

3D printing solutions to fight COVID-19

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BACKGROUND

In the context of the COVID-19 pandemic, there was the need to develop solutions to minimize the spread of the disease in public spaces. There is proof that SARS-CoV-2 can be found for several days in some surfaces, which combined with the natural tendency for humans to touch their eyes, nose or mouth, can cause a real threat to one's health. Thus, it became a necessity to develop hand free devices for personal and public use.

AIMS

Development and design of devices which will help on the prevention of the dissemination of the second wave of contagion in the university campus.

METHODS

Each prototype was designed in CAD and 3D printed using fused deposition modeling technology (FDM). The used materials on the research were the following thermoplastics: *Polylactide (PLA)*, *Polyurethane (TPU)* and *Polyethylene terephthalate glycol (PETG)*.

The product development methodology consists of iteratively designing and printing the part until a satisfactory product is achieved.

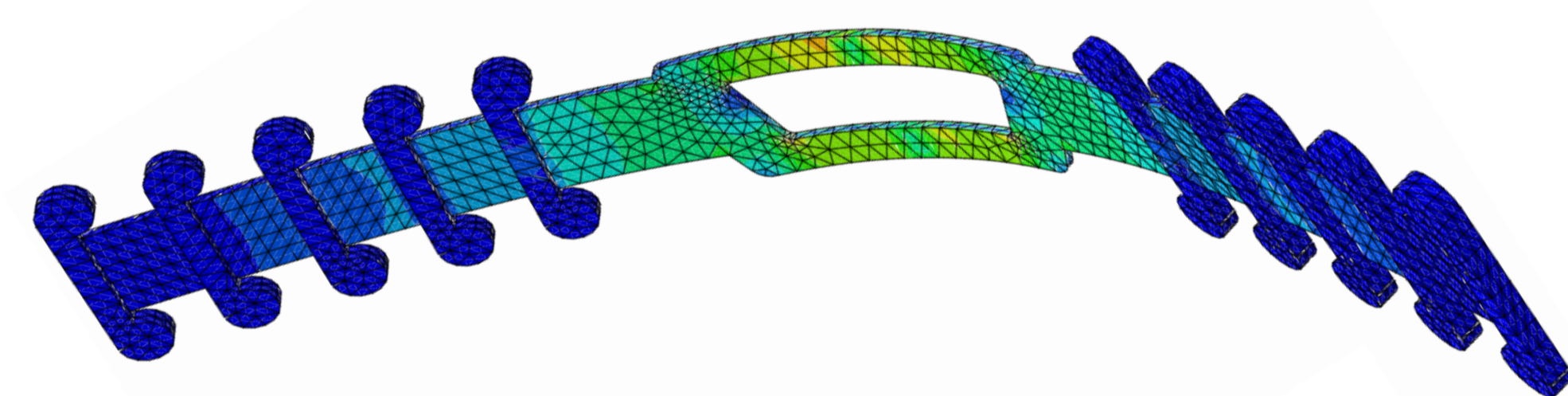
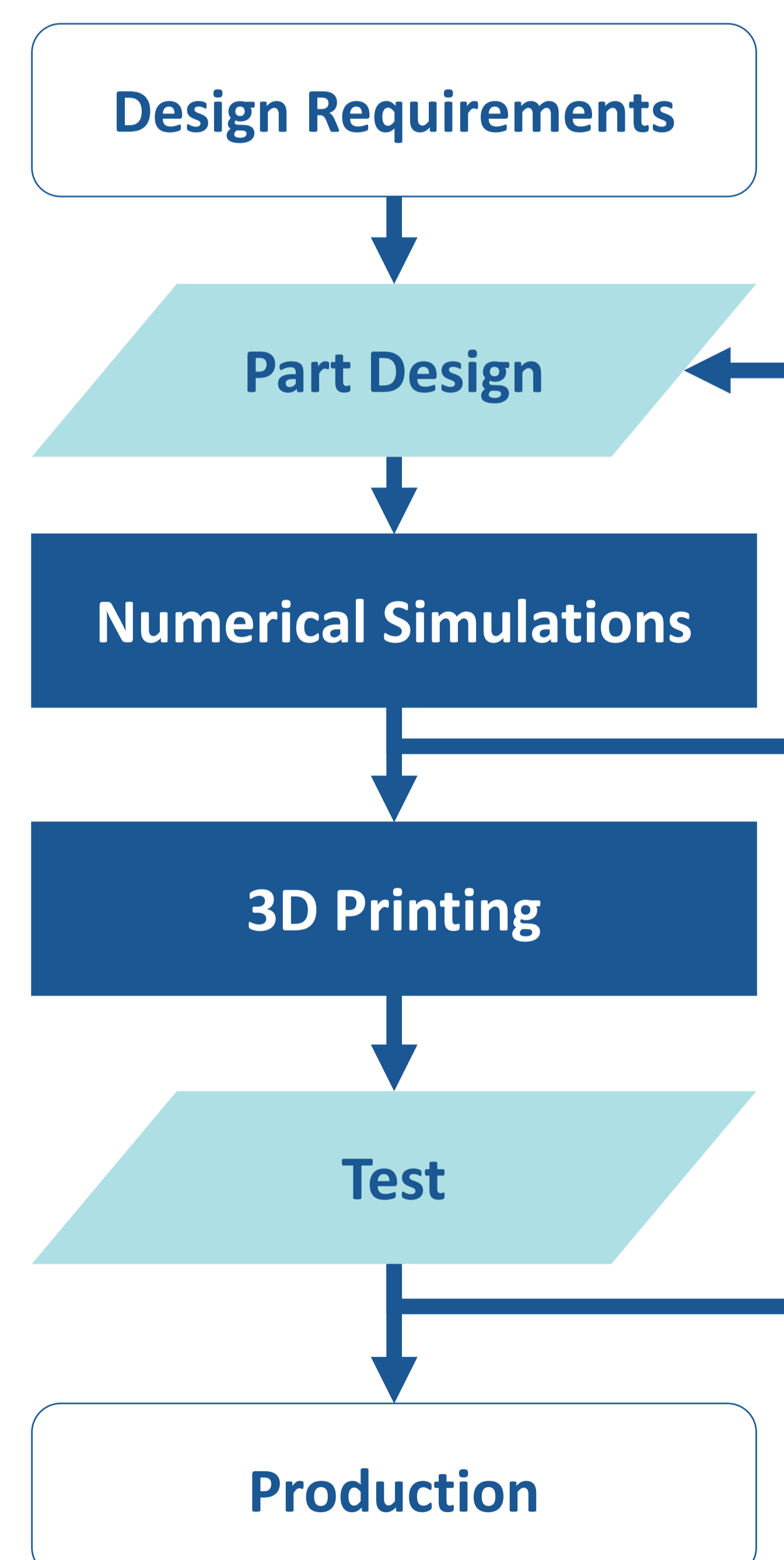


Fig. 1. Numerical Simulation of the designed Ear Saver. A numerical study and optimization for each component was done, which validates the original concepts.

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RESULTS

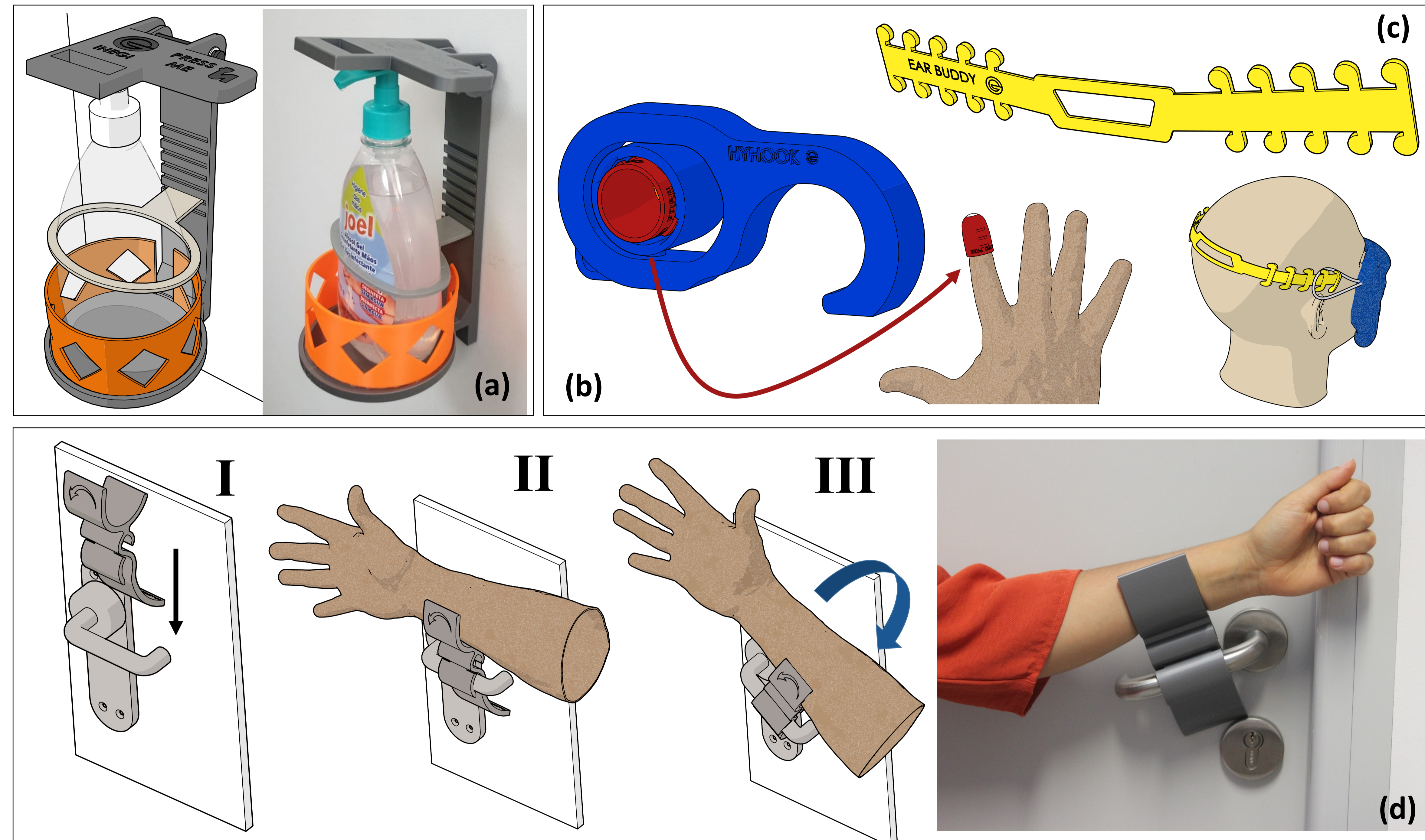


Fig. 2. Some examples of the developed prototypes: (a) Elbow Dispenser; (b) Hands Free Hook and a Finger cot for use on electronic devices and button pressing; (c) Ear Saver; (d) Hands-Free Door Opener.

SUMMARY AND CONCLUSIONS

The developed devices present interesting solutions to equip the university buildings. 3D printing allowed to fully develop all these solutions in a short period of time, before the beginning of the school year. The sanitizer dispenser, besides being elbow activated, presents a lower unit cost than commercially available solutions. The hook solution is a compact solution to distribute among students and university personnel. Finally, the Door Opener proved to be effective, ergonomic and sturdier than most available solutions.

Ending the pandemic is a team effort. Medical professionals fight in the front line and it is up to engineers to develop more tools to facilitate the rest of the battle against SARS-CoV-2.

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