Apoorva Kaushik

Mr. Speice

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<div align="center">3D Printing</div>
<div align="center">Assessment 3: Research</div>

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Aidan. "How to Use Cura - Tutorial for Beginners." *YouTube*, Core Electronics, 2 Oct. 2016,

www.youtube.com/watch?v=fGwBMFuMbos.

3D printing is a relatively new tool in the creative industry and allows 3D artists to create

the work they have in computer software in the real world. The concepts of 3D printing are

spreading at a rapid pace across the world and even across various industries as it is being used

for creative and practical purposes. As a whole this technology has brought a new wave of

innovation to many industries and can be used for various purposes in the creative industry such

as concepting characters and prototyping colors. However, while the uses for 3D printing are

rather small in scope currently it is a task that will continue to grow in importance over the years

and as such will become a more useful skill to have across various disciplines.

The beginning phases of the 3D printing software include making models in a 3D

software. This phase is important as it will create the product that will be printed and also creates

the base for how difficult the rest of the process will be. For example, if the model that is made at

this phase has many overhangs or small details the rest of the process will be affected by the

need for supports on the models overhangs and lowered printing speed for the small features.

Therefore, the modeling phase is very important to the workflow that will take place to make the

3D print. When creating models for printing there are specific factors that need to be accounted

for so that the print looks clean and does not have any major issues. One of the major factors for

3D printing is supporting the model so that it does not fall apart in the printer. Overhangs present

the largest problems for 3D printing as they will fall apart without support. Some overhangs need

supports while others do not need supports, this simply depends upon the degree of the overhang

and the specific printer mode that is being used. Another factor to take into account while

modeling for printing is what pieces of the model need to be printed separately and be glued onto

the print after the fact. Taking these new factors into account is new and not something that is

usually taken into account for models that are being made for film or games. However, most

models can be optimized for 3D printing after the model has been completed. The 3D modeling

process can be done through a software such as Autodesk Maya, ZBrush, or a CAD Software.

All of these different types of software have ways to export models to a file format that can be

used by a 3D printer. The main file format for printing is an STL file which is a format that is

supported as an export format by the vast majority of 3D softwares used in the creative industry.

To test modeling for 3D printing I used Autodesk Maya and made a simple model that was then

optimized for 3D printing.

To optimize a model for 3D printing many parts of the model must be looked at. First,

overhangs must be supported so that the print does not slowly deform while being printed.

Additionally, the model must be completely manifold so that it can be printed in the real world

without issues. These problems can often be found and fixed by Cura, a software for 3D printing, that can control printing speed, heat and many other variables of the printer. Using the software many factors can be controlled to create an optimized print of a model. For the print of a torso statue many supports had to be used for the arms, head, and small details. This maintained detail and resolution of the sculpt that should be maintained through the 3D printing process.

  As a whole the 3D printing process is becoming increasingly important as various industries use it to show products to clients, create concepts art, and prototype inventions. Creating a model for 3D printing forced me to take into account many more factors than modeling for animation or concept. Overall this was an interesting skill to learn and is something that will be useful in the future.

Notes

- 3D printing is done by a nozzle melting plastic through an extruder in a 3D printer.
- Since the 3D printer is melting plastic any overhangs will fall apart and deform in the printer.
- Adding supports can be done through Cura or a 3D modeling software.
- For 3D printing manifold geometry is necessary and can be checked through errors.
- Following the 3D printing process the print can be sanded down to get rid of any strings that are hanging off the model.
- The model can also be painted at this point in the process once the model has been sanded and tweaked.
- Through Cura factors such as print speed, heat, and layers can be controlled to make sure the the print doesn't go too fast or fall apart in the printer.
  - If the speed is too high the extruder will eject plastic too quickly and the cooling of the model won't be able to keep up with the printer.