



# Making Learning Media for HOTS-Based Transmission Course

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**Abstract.** The learning strategy Project based Learning is one part of the Higher Order Thinking Skill (HOTS). Both Project based Learning and Higher Order Thinking Skills (HOTS) have a goal in developing ways of thinking, analyzing, and creating something creative. This stage is expected to exist at the student level development. The database used as a reference is taken from studies that identify the application of Project based Learning in several examples of activities. The journals reviewed relate to the vocational education environment and the purpose of its application to support the knowledge and skills of students or students. In addition, the choice of learning strategy is also based on the vocational education system for Automotive Technology Vocational Education Department, Universitas PGRI Yogyakarta. Students are expected to be able to identify and investigate in depth the needs of Transmission learning media as a group project. Lecturers stimulate by giving important questions related to real analysis for the manufacture of learning media. Questions asked by lecturers must also be open, provoking, and triggering for students to apply Higher Order Thinking Skills (HOTS). The research used is a literature study with analysis of various cases regarding learning strategies and their application. At the end of the research, students can create and create a learning media product in the transmission course.

**Keywords:** Project based Learning · Higher Order Thinking Skill (HOTS) · Literatur Study · Transmission Course

## 1 Background

Learning to students must be distinguished from other levels. This understanding is not only limited to understanding what material is given, but also related to learning methods and objectives. The understanding given from lecturers to students reflects aspects of effective and sustainable learning [1].

Education for students who are given Technology Vocational Education Department, Universitas PGRI Yogyakarta applies a system of vocational education. Education is carried out to hone students' skills in the field of practice, especially automotive. Skills that are honed need to be carried out using an appropriate learning model and have the same purpose. So that the application of the learning model uses Project based Learning [2].

Project based learning [3] focuses on the independence of students so that they are expected to play an active role in investigating constructively, being able to set goals, collaborating with colleagues, establishing communication, and drawing out practices that will be implemented in the world of work later [4]. Understanding to get closer to the world of work makes it easier for students to adjust to the dynamics of the task and solve problems that arise.

The need for understanding learning must also be seen from the student's perspective. Learning needs Project based learning [5] that is applied requires analysis, reasoning, and creative power that comes from students with reference guides from lecturers. The learning model is also expected to hone the imagination and strengthen students' understanding so that problem solving [6] or the emergence of ideas can be initiated. The approach taken needs to use Higher Order Thinking Skills (HOTS) [7].

Higher Order Thinking Skills (HOTS) [8] stimulate students to think broadly in an effort to find new challenges as well as new understanding. The demand in [9] High Orders Thinking Skills (HOTS) is that students can process all information and knowledge previously obtained to be used as guidelines in constructing it into analysis in a problem. In addition, creativity also appears to apply the information and knowledge in the form of useful ideas.

In Bloom's Taxonomy, Higher Order Thinking Skills (HOTS) [10] are mapped at the very end level. This relates to the level of how to analyze, how to evaluate, and how to create. Students are equipped with skills to transfer their knowledge in a tangible form. This is the expected goal in Bloom's Taxonomy. This thinking ability is related to the way they develop knowledge and skills during learning.

The learning model applied is project-based [11] to be analyzed, evaluated, and created by students themselves. With a specific project in the form of making learning media in the Transmission course. Learning media is literally something that is used by the source to provide an explanation to the recipient. [12] Or in another sense is a tool to provide a clear picture of information from the presenter to the subject. Of course, with the approach that is explained in the form of knowledge in the practice of Transmission courses. Institutionally, the availability of learning media in the Transmission course will make it easier for learning in the years to come.

As a form of responsibility for the implementation of learning by the Automotive Technology Vocational Education, Universitas PGRI Yogyakarta, students are given a project in the form of making learning media in the Transmission course. The implementation uses a project-based learning model that is combined so that students can apply how to analyze and solve problems. And in implementing the learning model, the Higher Order Thinking Skills (HOTS) [13] approach is used so that students can analyze, evaluate, and create something new according to the level division in Bloom's Taxonomy.

## 2 Material and Method

The identification uses exploratory and review techniques in detail in the field of literature research studies. Collecting qualitative and quantitative data regarding Project based Learning [14], Higher Order Thinking Skills (HOTS) [15], and Transmission

Learning Media. In addition, the development of past cases in the manufacture of these learning media and future projections in dealing with technological developments in the automotive sector, especially for the Transmission course, is also collected [16].

[17] The database used as a reference is taken from studies that identify the application of Project based Learning in several examples of activities. The journals reviewed relate to the vocational education environment and the purpose of its application to support the knowledge and skills of students or students. The journals searched for and analyzed also came from the concept of Higher Order Thinking Skills [18] which was created and applied to cases in the field of Education. Therefore, integrative and intensive literature collection is combined to make application to the manufacture of learning media in the Transmission course.

The references taken are based on research needs and will be applied in making the learning media. So that the framework that was conceptualized at the beginning did not deviate from the main objective of this research, namely to give autonomy to students in being creative in making learning media. Of course, with the right thinking structure and designed to support each other, namely the ability to analyze needs and problems and evaluate during the manufacturing or production process.

Higher Order Thinking Skill (HOTS) is applied in several learning patterns that are often specified in qualifying certain situations.

## 2.1 Specific Learning Strategies

Learning using Higher Order Thinking Skills (HOTS) [19] is carried out with specific learning strategies. This means that the application is very specific and cannot be applied to just any audience. These considerations are based on the age group and the type of education applied. This is guided by Bloom's Taxonomy at the levels as expected for Higher Order Thinking Skills (HOTS).

## 2.2 Determinants of a Person's Intelligence

Along with the times, the development of the view of education has also changed towards a broader and independent direction. There is a view that sees a person's intelligence is no longer the absolute main factor. This intelligence is something that can be built through various factors such as the learning environment, awareness in learning, and strategies applied in learning. So that the view of intelligence becomes something that can change according to the right situation and there are fluctuations.

## 2.3 Multidimensional and Interactive View

The direction of people's views has also experienced a significant change in something. One object that is displayed can be translated into various views. This triggers a multidimensional view. So that leaves a unidimensional view, too linear, and leaves a view based on a hierarchy. Collaboration and interaction are increasingly making the view for Higher Order Thinking Skills (HOTS) [20] more interactive among the community, especially in the field of Education and its application.

## 2.4 Reasoning and Analytical Ability

The ability to memorize, read, and write is the initial specification in human growth. Of course this is also applied in the field of Education. Specific Higher Order Thinking Skill (HOTS) [21] is the ability to analyze, the ability to think critically, can apply creativity to problem solving.

The need for learning media is something important in the vocational learning system. This is based on the division of learning time which is dominated by practice and places more emphasis on student skills [22]. With the Project based Learning project combined with Higher Order Thinking Skills (HOTS), the need for learning media, especially for Transmission courses and increasing students' thinking levels can proceed gradually. Technology Vocational Education Department, Universitas PGRI Yogyakarta, received additional transmission practice tools from the creation of a combination of lecturers and students. Lecturers implement and guide the implementation of Project based Learning and Higher Order Thinking Skills (HOTS) [23]. Of course, these aspects have been studied that will be applied to students which are realized in the form of a worksheet. Students' creative power can be channeled and sharpened until learning media can be used. The analysis and execution in the project are wrapped in practical learning activities into a direct application of the principles of vocational learning [24].

There is a process of applying the Higher Order Thinking Skill (HOTS) [25] step in the making of this learning media. These steps are based on the division in Bloom's Taxonomy, the purpose of applying it to the needs of students' knowledge and skills, as well as technical making.

## 2.5 Analyzing

Students who work in groups will get a Jobsheet given by the lecturer. In it, students are divided into several stages prior to practical work. They are making real designs and designs to be applied in transmission engines and mapping requirements during manufacturing practice. The expected design is based on the suitability of function and practicality in use. The need mapping is made in the form of a Expenditure Budget Plan for the needs of materials and practical tools needed. The purchase of a transmission engine is also included in the Expenditure Budget Plan [26].

## 2.6 Evaluating

Skills that are also formed in the application of Higher Order Thinking Skills (HOTS) for students are accuracy in evaluating their work. Skills that are already divided into levels based on Bloom's Taxonomy. The evaluation work consists of the process of working on the Transmission learning media, looking for errors in its concept and practice, and seeing shortcomings when entering the final stage (finishing) [27]. A good analysis from students can minimize deficiencies in the design and use of these learning media. So that when it enters the trial use process, the transmission learning media can operate smoothly [28].

## 2.7 Creating

Creating something is also included in the Bloom's Taxonomy qualification in the application of Higher Order Thinking Skills (HOTS). The transmission learning media that has been completed in the production process is then added with additional operations. This addition aims to prevent damage and be a guide for the maintenance of learning media. Its use, which will be managed by the Institute, of course, is not only for one batch of students, but can be applied to younger students or other lecturers [29].

## 3 Result and Discussion

Project based learning is used to stimulate students to think independently and aims to construct learning on real project products. The focus of honed skills is related to skills in constructing information, finding comfort in analyzing, and increasing interest in independent learning [30]. So that students can freely determine the project to be carried out until what questions will be answered, what must be prepared, and determine the desired work steps.

A lecturer is expected to be a facilitator, guide in determining work materials, and provide work experience processes [31]. In addition, in the discussion process, the role of the lecturer can encourage healthy, scheduled, and directed discussions to stay on the main goal. Problem solving or project creation is very dependent on lecturer management in supervising and controlling students.

Stages of Project based Learning in the project of making learning media Transmission adheres to:

### 3.1 Important Questions for Beginning

Students are expected to be able to identify and investigate in depth the needs of Transmission learning media as a group project. Lecturers stimulate by giving important questions related to real analysis for the manufacture of learning media. Questions asked by lecturers must also be open, provoking, and triggering for students to apply Higher Order Thinking Skills (HOTS) [32].

### 3.2 Project Planning

Project ownership by students must also be invested and considered as an aspect for the clarity of making this Transmission learning media. Discussions conducted by lecturers and students related to the agreement on their respective roles and were stated at the beginning, parsing and analyzing from the lecturer's questions for project needs, as well as integrating everything into one material, namely the materials needed for guidelines, tools to be used, and materials for making them [33].

### 3.3 Make a Work Schedule

Scheduling is carried out by lecturers and lecturers through a collaborative process. The discussion is in the form of work schedules and the use of Technology Vocational Education Department workshops, Universitas PGRI Yogyakarta, duration of work on Transmission learning media, guidance and supervision schedules, schedules for evaluation before the final process (finishing).

### 3.4 Supervise Students

Scheduling that has been carried out must also be ensured to run in an orderly manner. Lecturers are expected to be responsible for being mentors and supervising student performance in each process. For this stage of supervision, it is necessary to provide a monitoring file containing a schedule of activities carried out along with a rubric to record what has been done and what will be done.

### 3.5 Result Assessment

Competency standards prepared by lecturers through Learning Planning are applied in measuring students for this learning media project. In addition, the assessment carried out is used to evaluate student errors and progress, as well as a feedback medium in measuring the level of student understanding. This assessment is also used by lecturers in evaluating learning strategies for the future.

### 3.6 Evaluating and Providing Advice

Discussions conducted by lecturers and students at the end of the activity provided a reflection on the project steps that have been carried out. The discussion process involves an individual evaluation of the understanding of this learning media project or in groups in the form of teamwork [34].

## 4 Conclusion

Learning strategy Project based Learning is one part of Higher Order Thinking Skills (HOTS). Both Project based Learning and Higher Order Thinking Skills (HOTS) have a goal in developing ways of thinking, analyzing, and creating something creative. This stage is expected to exist at the student level development. In addition, the choice of learning strategy is also based on Rthe vocational education system for Automotive Technology Vocational Education Department, Universitas PGRI Yogyakarta..

The making of transmission learning media is done to give students the flexibility in working on and making learning media. This basis is obtained by implementing Project based Learning that was prepared at the beginning. Its effectiveness is monitored and controlled by the lecturer as a mentor and the party who will evaluate and assess.

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