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ISM I

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## **Comparing CNC and 3D Printed Manufacturing**

### **Research Assessment 8**

**Date:** 12/14

**Subject:** Differences between CNC and 3D printing

**Works Cited:**

Grieser, Franz. "3D Printing vs CNC: Explained and Compared." All3DP, 5 Oct. 2015,  
[all3dp.com/3d-printing-vs-cnc-milling/](http://all3dp.com/3d-printing-vs-cnc-milling/).

"Settling the Debate: CNC Machining vs. 3D Printing." Bunty LLC,  
[buntyllc.com/settling-the-debate-cnc-machining-vs-3d-printing/](http://buntyllc.com/settling-the-debate-cnc-machining-vs-3d-printing/).

**Assessment:**

Throughout these articles the authors discuss the various differences between both CNC machining as well as 3D printing manufacturing methods. With CNC machining the machine cuts away at a solid block of metal, wood, plastic, or material being milled in a subtractive manufacturing process while with 3D printing the machine prints layer by layer of plastic with additive manufacturing. Both authors state how the processes are often opposites of each other, but do share several similarities. Some of these similarities being that both processes require finishing after the part is manufactured, both use gcode and computer-aided manufacturing software, and that both processes can use standard CAD models. The authors also state how

CNC machining is almost always faster than using 3D printing, but are only economical for producing large quantities of parts rather than the small quantities manufactured using 3D printing. With 3D printing the price of manufacture always stays constant while with CNC machining the price of manufacture is dependent on the quantity of parts made. CNC machines are also able to create more precise parts for higher-intensity applications than 3D printers can, being that CNCs often create parts made out of metal and other rigid materials rather than the relatively weak plastic 3D printers use.

For most of this article, the content was able to accurately reinforce the information I had gathered from both previous research assessments as well as interviews. The article explained how the CNC and 3D printing processes, while similar, did still differ significantly from each other. With the use of gcode in both processes, it may be easy to transfer a model from one type of manufacturing to the other, but may require some learning as the CNC machining process requires knowledge of cutting tools as well as a variety of materials while the 3D printing process only requires some basic knowledge of how the 3D printer works as well as how to use the CAM software. Often a user can easily waste material and damage tools by improper usage of the software on both CNC and 3D printing processes. This article also mentioned how the price of 3D printers can be as low as \$500, similar to what Mr. Mueggenborg and Dr. Choi had said during past interviews. The first article also mentioned how 3D printing has applications in medical and dental uses as well as for personal use, similar to what Dr. Choi also mentioned during a previous interview. Both articles mentioned how 3D printing is especially important for rapid prototyping as they can create small quantities quickly and economically but do not share the resolution that CNC machines can deliver. CNC machining can create parts which look

finished when done while 3D printed parts can only deliver parts which may look decent, but still require some finishing. This could further add to the cost of 3D printing but even so would still cost less than some of the cheapest CNC machines on the market today. While CNC machines may provide higher accuracy and resolution and appear to be superior to 3D printers, we must remember to incorporate every factor of each process such as cost, application, and size. 3D printers are useful for creating small quantities while CNCs are not while CNCs are useful for creating parts out of metal while 3D printers are not.

From reading this article, I not only learned an abundant source of information on CNC machining, but also more about 3D printing and how each process was similar as well as different. As I continue conducting research, interviews, and working on my original work, I will be sure to incorporate some of the information I have learned in these articles as well as the information from my previous research. In future research I plan to focus more on articles such as these which provide both viewpoints rather than one or the other as I found previously. I also want to compare how much the process differs between the two as well as how much of a learning curve is required to understand how to properly operate CNC machines as opposed to operating 3D printers.

**Annotated Articles:**

<http://scribble.com/s/2bU6m>

<http://scribble.com/s/izU2m>