What Not to Do with 3D Printing

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WeARE Research Area

Along with Dr. Wan, Rafid, and James we have been conducting a research paper on what not to do with 3D printing, mainly to show the limitations that the printers have, from a manufacturing standpoint.

Motivation or Background

The members of this research team has witnessed many cases where 3D printing was misused or the results or printed pieces did not meet the expectation usually appeared. For example some parts can be printed with size differences, gaps, bumps, machine failures, which can all lead to economic issues for the users.

Therefore, the team decided to investigate how people use this technology and what opportunities are there to educate future engineering students to use the technology correctly.

Objectives

1. Explore the capabilities and limitations of commercially available 3D printers.
2. Investigate on how 3D printers are used in engineering practices and the opportunity to misuse them.
3. Summarize the cases and lessons learned into an article to be used for engineering educators and practitioners.

Methodology

We surveyed relevant research in various articles, books, and other academic papers. Research was used to give a better understanding on the topic but also serve as good evidence for the real world information. Finding quotes and information to help support the evidence.

First-hand experiences were collected from 3D printing usera, including James Manly (Engineer at Lancer Corp. and BS-ME student at UTSA) and Dr. Hung-da Wam (faculty in manufacturing area at UTSA).

Most of the team has hands-on experience has from Dr. Hung-da Wan and James Manly with years of experience. As well as myself with minor uses with a group and doing minor maintenance in a lab.

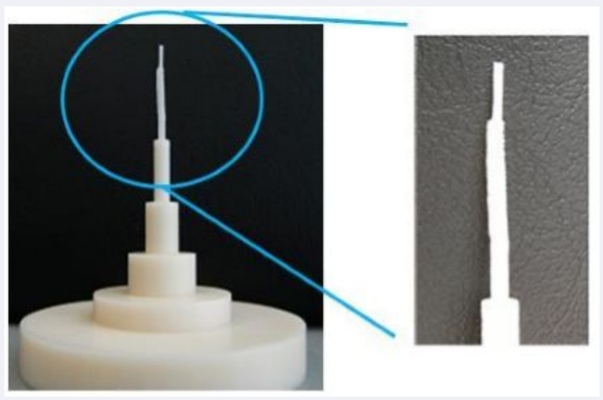

Fig. 1

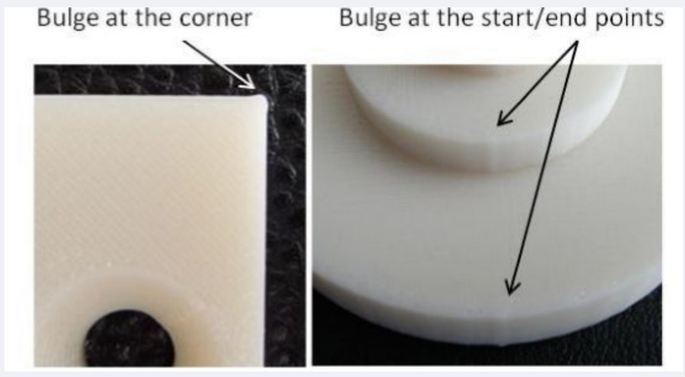

Fig. 2

Results

Most students go into college only see positives from 3D printing but the not always said limitations and problems can serve as a big problem for projects or real life applications, as it is a great machine but not fully complete.

Leading to the reason of the paper to be able to serve as a tool for students to read and understand what limit 3D printers have, to teach them so their will not be utter disasters from using this tool.

Our findings led to the support of the real world evidence and former evidence from the literature. The materials found was great supporting pieces for the information conveyed in the scholastic paper. The findings served as a confirmation to our experiences, to be able to compare and contrast to other people's material.

Concluding the paper gave me the the capability to learn about the material and fully understand it. If it was not for working on the project I would not know much of what was said on the paper. Giving me an understanding that I can take for my future projects, like senior design. Even allowing me project this information to colleagues that do not know the deeper understanding on the topic.

Skills and Experience

In going about the research I have always had a decent knowledge on how to conduct papers for classes and projects, but I had never done an academic paper like this before.
The project has taught me on what is truly needed for these papers to go into the field and be able to serve as a scholastic paper.
Teaching me how to find research, where to place my findings, and that we can always find more sources.
Including some hand-on experience using printers from assisting a colleague and learning how to maintain the printers.

What I Learned

From working on this papers I learned how to work better with higher level peers, in order to make the research a success. How to be able to conduct research that is needed for the paper itself, for example citations, material, and other supporting material. Having me develop a knowledge for the material on the paper, going in I did not fully know most of the finding that were on the paper. Giving me a better understand for the subject at hand, which leads to me to keep this knowledge for future project or papers.

Future Plans

After this experience I do want to be able to work on other future research opportunities. I gained a lot of experience in doing this project, getting a better understanding in more advanced 3D printing processes that handle metal parts, soft materials, functional products, etc.
I do expect to finish my bachelors in a few years with working more academic but also hand on experience with internships or even other research with Dr. Wan.

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