# Management Information System for Materials and Tools At Automotive Educational Workshop

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**Abstract.** Educational facilities and infrastructure have important roles for facilitating students to achieve their learning objectives. Hence, this study aims to identify, analyze, and design information systems for equipment and materials management at Automotive Engineering Education work shop Faculty of Engineering, Universitas Negeri Yogyakarta. The method used in this study is qualitative by conducting interviews with lecturers, technicians, and students regarding the implementation and needs of management information systems for the management of tools and materials in the workshop of Automotive Engineering Education of UNY. The results obtained then become materials for designing an information system for tools and materials management at Automotive engineering department. The information system will be developed and implemented for the teaching-learning activities improvement at Automotive Engineering Education department.

## 1. Introduction

Universitas Negeri Yogyakarta (UNY) is one of the universities in Indonesia that has a vision to provide a creative, innovative, and high quality educational services based on faith in God, dedication, and independences (UNY, 2019). To achieve this vision, each department at UNY must be able to demonstrate the achievement of ten national standards of higher education including standards of graduate competency, content, learning processes, assessment and evaluation, lecturers and school administration staff, learning facilities and infrastructure, school management, financing, research, and community development. Based on the research conducted by Arifin and Solikin (2018), Automotive Engineering Education departments have met the standards of educational facilities and infrastructure as stated in Permendikbud No. 49 of 2014. However, this achievement still needs to be improved in the form of management of educational facilities and better infrastructure.

Management of educational facilities and infrastructure includes all activities to plan, procure, distribute, use, maintain, and eliminate tools and materials needed in learning activities (Indrawan, 2015; Mulyasa, 2004; Musa, 2012). Pangestika (2018) revealed that information system-based management positively improve the effectiveness and efficiency of management because it able to provide real-time data online. Furthermore, Irmawati and Indrihapsari (2014) developed an archival information system to improve the quality of services in the Electronics Engineering Education Department of UNY. Their study revealed that the manager and administrative staff can update the data (edit, delete, and search) faster. Hence, the use of information system-based management tools and materials management is expected to increase the effectiveness and efficiency of procurement, use, and maintenance of tools and materials in the Automotive Engineering Education department of Universitas Negeri Yogyakarta.

Therefore, this study aims to describe management of tools and materials, analyze information system requirements needed for management of tools and materials, and design management information systems for tools and materials at Automotive Engineering Education department of UNY.

## 2. Research Method

This research conducted at the workshop of the Automotive Engineering Education department of UNY. Data collection techniques were conducted using structured interviews to determine the needs of lecturers, technicians, and students about information systems management tools and materials. There were four lecturers, four technicians, and five students participated in this study. A further Focus Group Discussion was conducted to get feedback from the lecturers and technicians about the design of the management information system. Furthermore, a components of data analysis performed to analyze the qualitative data. Data process analysis including data collection, data reduction, data display, and data conclusions. Furthermore, a descriptive analysis will be performed to describe the management information system which are developed.

## 3. Results and Discussion

### *3.1. Need analysis of the management of tools and materials at the educational workshop*

There were four workhsops at Automotive engineering education department including engine and electrical, chasis and power trains, body and painting, and motor cycle workshop. Each workshop unit is managed by a workshop coordinator and a technician. The process of managing inventory including the submission, receipt, storage, maintenance, and elimination in each workshop unit is the responsibility of the workshop coordinator, technician, and coordination with department managers (Head of department, Department Secretary, and Chair of the Program studies).

For the process of submitting inventory and inventory items, there are several obstacles faced. First, the process of submitting inventory and inventory is carried out after the Faculty has information about the procurement of tools / materials. This causes the process in the automotive department seems rather sudden. Second, the existing budget is only sufficient to meet the needs of practical services and insufficient to plan new facilities in accordance with the current technology demand. Third, technicians find it difficult when the inspection is being carried out to show the inventory that they want to check because they do not have an information system that makes it easy for them to show the number of tools or materials, year of procurement, circulation of equipment/material, and where the current locations.

The procedure for students to borrow equipment for class activities based on the course schedule. However, there are some lecturers and students who use the equipment for out off class activities. For practical reason, they only need to ask the technician to provide the equipment without leaving any identity card as a guarantee. Hence, it happens that some equipments are missing or overall data cannot be shown immediately when needed.

The next crucial process of material and tools management is the elimination. Generally, there are two categories to differentiate the inventory management, material and equipment. The important thing on material management is there should be a record when it is received and be used. The management team needs to pay more attention on equipment management, because it shoud be can be use for several times and has a life time factor (Susanto & Sudira, 2016). Hence, the equipment record have to provide this data. The process of elimination of inventory equipment at the department level is quite simple because it only needs to hand over the items to be eliminated to the task force at the faculty level. However, there are some difficulties when the inventory data both at department and faculty level are quite difficult to access, making the eleimination process often constrained longer.

In addition, there are several items which cannot included as material or equipment types, such as learning media. Sources of learning media procurement can be from university budgets or from student/donation. Learning media cannot be managed the same as material because it can be used repeatedly. However, if it is included as an equipment, the procedure to eliminate it wasting more effort and energy compared to its value. Therefore, new categories management is needed to accommodate learning media in the material and tools management system.

After the initial data analysed, a further Focus Group Discussion (FGD) is conducted. The participants including task force form faculty level, lecturers, technicians, and student. Several inputs were obtained for improving the material and tools management system at automotive engineering department. Suggestions from the task force such as the team at department level needs to renew the data and they have to clearly differentiate between material, equipment, and learning media. The recommendation from workshop coordinators, technicians, and students including management of material and equipment should be integrated for all workshops (Motorcycle, engine and electrical, chassis and power trains, body and painting), an information system is needed for the management, an

active participation from students and technicians is needed because all the technician will be focused on maintainance job.

### *3.2. Need analysis of the information system needed to optimize the management of tools and materials at automotive engineering department.*

Based on the data collected through interview and focus group discussion, there are some factors influencing the information system design such as internal inspection is carried out on material and equipment's procurement in the current year. Therefore the information system must be able to show the time of receipt of goods to the manager at the department level. Receipts of material and tools delivered to each workshop has been made by the manager at the faculty level. Consequently, the information system created must be able to show acceptance data from managers at the faculty level. Proof of release of material and tools at each workshop needs to be made by the workshop coordinator or technicians. Hence, the information system created must be able to provide evidence of the release of goods for practical purposes at any given time. If management is carried out in turns by involving technicians and students, the information system created must be able to be used by many people effectively and efficiently, and can guarantee the accuracy of the data even though different users.

### *3.3. Designing information system management design for tools and materials management at automotive engineering department*

Based on the analysis aforementioned above, a design of the management information system of material and equipment is proposed.

#### *3.3.1. System Flow*

System Flow is a flow that is used to show the system that will be applied to manage the material and equipment management system at automotive engineering department. The system flow is made based on the process of workshop activities such as registration of student cards on management information system, registration of material and toolds, circulation, and elimination.

*3.3.2. Data Flow Diagram* (DFD)

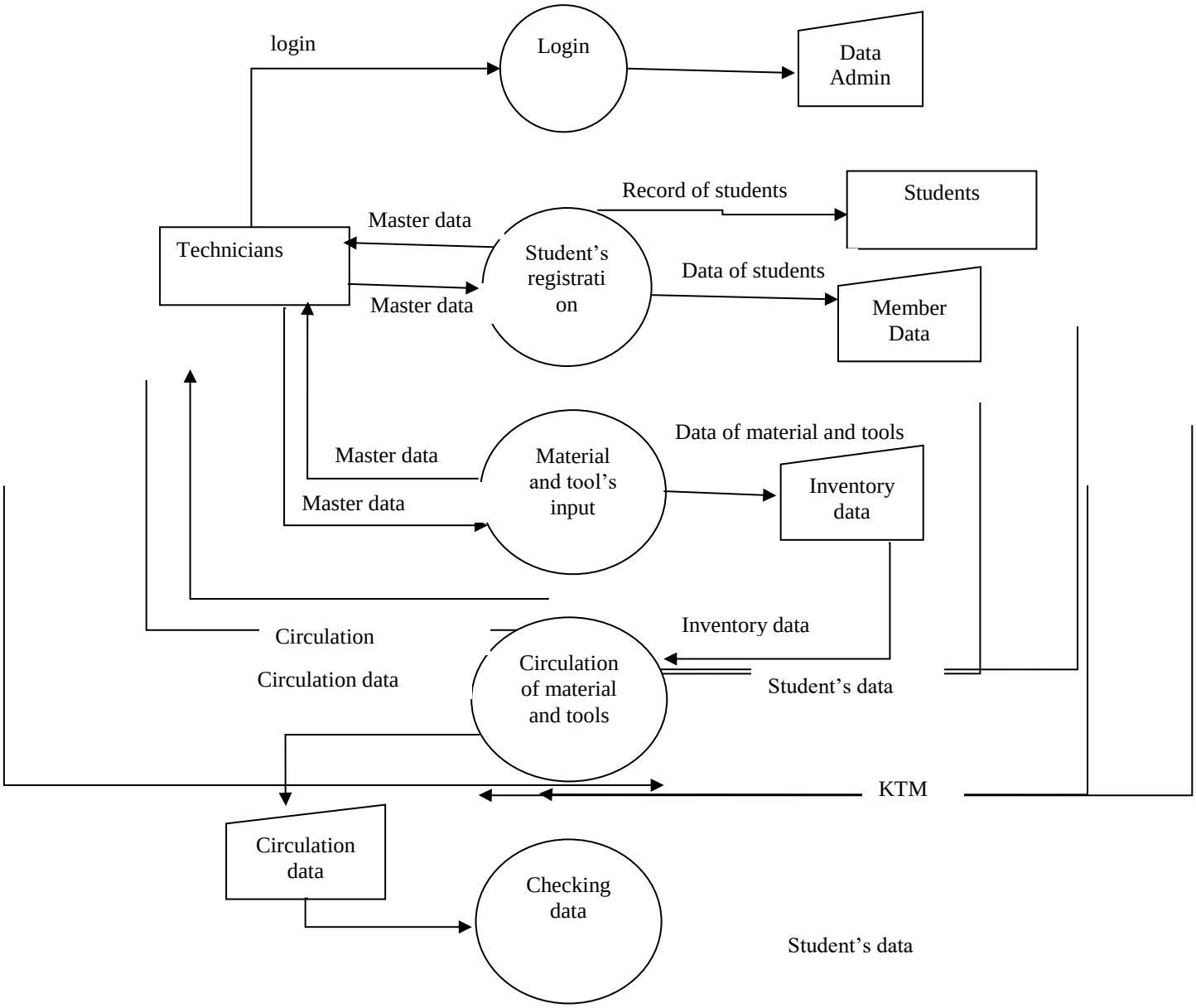


**Figure 1.** Data flow diagram of Management Information System at Automotive engineering workshop.

The data flow diagram reveals the process needed in the management information system. The process is starting from student's registration and input inventory data. The next process is to manage the circulation of material and equipment during the learning activities in the workshop. The last one, the information system is able to provide the real time data of material and equipment available at automotive engineering workshop. The management information system is designed to provide real time measured data, supporting stake holder to make an important decision related to the teaching-learning processes and its improvement (Hutahaean, 2015; Sihotang, 2018; Sutabri, 2012). It also help the workshop's coordinator to manage all material and equipment (Awaludin & Eki Saputra, 2016; Bafadal, 2004)

## 4. Conclusion

The management information system of material and equipment at automotive engineering workshop should be able to provide data of material, equipment, and learning media. It also needs to provide the real time data on the number of inventory, circulation process, and identify student or lecturer who use the equipment or learning media. The management information system proposed in this study will be developed and implemented to measure its effectiveness and impact of its implementation at automotive engineering workshop.

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