



ARE 3D PRINTERS CHANGING ART & DESIGN SCENARIOS?

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Abstract

Nowadays pollution has become havoc in our daily life, and it is polluting our environment as well as our health. We all are trying to find a solution to it, but every solution is becoming a failure. One of them is Plastic Pollution and which is caused by the littering of plastic waste, or we can say the use of plastic. The one and only solution to this is 3D printing and it is done by the use of 3D Printers. A 3D printer is a device that makes any models and objects layer by layer with the use of plastic, paper, metals, resins, etc. They are used in industrial sectors like robotics, automotive, defense, etc. But they also can be used in the Education sector. The benefits of these printers are enormous. Many professional artists like cartoonists and commercial artists use 3D printers for their artworks. It increases the speed of the artwork and reduces time. Just like this it also helps in reducing plastic waste by making models and artwork from them. 3D printers can kill two birds with one stone. It helps to increase a country's GDP by increasing the economy as it follows one of the SDG (Sustainable Development Goals) Principles. 3D printing is one step closer to new innovative technologies. So, increasing the use of 3D printers in every sector can help us in unlimited ways.

Keywords - 3D printers, 3D printing, sustainability, waste reduction, plastic waste, economic development, innovation

Introduction

A 3D printer is a device that builds 3D objects, models, and components, using an additive manufacturing process. It uses computer-aided design or software to create 3D design diagrams, figures, and patterns. As 3D printers use an additive process, they make the final product by cutting and grinding the product. They do not residue any waste while creating models. Elements such as plastic, metals, resins, liquid, powder grains, carbon fiber, paper, etc are used. As we all know that 3D printers are used for 3D printing so, [2]3D printing is a key component in the proliferation of Industry 4.0 processes [2]. It is part of a disruptive technology that is creating a revolution in the industry. This technology involves components like artificial intelligence, machine learning, cloud technology, additive manufacturing, and 3D printing. 3D printing can produce complex parts of a product or a model easily with speed. It is also used in the research and development stage to fix design problems before mass production by making a prototype. Industries like automotive, aerospace, robotics, defense, education, and manufacturing use 3D printers to reduce time and money, cost and pricing, and technological advancement.

Where it is used -

- **In Education**

3D printers are used in education for learning and teaching purposes. For example, history students can print out historical artifacts to examine with 3D printers, and graphic design and sculpture students can print out 3D versions of their artworks. Like in chemistry, biology, geography, and math students can print out 3D models of their molecules, topography, demographic or population maps, cells, viruses, or other organs and artifacts. Overall it can help them to solve their problems by making learning and teaching better like -

Creating excitement which results in opening up new possibilities for learning. Complements the curriculum, and increases the interaction between student and teacher. Builds students' confidence by teaching them to accept that failures are part of life. It also gives new opportunities to experiment with ideas and expand and grow their creativity. [3]Feeding students creative skills can be useful for developing a passion for original thinking and later applied in the business aspect[3].

- **In Industry**



The use of 3D printers in the Art & Design industry is dynamic. Filmmakers, game designers, and set designers can use 3D printers for their artworks. 3D printers provide artists to make any aesthetic changes related to production. Commercial artists can make 3D art for film production. It allows the creation of artwork even in hyper-realistic images of specific actors, locations, or props. A cartoonist can create 3D models of characters quite easily. [4] 3D printing offers a quick reliable, and agile solution in this custom design-driven application [4].

- **In Sustainability**

3D printers are environmentally friendly and minimize waste quite easily. It can use plastic waste which results in the management of waste. It is beneficial for the environment because it enhances sustainability as it follows one of the SDG principles i.e. Zero Hunger and Economic Growth. So it helps in the growth and development of the country economically.

There are many artists who work for the sustainability of the environment such as-

Manveer Singh who lives in Delhi, India is a teacher by profession and known as ‘plasticvalla’ and has converted 350 kgs of plastic waste into art. He creates art by collecting plastic waste from his neighbors. He says creating art from plastic waste is the same as using colors by a painter. He is making his contributions by recycling plastic waste. Recently he made a sea turtle, 15 feet, and named it an ‘Olive Ridley sea turtle’ at Odissa, Puri Beach. He wants to create awareness about plastic pollution through this art installation.



Figure no.1: Olive Ridley sea turtle (art installation by Manveer Singh)
Source: https://yourstory.com/2022/01/plasticvalla-artwork-plastic-delhi-pollution?utm_pageloadtype=scroll

Sunil Vyas is a 45 years-old artist, and graphic designer. He lives in Indore, India. He thinks that the only way to reduce plastic pollution is 3R' i.e. Reduce, Reuse, and Recycle. By small small changes, we can make a big change, we all should contribute something as an individual to reduce plastic pollution said Sunil Vyas.



Figure no.2: Some Eye-catching Artefacts by Sunil Vyas
Source:<https://swachhindia.ndtv.com/best-out-of-waste-indore-artist-makes-art-out-of-trash-urges-people-to-reduce-reuse-recycle-rethink-66756/>

Fashion designers are also making awareness through their collection of dresses in fashion shows such as Aneeth Arora, which uses waste materials like fabric or lace the dress as packaging materials.



Figure no.3: Fashion Show by Aneeth Arora (dresses made with packaging materials)
Source:<https://timesofindia.indiatimes.com/city/delhi/repurpose-recycle-how-sustainable-fashion-got-trendy/articleshow/66577197.cms>

Narendra Kumar uses flex hoardings in his dresses recently in Delhi Times Fashion Week.



Figure no.4: Models on ramp walk (dresses made from flex boarding which are used in streets)

Source:<https://timesofindia.indiatimes.com/city/delhi/repurpose-recycle-how-sustainable-fashion-got-trendy/articleshow/66577197.cms>

Literature Review

In past research, it is concluded that 3D printers are beneficial for industrial sector use and it is used by very few people as they are not aware of their benefits. In this research, the uses and benefits of 3D printers or we can say 3D printing in different sectors are described. The literature review shows that 3D printers can increase allover development and growth not only in the industrial sector but also in the education sector and for sustainability. Articles titled ‘5 Benefits of 3D Printing in Education’ and, ‘Development of a small-scale plastic recycling technology and a special filament product for 3D Printing’, are the articles that define the benefits of 3D Printers in reducing plastic waste. They can minimize plastic waste resulting in the reduction of plastic pollution and can be a solution to plastic pollution.

Research Objective

The objective of this research paper is to make aware people of the numerous uses of 3D printers and they can play a very effective role in society by protecting the environment from plastic pollution. Plastic waste can be reduced only through recycling and reuse and 3D printers provide a very efficient service for this. So. 3D printers will be used widely throughout the World, precisely in India.

Research Gap

The research gap in this paper is to discover the role of 3D printers in society, education, and the industrial sector. Also to spread awareness and information about 3D printing. And to

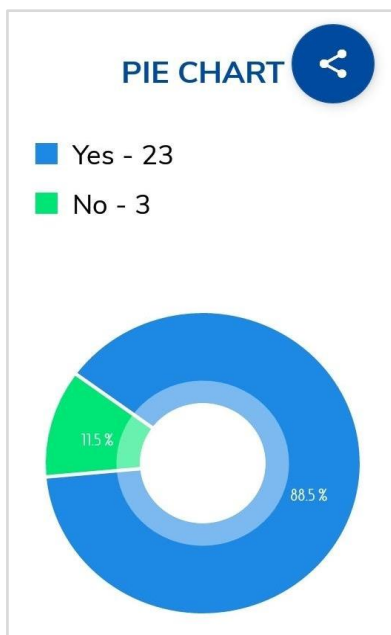
enhance the scope of learning and teaching. It is to describe the revolutionary aspect of 3D printers to be the solution to plastic waste and plastic pollution in the future. It is for the sustainability factor.

This research gap will be verified through observation, data collection, and surveys.

Research Methodology

The research method is through observation, data collection, and surveys. The method that is used is both a qualitative and quantitative approach to research. It is based on previous research papers, surveys, and articles. Firstly data is searched, secondly, it is collected, thirdly it is analyzed then it is concluded which came up with the result. This means the data is collected through these.

A survey is conducted based on the questionnaire form. The respondents actively respond to this survey. It is conducted between some students and teachers. The respondents are 27 people. According to the survey (questionnaire), maximum people want that a solution to pollution i.e use of 3D printers should be given a chance.



The survey (questionnaires) is as follows-

Is 3D Printers Are Changing Art & Design Scenerio?

1. Do you know about 3D Printers?

- Yes
- No

Required

2. What is the role of 3D Printers?

- to do 3D printing
- to create models and objects
- to create components
- all of the above

Required

3. Did 3D printers leave any waste while creating models?

- yes
- no

Required

4. 3D Printers use which elements?

- plastic and paper
- metals and resins
- powder grains and carbon fibers
- all of the above

Required

5. Do you know that 3D printers can play a significant role in the reduction of plastic waste?

- yes
- no

Required

6. Did you know that 3D printers have wide scope in the future?

- yes
- no

Required

7. Which Industries are using 3D printers?

- Automotive and robotics
- aerospace and defense
- education and manufacturing
- all of the above

Required

8. Any suggestions about this topic.

Required

SUBMIT ✓

A research paper, titled 'Development of a small-scale plastic recycling technology and a special filament product for 3D Printing', says that Plastic Pollution has become a real challenge. Recycling is the only solution for plastic waste. Not only household plastic but also industry discharge is increasing. This paper gives the impression of making more solutions to reduce pollution.

The article named 'The Important Role of 3D Printing in Industry 4.0', describes 3D Printers & 3D Printing and the role they play in various industries. Also, the benefits and importance of

them. The article is well written because it describes everything very clearly and hence it is very beneficial & purposeful.

Another article is named 'The Top 5 Benefits of 3D Printing in Education', according to this article 3D printing is beneficial for both students and teachers. It enhances learning and teaching. The benefits of 3D Printing are described in this article.

The newsletter titled Divide by Zero published as '3D Printing Art - The Next Generation of Creativity' tells about the benefits of 3D Printing by Artists. Artists use 3D printers for their artworks, it decreases their problems and gives them a solution instantly.

A Blog named 3D Universe published an article named '5 ways artists use 3D printing'. In this article, Artists are using 3D Printing in their artworks which brought their works to a new level. 3D printers save time and money both. Many professionals like Cartoonists and commercial artists are using 3D printers very commonly.

Conclusion

As we know that to control Plastic Pollution, we have to recycle and reuse plastic waste. This has to be done by common people also, 3D printers are making it easy for them also. Many artists and designers are using 3D printers to create awareness about plastic pollution. So we should also do the same for a pollution-free and sustainable environment. 3D printers increase the speed of manufacturing and take less time to create models and objects. Hence we should give it a thought and make our contributions to it by using 3D printers. Given below is the pie chart which shows the awareness of 3D printers, but we should also prove it by actions.

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Figure Reference

1. Figure 1, Olive Ridley sea turtle (art installation by Manveer Singh), Chahat Jain, yourstory.com
2. Figure 2, Some Eye-catching Artefacts by Sunil Vyas, Barkha Mathur, swachhindia.ndtv.com
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