THE WAR OF 3D PRINTERS AGAINST THE PANDEMIC

Indeed, the scientific milestones set by the ever-emerging three-dimensional printing (3DP) technologies are tremendous. Until now, the innovative 3DP technologies have benefitted the aerospace, automobile, textile, pharmaceutical, and biomedical sectors by developing pre-requisite designed and customized performance standards of the end-user products. As the scientific world, at this moment, is expediting efforts to fight against the highly damaging novel coronavirus (COVID-19) pandemic, the 3DP technologies are facilitating creative solutions in terms of personal protective equipment (PPE), medical equipment (such as ventilators and other respiratory devices), and other health and welfare tools to aid the personal hygiene as well as safe environment for humans by restricting the communication of risks. (Sunpreet S., Chander P., Seeram R.)

The 3DP technologies have just begun their career in dealing with the Pandemics. The eminent manufacturers and researchers understood the potential of 3DP technologies and directed them for developing PPE (Personal protective equipment) medical tools, and other gadgets (Clifton W., Damon A., Martin A.K. Considerations and Cautions for three-dimensional-printed personal protective equipment in the COVID-19 crisis. 3D printing and Additive manufacturing. 2020 Apr 24) The technological emergence, as stated in Table 1, shows that the 3DP technologies are uniquely positioned to support supply chain and inventory gaps for PPE and other medical equipment. Considering the demands of PPE, the sudden hike in the demand for 3DP technologies has stretched supply chains and the healthcare sector is using it to a breaking point. As an output, these initiatives enabled the producers to efficiently provide the critical components and products as a global response to the COVID-19 pandemic (3D printing COVID-19 rapid response initiative. World economic Forum. https://www.weforum.org/projects/3d-printing-covid-19-rapid-response-initiative) .

We have all been sleeping and getting up with masks recently. One filters bacteria, saying goodbye to viruses; we have nobody left to know. A mask should consist of a full face and airtight design, and a safe filter. 3D printable masks also promise that. In addition, they can be used repeatedly by changing the filter (İbrahim Sarbay, 2020).

Moreover, 3D printers made entrances to the medical world scene in the pandemic era with visors. Visors, which reach thousands of people in our country with many volunteers, including celebrities, are preferred by healthcare professionals because they protect the entire hundred from patient secretions.

In conclusion, while the pandemic is taking the world by storm, doctors, engineers, pizzerias, dessert makers, citizens are trying to do their best and support healthcare professionals in the "front." 3D printers continue to fight with us on the front to protect human health in this global war.

Type of 3DP	*Application(s)*	*Material category*
Fused filament fabrication (FFF)	Critical face-shields, masks, mask adjusters, respirator parts, hands-free door openers, and nasal swabs	Plastic
Selective laser sintering (SLS)	Ventilator parts, face masks, and face shields	Medical grade nylon
FFF	Disposable face shields	Plastic
FFF	Medical devices and protective clothing	-
FFF	Medical equipment	-
FFF	Printed fixtures for diagnostic equipment development	Metallic
FFF	Face masks	Plastic
FFF	Medical supplies	Poly-lactic-acid (PLA)
FFF	Face shields	Plastic
FFF	Quarantine booths	-
FFF	Ventilators	-
FFF	Hospital visors	-
FFF	Medical visors	-
FFF	Design for medical gadgets	-
FFF	Headbands for face masks	-
FFF	Door openers	-
FFF	Headbands for face masks	-
FFF	Open source ventilator	-
FFF	Respirator	

Table 1. List of notable 3DP technologies' implications against COVID-19

References;

İbrahim Sarbay,2020. https://www.acilci.net/3d-yazicilar-pandemiye-karsi/

Sunpreet S. , Chander P. , Seeram R.) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7309818/

https://www.hurriyet.com.tr/teknoloji/koronavirus-salgininda-3d-yazicilarin-onemi-anlasildi-41527510

It is possible to find more information about 3D printing, including applications, trends and its benefits for Education in the "3DP TEACHERS' GUIDEBOOK". Make sure you are following the "3DP TEACHER - implementation of 3D Printing in future education" project's Facebook page to be the first to know when the guidebook is published on project's website.