culminated with the launch of a company to market and sell the SOUP Spoon.

The process worked through initially recognizing there is a need, defining the problem, substantiating the desire for a solution, developing and exploring ideas of possible solutions, prototyping, protecting intellectual property, learning and executing the business aspects of a startup company, and searching for funding. Some of these things we knew a little bit about before beginning this project, but most of it we have had to learn along the way with some help from mentors, coaches, and friends. This is a little bit about our experiences.

This article documents the experience from the student perspective. It begins by describing the market need and the corresponding technology to address that need. It then describes the early product development work. The article then describes the experience of taking part in the TechTown Detroit Technology Exchange (DTX) Launch Detroit program<sup>1</sup>. The article then culminates with a discussion about initial prototyping, refining the product and production process and readying the intellectual property protection.

## The SOUP Spoon Technology

Tremors and involuntary movements are a common disability around the world. The SOUP Spoon provides a solution to individuals that have difficulty achieving a steady transfer of food from a container to their mouth using an eating utensil. Examples of people facing this problem are individuals with Parkinson's disease, Essential Tremors, stroke victims, and other related illnesses that affect one's ability to steady their hands. Often times, these tremors effect the individual's ability to eat without spilling, making it difficult to consume liquid-based foods without drawing attention or worse, having to be hand fed by a loved one or a caregiver. Eating is one of the most valued social activities, but depression and embarrassment can result from losing the freedom to do so independently.

The SOUP Spoon solves this problem with a low profile spoon that retains liquids to prevent spilling. The spoon, shown in Figure 1, is comprised of a suction bladder located in the spoon handle that allows the user to retain fluid portions of food when lifting the spoon from the bowl to their mouth. With a simple squeezing motion the user transfers fluids from the bowl and spoon head into the handle of the spoon. When they bring the spoon to their mouth they again squeeze the handle to return the fluids to the spoon head and their mouth. This function works much like a common turkey baster, but in the much more dignified form of a spoon. The SOUP Spoon returns customer's lives to normalcy by empowering them to eat independently, improving their quality of life and human dignity. Not only is the spoon an inexpensive way to provide increased independence, it reduces the costs of caregivers by alleviating some of their workload.



Figure 1 – A rendering of the latest incarnation of the SOUP Spoon.

### Early product development

The authors' first exposure to the SOUP Spoon was during the second semester of junior year (summer 2012) in the Intermediate Mechanics of Materials course (MENG 3900), which includes a major design project. The SOUP Spoon, at that time, was a regular metal spoon with a metal tube fastened to the handle, running from the depth of the spoon head to the end of the handle where a small balloon bulb was attached at the opposite end, shown in Figure 2.



Figure 2 – A photo of the initial SOUP Spoon.

The initial SOUP Spoon was easy to use, but extremely difficult to clean and was not aesthetically pleasing. The engineering senior design team that had initially conceived of the concept had done a good job delivering a product that worked for their specific client. However, that product had a number of things that needed addressing before it became practical for the larger population.

The team applied engineering tools such as the Quality Function Deployment QFD<sup>2</sup>, Design Failure Modes and Effects Analysis DFMEA<sup>3</sup>, and various ideation techniques to make the SOUP Spoon better from a product design and engineering perspective. At the end of the course, the SOUP Spoon was transformed from a fairly intricate six part metal spoon into a simple two part plastic spoon, shown in Figure 3.



Figure 3 –The two-piece plastic SOUP Spoon made using 3D printing.

The path from the metal spoon on the 3D printed ABS plastic one in Figure 3 was not straightforward. There were several design iterations in CAD using Catia V5 at first and then Solid Works later on. The CAD design iterations were printed on a Stratasys 3D printer using ABS plastic in order to validate the ergonomics and strength. Initial iterations proved to be unusable but allowed the team to modify and improve the design. For illustration, the first spoon printed was half the length of a pen and extremely thin. It broke in half after less than twenty minutes but that tactile experience allowed the team to quickly make correction to the design and to have a reasonable plastic spoon in few days. That experience illustrated to the team that this process could work but that a food safe version with an integrated suction apparatus was far from realization.

Even though the technology (both design and manufacturing) was far from ready at that stage, the team was encouraged to apply for early stage business development programs tailored to students. The first application to be successful was a Stage 1 E-Team grant from the National Collegiate Inventors and Innovators Alliance NCIIA<sup>4</sup>. That grant provided \$5,000 in funding to attend a three day workshop focused on market analysis and value proposition development. The second successful application was for TechTown's Detroit Technology Exchange (DTX) Launch Detroit program, which is a ten-week summer program with a strong focus on customer discovery and business model generation.

### **TechTown experience**

The TechTown Technology Exchange (DTX) Launch Detroit program is a ten week summer program that took place in the summer of 2013. One of the first and most important lessons from this program is to convey to the nascent student entrepreneur the amount of work that is required to launch a startup company. That knowledge opened the eyes of the authors to the difficulty in realizing the dream of a SOUP Spoon factory in the near future. That dose of realism is a critical initial filter that helps students make proper career decisions.

The program includes course work based on the book "The Startup Owner's Manual" by Steve Blank<sup>5</sup>. The lectures and reading materials are provided by a Massive Online Open Coursework MOOC from Udacity ([www.udacity.com/ep245](http://www.udacity.com/ep245)) which is freely and readily available on the internet<sup>6</sup>.

One of the first tasks was for teams to pitch their ideas to the other teams in the program and to present a business model canvas. Most teams, including the SOUP Spoon team, had never seen a business model canvas before and the first iteration consisted of best guesses at the various sections of the diagram. These presentations were done in a very serious but inviting atmosphere and it was extremely helpful to hear feedback from people in the audience who had experience in a wide variety of disciplines but who are seeing these project pitches for the first time. This provided very valuable feedback but was only the beginning of a feedback and information gathering period that would set the team up for success.

The program included coaching sessions that had the team focusing on identifying who the customers are going to be and developing a value proposition that is appropriate to those customers. The most basic premise of the approach behind the program is the requirement that the team interviews ten potential customers each week. The aim of these interviews is validating the problem that is being addressed, and that the solution being offered is one that the customers are willing to pay for. The understanding is that if the team is not able to establish affirmative results from these customer interactions, there will be a need to change the direction of the startup. The authors believe that getting out of the building and talking to potential customers was the most important step toward realizing the viability of the startup.

Working closely with the coaches and receiving feedback from potential customers and partners helped steer the SOUP Spoon team through the intricacies of starting a business. Having people with backgrounds in business, law, and other fields helped the team avoid issues that would have

taken a long time to recognize and recover from. The coaches were also a great resource in that they enabled the SOUP Spoon team to broadcast to their extensive networks for additional assistance.

There were some important lessons learned that are applicable far beyond the SOUP Spoon start-up venture. Perhaps the most important of all is the realized necessity of having to “leave the building” and talk to people when developing an idea for a venture. It is important not to be afraid of what people will think or say, one must get other peoples’ thoughts in order for one’s product/service/company/idea to succeed. The experience of having to talk and explain the idea to strangers also helped in developing the author’s public speaking skills and conveying a message in a succinct and simple to understand way. This process extensively exercised the authors’ networking skills in the process of reaching out to disciplines and industries with no prior experience in, such as geriatric medicine and assistive living industry.

The coaches at TechTown were instrumental in the development of the SOUP Spoon’s startup. Being engineering students, we had minimal experience pitching ideas in a non-technical sense. We were so used to presenting our work and focusing on the functions and features of our devices and other ideas, always getting caught up in the technology. The coaches at TechTown really helped us learn to focus on our customers and the value we were bringing to them. They helped us understand what was important to talk about, what potential customers and investors really were interested in, not just what we were most excited for.

## **Prototyping**

The focus on the customer that the TechTown program engrained in the team was instrumental to the success thus far. However, during the tenure at TechTown, the team got too far away from iterative improvements to the spoon prototypes. One of the lessons is to be careful not to get caught up in the excitement of applying for grants and pitching in competitions. Once TechTown’s Launch Detroit program was over, the team had to refocus and get back into the prototyping process. In retrospect, the team should have been spending equal amounts of time building prototypes while doing customer discovery.

As a team, we got caught up in validating whether the problem that we were trying to address was actually real. We should have done a better job of quickly building a minimum viable product to get into the hands of potential customers for feedback once we validated that the need was real. In the period following the end of the TechTown Launch Detroit program, we have developed a minimum viable product that people can eat with. The feedback that we are able to get from customers when they have a product in their hand is incredibly more helpful than the feedback they were providing us when we were only talking about a problem and a potential solution. When they are able to hold the solution in their hand and experience it they can give us real feedback. Since building our initial minimum viable products, our company has progressed so much faster than before. The lesson for any team working on a startup is to get a minimum viable product in the hands of your end users as soon as possible. It is the most important thing in validating your hypothesis about your startup.

We have filed a provisional patent for the SOUP Spoon with the help of a UDM alum who works at a intellectual property law firm. The cost of the intellectual property protection is a major consideration for a start-up and a student team with limited financial resources will most likely have to consider relying on the largess of alums if the technology transfer office of the institution is unwilling or unable to help defray the cost.



Figure 4 – Progression of the SOUP Spoon from left to right with the far right spoon being readied for production.

### **Current state and conclusions**

The lessons we learned and the guidance we received at TechTown has helped set our startup for success. The SOUP Spoon has recently begun to sell spoons, spoons that do not include all of the features initially proposed for the technology. The feedback we have been able to receive from those that bought spoons and those who have received free spoons has helped us advance our product tremendously. Now that we have had initial sales and we have collected positive feedback from a number of end users, we are building up credibility, and now beginning to execute on parts of our business model and business model canvas that were only hypothetical when we were filling them out during the TechTown Launch Detroit experience. Our company is entering a new chapter of its short life, and TechTown has graciously continued to take an influential role in our company, continuing to offer their resources and guidance to help us succeed.

In the coming months the SOUP Spoon team will continue the development of spoons, planning for larger scale production. We will also be more seriously exploring potential distribution channels, partners, cost structures, and revenue streams, We will also be focusing on cultivating relationships with potential customers and influencers, getting the word out to people that the SOUP Spoon can help improve people's lives.

The journey of the SOUP Spoon from class project to real world product is documented in this article and in Figure 4. The growth and maturity of the product mirrors the growth and maturity of the student team.

### **Acknowledgement**

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