Comparing Design Processes in Academia and Industry of Microfluidic Professionals: Qualitative Analysis of Key Factors that Affected Their Design Processes.

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Introduction

Collaboration between academia and industry has been identified as key to innovation because companies can access to the latest research results, and turn them into commercial products. To further optimize collaboration, a baseline understanding of their design processes could help identify areas that benefit each other. Better understanding their design processes can facilitate control and guidance throughout a project, which could reduce unwanted surprises and streamline the development process.

Background

- Design is the process of devising a system, component or process to meet desired needs[1].
- Important to maximize design strategies during different phases of a design process[2].
- Design heavily depends on the context due to many constraining factors[3].

Research Questions

- What are the differences in design processes between industry and academia?
- What factors contribute to the differences in design processes between industry and academia?

Methods

Conducted three pilot interviews[4]

Refined interview questions

Interviewed 10 academic and 11 industry professionals

Transcribed interviews

Inductively coded results[5]

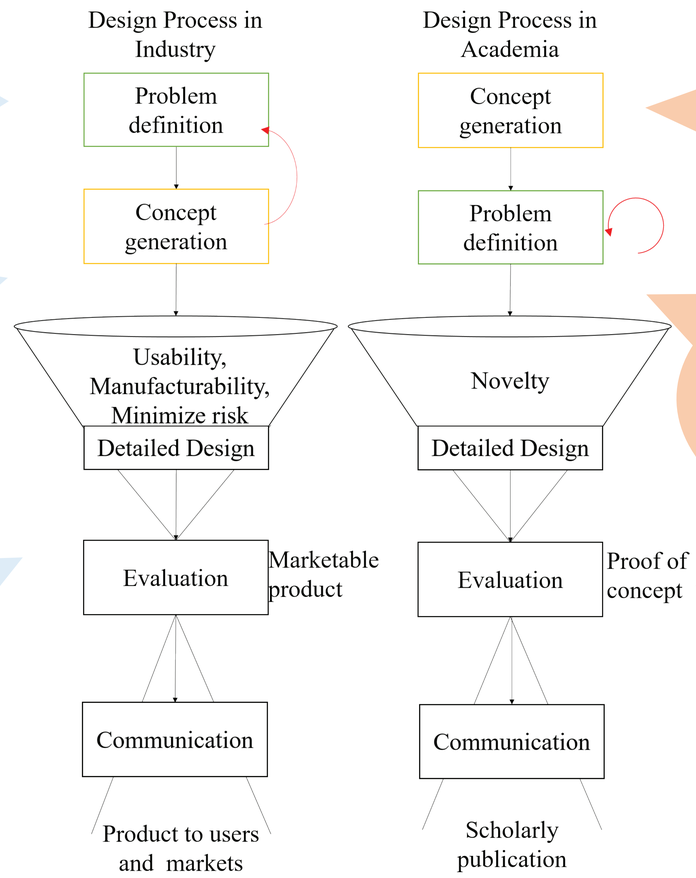
Findings

"The business side will come up and go out and then determine there's a customer need."

"You test out a bunch of different solutions. You'll test out different assay technology. They'll test out different pumping technologies. Different flow technologies, channel technologies."

"I think that's an area where some of our competitors and a lot of the academic labs have generated some very high quality results, there's a big gap there in terms of getting to something that's usable…We looked at everything that's available and said, how can we do this, that enables our users..."

"You assess with the panel of customers whether that design that you created, that you're ready to launch [and] really meets all of the requirements that they wanted."



"We kind of have a hammer almost ready, and then, if a good application comes up that matches this, then we can tweak and do something towards that"

"I just wanted to get some experience in the biology lab and talk to biologists, so I didn't care if it was [a topic] or something else. I just wanted to find basically a good application of microfluidics…so it had a practical use."

"If this one works pretty well I probably wouldn't even bother to try another. Because I mean the ultimate goal is to measure the thing. If I can measure it pretty well in this way, I wouldn't want to try some other method."

"I guess the sign to finish is because, at the end, we publish a paper. We do what we need to and if we finished all the experiments, then we are done."

Influencial Factors

- Given problems
- Driven by profit
- Considered diverse alternative solutions
- Less emphasis on expertise

- Chose problems
- Driven by knowledge
- Considered limited alternative solutions
- Stayed within expertise

Implications

- Understanding the different design processes can lead to better selecting and optimizing tools.

- Understanding the strengths of each other can provide opportunities to better communicate and support collaboration.

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