

Repairing a Household Blender Gear



My attempt to repair a moving blender component with a 3D printed part is great example of how some components currently aren't suited to being repaired by consumers themselves. Furthermore, it illustrates that a potential system where users can replace their own components would require great consideration from manufacturers in how they assemble their products or should perhaps be left to only a handful of components.

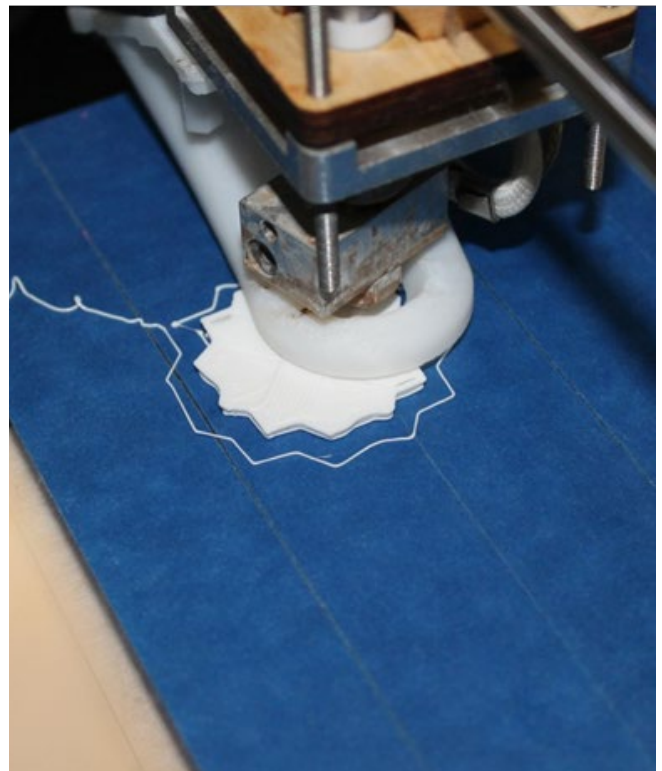
The Repair Scenario

After my mother had accidentally left a spoon in our blender and turned it on (shattering a plastic component) we had left the useless blender hidden away for a good 8 months. We could not easily find a place to buy this single broken piece and had no luck contacting the manufacturer for a repair. Thus we eventually bought a new blender and continued on with our lives forgetting about the old blender whose life was prematurely ended due to the failure of a single component. This scenario of orphaned products is a common occurrence today and creates immense amounts of waste. An electric motor, plastic housing, glass jug, rubber seals, screws and wiring all assembled together to create a useful product that was only used for a maximum of a few days.



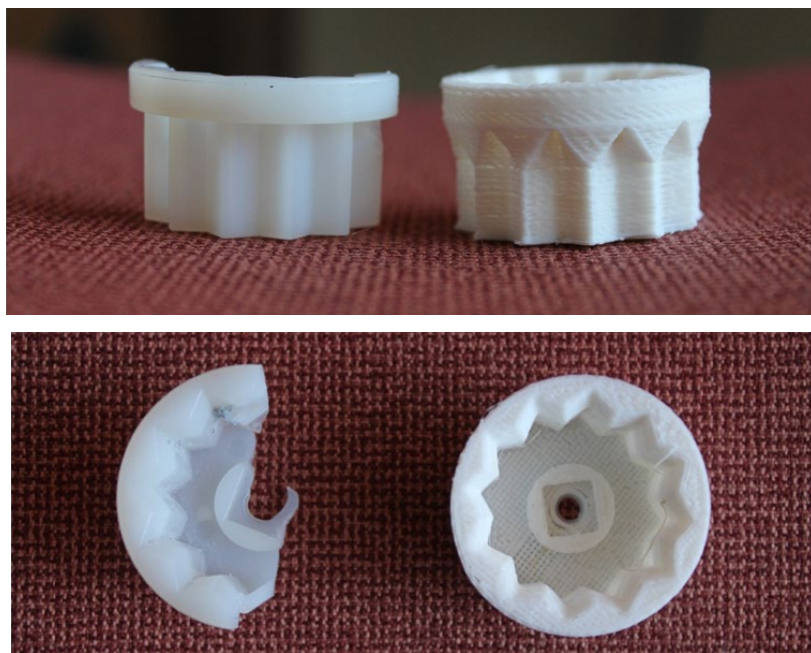
The broken component

In my eyes, this became the perfect product repair scenario for 3D printing. I could intricately measure the part, create it in CAD and print out a brand new one, bringing life back to our blender. So I got to work and created the 3D model in Solidworks and printed it on the Ultimaker Original 3D Printer.



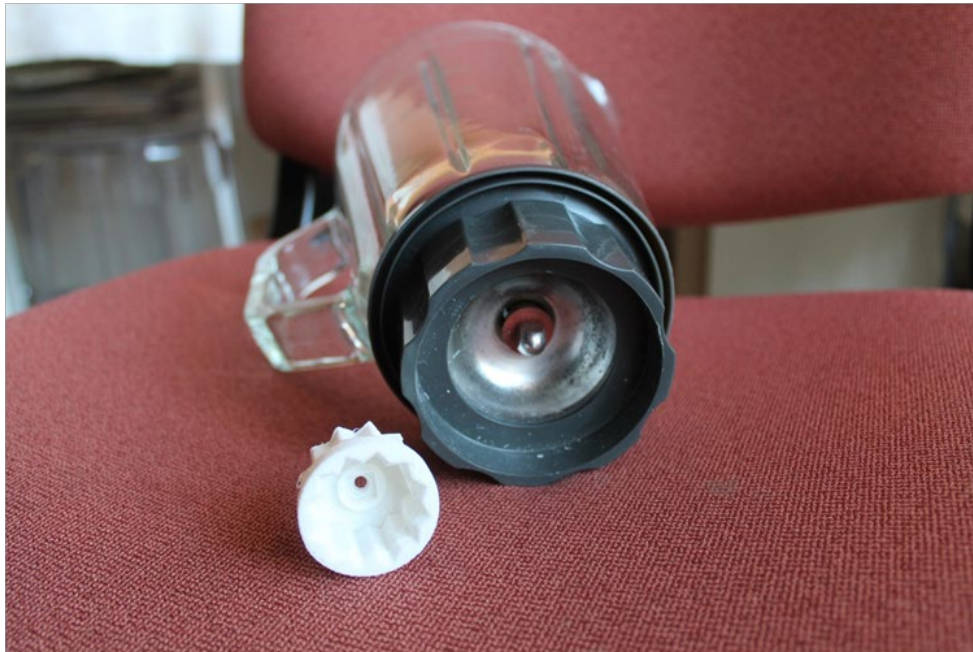
The Ultimaker original 3D printer

There are some very important points to consider since I was attempting to replace a moving component which was going to be placed under a significant amount of stress. First of all, 3D printed parts are not as strong as injection molded parts due to the layering nature of the 3D printing process. Secondly, the Ultimaker was printing this component in PLA which is a bioplastic and is intended to biodegrade over time. These factors must be considered.



The original and printed component side by side

I had my new part printed and ready to trial. This however, is where my journey ended. What looked like an easily unscrewable hex nut ended up being immovable. After a long time of attempting to unscrew the shaft with tools, I figured that it was permanently secured.

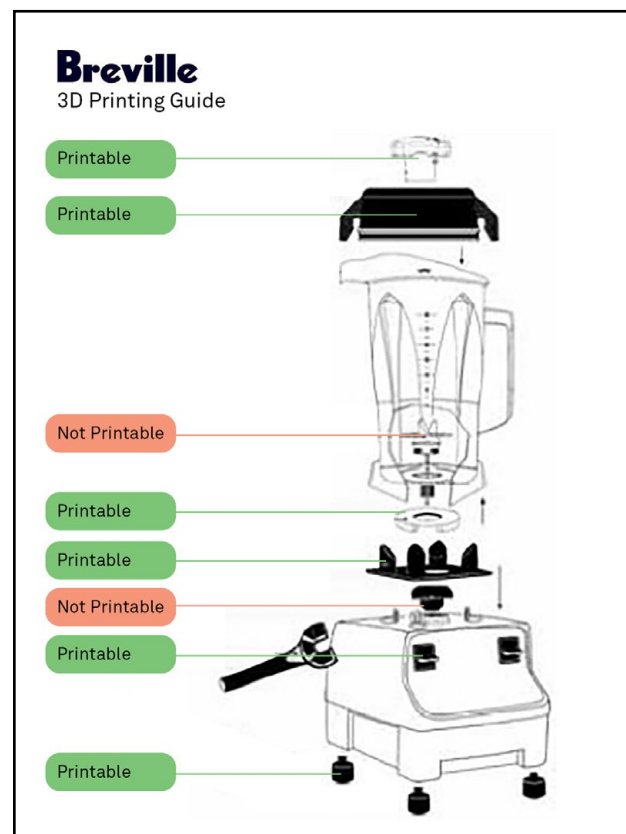


The shaft was near impossible to disassemble with regular household tools

I came to accept that its inability to be disassembled was likely due to safety concerns regarding users modifying their blender. Perhaps in a world where users are encouraged to print and repair their own parts, companies could specify which parts can and which parts shouldn't be printed. They could also perhaps list print quality specifications such as layer height and fill density according to the mechanical requirements of the part to ensure it is physically sound.

Alternatively, such repairs might perhaps be left to repair-specific 3D printing retail companies who have access to a multitude of stock components to print on demand for consumers. From a broken keyboard button to a toilet seat hinge, these 3D printing outlets could be the one stop shop for small repairs at home.

Marcus Lee (UNSW)



A visualisation of what a manufacturer's guide to their product's printable components could be