

# SOCIALIZATION OF DRAWING TECHNIQUE WITH INVENTOR SOFTWARE FOR HIGH SCHOOL STUDENT

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## Abstract

In today's digitalization era, the sensitivity of using design and illustration software is a demand in improving the competencies possessed by students at the high school level. This ability will support students' interests and talents by adjusting the Project Based Learning Program owned by SMAM 1 Gresik, namely the L800 Motorcycle Modification Automotive Project. By introducing and training students using the design and illustration software used, namely Autodesk Inventor: Student Version, This training activity aims to (1) Students are able to use the Autodesk Inventor Application in 2D and 3D schemes, (2) Students are able to gain an understanding of motor engineering components and motor engineering drawings, (3) help teach teachers who teach subjects in the field of applied science. The methods used in this community service are teaching, demonstration and practice methods. The result of this community service is to improve the ability of the participants in terms of designing and modifying the practice of observing L800 motorcycle components and students more easily understand the shape of an Engineering component through Technical Drawings effectively and efficiently due to virtual 3D modeling in the Autodesk Inventor application.

**Keywords:** Socialization; Inventor; Competencies; Senior High School Student

## 1. Introduction

Autodesk Inventor is a graphic processing software that is commonly used in the field of engineering both 2D and 3D. Autodesk Inventor training contains basic materials related to drawing 2D techniques with 3 cross-sections of sides and drawing 3D from sample drawings (Hidayat et al., 2020). This training began with a question and answer session about technical drawings and the use of Autodesk Inventor software to find out the students' initial understanding of related material. Furthermore, the speaker explained the material on the use of the Autodesk Inventor program and drawing techniques (Alviani Hesthi Permata et al., 2021; Ariyansah & Gamayel, 2021; Ningtyas et al., 2021).

SMA Muhammadiyah 1 Gresik has general competencies that still need to require special additional skills to support their passion, one of which is automotive. In addition, this is linear with the mechanical engineering study program at the University of Muhammadiyah Gresik. To support students' ability to use software in the field of engineering (Mustakim et al., 2020; Pahlawan et al., 2021; Toteles, Aris; Alhaffis, 2021)

Based on the description of the problems faced by partners, namely SMA Muhammadiyah 1 Gresik, our team from the University of Muhammadiyah Gresik will share knowledge by holding training on the use of the Autodesk Inventor program to class X students who follow the Automotive passion

## 2. Method

The implementation method used to deliver the material to students of Muhammadiyah 1 Gresik High School begins with the introduction of the parts in the vehicle, especially motorcycles, where students are invited to look directly at the field the actual shape of the parts contained in the motorcycle. Then the activity continued with the provision of material in the classroom about inventor software, in this activity students were given an understanding of how the use of inventor software in drawing a part of a motorcycle vehicle. At the last stage, practice is carried out using inventor software in accordance with the parts of the vehicle that have been seen at the time of identification of the parts on the vehicle.

### 3. Findings and Discussion

Socialization activities about software inventors consist of 3 stages, the first is the observation of the inside of the motorcycle. The second, material about software inventors and finally the practice of operating software inventors.

Observation of motorcycle parts.



Figure 1. Observation and Planning of L800 Motorcycle Modifications

In the observation activity of the vehicle, students are invited to see firsthand how the circuit in a motorcycle vehicle, where the spark plugs are located and their shape, gears and open the components on the front tire of the motorcycle. the students were very enthusiastic as seen from each student holding the key and trying to open the components on the vehicle.

#### Providing material on software inventors.

In the activity of providing material about inventor software, it is given in the classroom, where students are given an explanation of the tools contained in the inventor software, such as 2D Sketch (Line, Curve, Constraint, Extend, and Trim) and 3D Model (Extrude, Revolve, Hole and Fillet). In 2D sketch, students are trained to be able to draw sketches by paying attention to constraints and dimensions so that when there is a change in shape, it can be easily modified both in size and shape. While in the 3D model, the students are trained to be able to change the shape of the sketch into a virtual 3D form in the application by utilizing 3D features and with a definite dimension size.

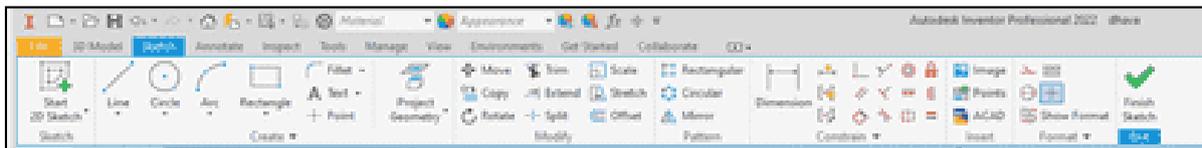


Figure 2. Tool Sketch Menu in The Inventor Application

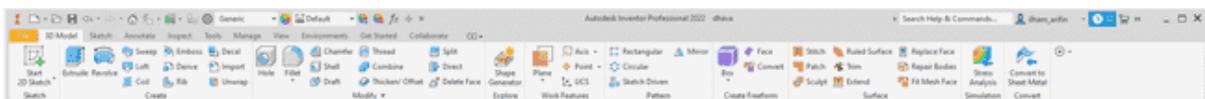


Figure 3. 3D Model Menu Tool in Inventor Application

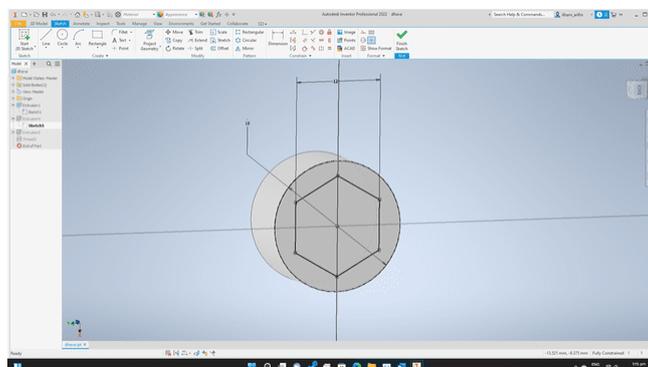


Figure 4. Results of training on 2D sketch schemes

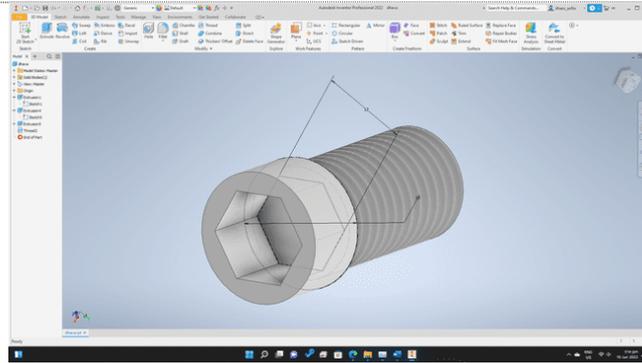


Figure 5. Results of training on 3D model schemes

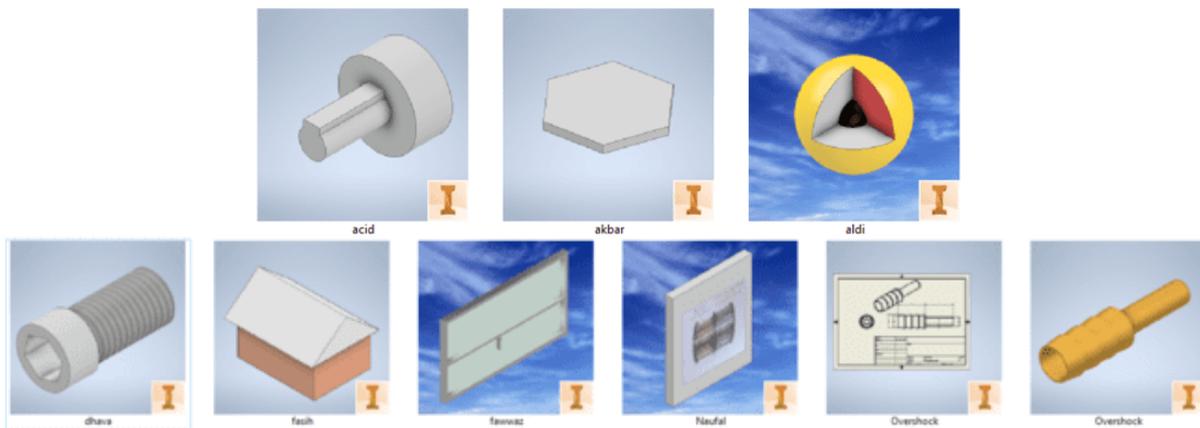


Figure 6. Some results of training 3D model shapes using Inventor in SMAM 1 Gresik



Figure 7. Provision of material for the operation of inventor software.

**Practice of using software inventor:**

In this practical activity, fellow students tried to operate the inventor software by drawing automotive components that had been observed earlier.



Figure 8. Practice and assistance in operating software inventors.  
From this activity students gain experience on how to operate inventor software.

#### 4. Conclusion

From the results of community service on technical drawing training using the Autodesk Inventor program at SMAM 1 Gresik, it can be concluded as follows:

1. Computer Aided Design training using the Autodesk Inventor application is able to improve the ability of students in terms of designing and modifying in the practice of observing L800 motorcycle components.
2. Students more easily understand the shape of an Engineering component through Technical Drawing effectively and efficiently due to virtual 3D modeling in the Autodesk Inventor application.

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