

Using 3D Printing to Understand Customer Engagement During Active Customization

Author: Ashley N. Martof

Advisors: Dr. Brett Conner and Dr. Kerry Meyers

Abstract

Additive manufacturing also known as 3D printing is an emerging technology. Additive manufacturing can displace traditional manufacturing when products have high levels of complexity and/or customization. Today, most consumers have little experience in actively customizing a physical product. The goal is to put the word “custom” back into “customer” by making individuals comfortable in actively designing a product. In order to get a clear understanding of how customers respond to active customization, a survey was designed, disseminated, and the results were analyzed. Individuals were allowed to customize a product in three different ways: Selection Only, Mentored Customization and Self-Directed Customization.

Research Questions

- Are college students willing to actively customize a physical product for themselves?
- If so, would they prefer guided/mentored customization or doing it on their own?
- Does gender play a role in desire to customize products?

Background

- 3 steps in 3D printing: Design, Slice & Print
- Additive manufacturing should be considered on products with: High Complexity, High Customization and/or low volume.
- Additive manufacturing allows for high complexity due to the layer by layer ability.
- Additive manufacturing enables easy customization through on demand software that allows one click revisions and changes.
- Factors to choose additive manufacturing over conventional processes :
 - Reduces time to market
 - Elimination of tooling-Lower costs
 - Labor cost reductions

Survey Design

- Nervous System Kinematic Bracelet was used as the design product due to the high complexity and customization capabilities.
- 15 total questions : 3 Pre-questions, 12 participant questions
- Time to complete survey approximately 5 minutes
- Survey conducted over 3 hours

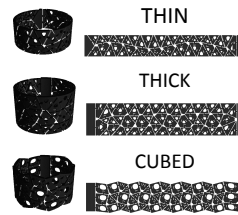
Participants

If you are a college student what year are you in?		
Freshman	17	43.6%
Sophomore	13	33.3%
Junior	2	5.1%
Senior	3	7.7%
Graduate Student	3	7.7%
N/A	1	2.6%

Gender	Count	Percentage
Female	20	51.3%
Male	19	48.7%

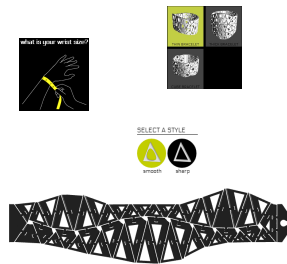
Selection 1: Selection Only

- Wrist size
- Choose from 1 of 3 predefined options:



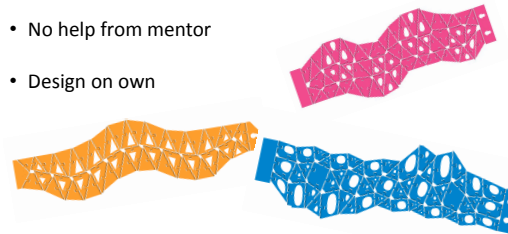
Selection 2: Mentored Customization

- Pick Template
- Wrist Size
- Select Style
- Shape
- Morph
- Pattern

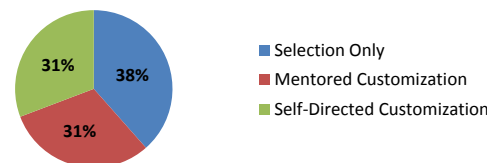


Selection 3: Self-Directed Customization

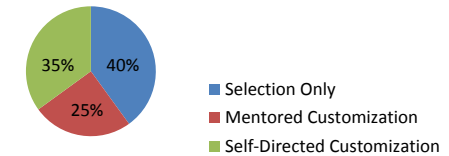
- Same options as Selection 2
- No help from mentor
- Design on own



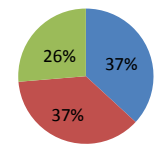
Option Selected



Female vs. Selection



Male vs. Selection



Would you change your selection?

- 63% would change to more active customization
- 8% would change to less active in customization
- 28% did Self –Directed and would not change

Does experience with additive manufacturing influence one's choice?

No experience		
Selection Only	9	32%
Mentored	9	32%
Self-Directed	10	36%

Some/Limited experience		
Selection Only	3	50%
Mentored	2	33%
Self-Directed	1	17%

Yes I have experience		
Selection Only	3	60%
Mentored	1	20%
Self-Directed	1	20%

Summary

- No significant relationship between gender and the type of selection chosen.
- High participation indicates an interest in learning about additive manufacturing
- Once participants had some exposure to the design software they wanted to learn more and wanted to do more independently.
- 38% of participants chose selection only. College students are on the go and the easiest way for them to get a product it with pre-defined options. Once participants became aware of the customization software and technology individual were more interested in actively customizing their part.

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 - Conner BP, et al. Making sense of 3-D printing: Creating a map of additive manufacturing products and services. *Addit Manuf* (2014), <http://dx.doi.org/10.1016/j.addma.2014.08.005>