Sean Ding

Mr. Speice

ISM I

15 September 2017

<p align="center">**Fused-Deposition Modeling**</p>

<p align="center">**Research Assessment 2**</p>

Date: 9/15

Subject: 3D Printing

Works Cited:

Brown, A. C., et al. "Development of a Stereolithography (Stl) Input and Computer

Numerical Control (Cnc) Output Algorithm for an Entry-Level 3-D Printer." South

African Journal of Industrial Engineering, vol. 25, no. 2, Aug. 2014, pp. 39-47.

EBSCOhost,

search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=100705606&site=ehost-live.

"Types of Filaments for FDM Printing." Library Technology Reports, vol. 53, no. 5, July

2017, pp. 12-15. EBSCOhost,

search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=124035290&site=ehost-live.

Assessment:

In recent years, 3D printing and CNC (computer numerical control) machining has

become more common and more accurate with tolerances. In the first article the author describes

the way that a 3D model is turned into a 3D-printable or CNC machinable file. The model file is

first "read" to determine its orientation, then sliced into a series of layers or multiple passes that

the 3D printer or CNC machine will take in order to create the desired part. These sliced layers are converted into instructions which are given to the machine in a "G-code" format. In the second article, the author describes the various types of 3D printer filaments which can mimic various materials like wood, metal, ceramic, clay, glass or acrylic, and even circuit boards.

Overall, both articles helped to provide insight on a specific topic in the broad field of mechanical engineering. The first article provided details about various manufacturing techniques which really piqued interest my interest and will be sure to guide my ISM topic and final product. The 3D printing and CNC machining mentioned in the article are also relatively new developments in engineering and are quite popular in the engineering field currently. However, while I did have some substantial knowledge of 3D printing and CNC machining beforehand, this article was still able to provide valuable information on the actual mechanical and mathematical processes behind it rather than the actual manufacturing process. Prior to reading, I had previously thought that the math involved would be relatively simple, only creating line segments, but the article showed that the process was quite complex; requiring several formulas just to make simple curves. The second article also introduced to me various types of filaments which were not known to me prior to reading the article. Many of these different types of filaments were able to act and look like other materials which would change how products are made in the future. Some of these products include circuit boards, which currently are quite a complex manufacturing task, but could be simplified with the introduction of 3D printers combined with the use of conductive filament. Other products that are typically made out of wood or metal could also be made cheaper with the use of filaments which mimic

the appearance of those. With 3D printing and CNC machining we are able to product products and prototypes in ways not possible before.

As a whole, the information and ideas presented in these articles were really beneficial in introducing me to new methods in which 3D printers and CNC machines can be used which I had not been exposed to previously. Ever since a few years ago, I have been fascinated with the world of rapid prototyping, 3D printing, and CNC machines. These articles not only furthered my interest in this field and helped to lead me in a direction to focus on for the topic of mechanical engineering, but also combined my hobbies of engineering, computer science, and AutoCAD into one form. As my ISM journey continues, I will most likely lean toward this specific topic of study and continue researching the use of rapid prototyping, CNC machines, and 3D printing in mechanical engineering.

Annotated Articles:

Article 1:

http://scrible.com/s/0bF6k

Article 2:

http://scrible.com/s/gHF6k