Innovation in Teaching Learning Process

3D-Printed Models for Teaching

Name of the Innovation : 3D-Printed Models for Teaching

Course Code and Name : 2AEPC213-Air Breathing Propulsion

Class and Semester : SY and Even

Academic Year and Term : 2024-2025

Faculty Name and Designation : Dr.Yuvaraj.S

Introduction:

Airbreathing propulsion (2AEPC213) is a fundamental course for second-year B.Tech Aeronautical Engineering students. The complexity of turbojet and turboprop engines often poses challenges in conveying the intricate workings of their components through traditional lecture-based methods. This report details the implementation of 3D printed engine models as a teaching aid, developed by Dr. Yuvaraj S, to enhance student understanding and engagement in this crucial subject.

Motivation/Purpose of Innovative Technique:

The primary motivation for creating 3D printed models stemmed from the observation that students struggled to visualize and comprehend the internal mechanisms of airbreathing engines through verbal explanations and static diagrams alone. The purpose of this innovative technique was to:

- **Improve Visualization:** Provide tangible, three-dimensional representations of turboprop and turbojet engines, as well as compressor blades.
- **Facilitate Understanding:** Enable students to physically interact with the models, leading to a deeper understanding of component functions and their interrelationships.
- **Increase Engagement:** Foster a more interactive and engaging learning environment, stimulating curiosity and encouraging active participation.
- **Strengthen Knowledge Transfer:** Simplify the transformation of complex concepts into readily understandable knowledge.
- **Encourage Detailed Discussion:** Spur students to ask in-depth questions about engine components.

Procedure Followed:

Model Design and Development: Dr. Yuvaraj S designed and developed 3D models of turboprop engines, turbojet engines, and compressor blades.

3D Printing: The models were fabricated using 3D printing technology, allowing for precise and detailed representations of engine components.

Classroom Implementation: The 3D printed models were integrated into the airbreathing propulsion (2AEPC213) course.

Interactive Learning: Students were encouraged to handle and examine the models during lectures,

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facilitating hands-on learning.

Discussion and Explanation: The models were used as visual aids to explain the functions and interactions of engine components, leading to more detailed and engaging discussions.

Institutional Support: The institution provided sponsorship for the creation of these teaching and learning aids, showcasing support for innovative teaching practices.

Outcome:

The implementation of 3D printed engine models resulted in:

- **Enhanced Student Understanding:** Students demonstrated a significantly improved understanding of airbreathing propulsion concepts.
- **Increased Student Engagement:** The classroom environment became more interactive and engaging, with students actively participating in discussions.
- **Strengthened Knowledge Retention:** Hands-on interaction with the models reinforced learning and improved knowledge retention.
- **Improved Interaction:** The interaction between the student and teacher was improved.
- **Increased Curisosity:** the student desire to know more detail about the engine components was increased.
- **Positive Feedback:** Students provided positive feedback on the effectiveness of the 3D printed models as a learning tool.

References:

Educational Technology in Engineering Education.

Active Learning Strategies in STEM.

Application of 3D Printing in Educational Settings.

Personal observation and student feedback collected by Dr. Yuvaraj S.