# DISCOVERY LEARNING-BASED MODULE OF OFFICE TECHNOLOGY FOR STUDENTS MAJORING OFFICE AUTOMATION AND MANAGEMENT

Yuli Agustina
Agung Winarno
Ayu Diyah Ramadani

## ABSTRACT

*The implementation of the 2013 Curriculum in Indonesia provides broad opportunities for students to explore learning material independently with their own understanding. However, this encountered an obstacle, namely the lack of learning resources in schools, namely discovery-learning based learning modules. This study aims to develop and determine the feasibility of Discovery Learning-based Module for Office Technology as well as examining the differences in student learning outcomes by comparing the learning outcomes of students in the experimental class and the control class. The product produced in this research and development is a Discovery Learning-based Module for Office Technology. This research and development used the Research and Development model developed by Borg and Gall which consists of ten steps, namely: a) initial study; b) planning; c) development; d) preliminary field testing; e) main product revision; f) main field testing; g) operational product revision; h) operational field testing; i) final product revision; j) dissemination and implementation. The results of this research and development indicate that the module is feasible based on the feasibility assessment by module experts, lesson content experts and the assessments by small groups trial. The module can also improve student learning outcomes, it was seen from the posttest score of the experimental class that was higher than the control class. Students can actively and independently carry out structured learning through modules that have been developed, because the modules are equipped with learning instructions so that they have adequate knowledge and competence in their fields, namely office automation and governance.*

Key words: Discovery Learning, Office Technology, Automation and Office Management Module

## INTRODUCTION

From time to time, education continues to evolve. This trend can be seen in Indonesia's constantly evolving education system. In order to address the community's needs to increase the quality of graduates from educational institutions (Malik, 2018), which is calculated by learning outcomes, the education system, which is widely referred to as the curriculum, must continue to develop (Serdyukov, 2017). In line with the needs of society and the development of the curriculum, the standard of learning outcomes also continues to develop from time to time. Learning outcomes which consist of assessment instruments also continue to change or even increase dynamically (Aji & Winarno, 2016; Subagia & Wiratma, 2016) according to the needs of the subjects. Even so, learning outcomes are still measured by giving exact numbers or perhaps letters, which are basically coding or grouping certain ranges of numbers (Meiers, 2007).

Assessment instruments that continue to develop or change due to curriculum changes result in the unpreparedness of several educational institutions and students for these changes. Some educational institutions will find it difficult to provide relevant instructional materials for the large number of students. This causes students to lack instructional materials, accordingly teaching and learning activities become obstructed, not optimal and inconducive.

Currently, the 2013 Revised Curriculum that is enforced in Indonesia consists of a criteria in the form of providing opportunities for students to continue to develop abilities in the aspects of attitudes, knowledge, and soft skills that are important within social life, as a nation and as a state, and to contribute to the welfare of human life (Setiadi, 2016). The 2013 curriculum employs a scientific approach by organizing learning experiences in a logical sequence, specifically observing, asking, gathering information, reasoning, and communicating (Fernandes, 2019). Meanwhile, according to Nugraha & Suherdi (2017), the scientific approach consists of asking, observing, reasoning, experimenting or trying, and network developing. The 2013 curriculum also suggests the concept of independent learning. It further means that students do not only focus the acquisition of knowledge on the teacher. Moore (2014) said that in independent learning, students obtain great responsibility for the learning process. Self-learning requires students to complete a task or problem through analysis, synthesis and evaluation of a topic in a subject profoundly. Not to mention, it is sometimes also through a combination of knowledge with the knowledge obtained from other subjects (Darling-Hammond, Flook, Cook-Harvey, Barron, & Osher, 2019; Moore, 2014).

Independent learning which is identical to the 2013 Revised Curriculum provides broad opportunities for students to explore lesson content with their own understanding. However, this approach can be difficult for students to understand the existing subject matter for themselves, therefore instructional materials are required that can contribute and promote their independent learning process, that is modules (Handayani, 2018; Swandhana, Churiyah, & Juariyah, 2016). Modules are one of the instructional materials that are able to encourage students to learn actively and independently because they are equipped with learning instructions (Depdiknas, 2003). Modules are an instructional materials in written or printed form that are arranged systematically, consisting of lesson contents, methods, learning objectives, based on basic competencies or indicators of competency achievement, instructions for self-learning activities (self-instruction), and providing opportunities for students to test themselves through the exercises presented in the module (Hamdani, 2011).

Based on the results of observations and interviews with teachers that the researchers conducted at Vocational High School Muhammadiyah 3 Singosari, it was found that the number of literature and printed books used by students based on the 2013 Revised Curriculum, particularly in Office Technology subjects, was very limited. Teachers and students use the internet and student worksheets a lot in their teaching and learning activities, this is because the number of textbooks for Office Technology subjects is inadequate and even that is not the latest revision, even though Office Technology is a productive subject which means it is dynamic and developed rapidly. This certainly makes it difficult for teachers to teach in class if the instructional materials are not too relevant. In addition, the teachers only use a conventional textbook consisting of theoretical explanation while teaching in the classroom. However, the use of conventional textbooks in the classroom does not encourage students' learning motivation since they are too bored to read the textbooks while studying (Rodriguez-Morales et al., 2020). Therefore, it requires an attractive instructional material to encourage students' learning motivation and avoid their boredom while studying (Fatimah & Santiana, 2017).

Based on this explanation, the researcher intends to develop a module in the Office Technology subject which is based on a discovery learning model. A discovery learning model is a model for implementing the presentation of learning that is not given directly to students, but they must conclude it themselves from the information provided (Kistner, Vollmeyer, Burns, & Kortenkamp, 2016). This is in line with the argument of Dewey (2004) which states that the discovery learning model is defined as a learning model that comprises a process of learning which does not explicitly explain a concept or theory to the students. However, it enforces students to construct their concept understanding by organizing what they acquired during the learning process. This research and development aims at developing a module for Office Technology subject based on discovery learning. This research also aims at examining the module feasibility by performing media validation to a media expert, lesson content expert, and small field trial. Not to mention, this research also intends to compare students' learning outcomes from experimental class and control class.

**METHOD**

This research and development employed a model of Research and Development suggested by Borg and Gall which consisted of ten stages (Borg & Gall, 1983). This method is usually used to research and develop learning instruments (Maghfiroh & Mulyani, 2019; Marzuki, Ramli, & Sugiyarto, 2017; Perwitasari & Djukri, 2018; Restika, Wibowo, & Linuwih, 2019). The following is a chart of this research and development flow.

**Figure 1. Research Development Process by Borg & Gall**
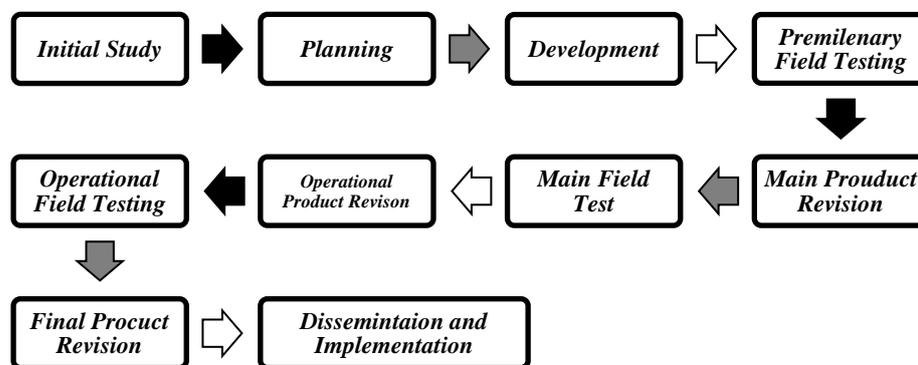


Based on Figure 1, it can be seen that this research and development starts from (1) the stage of initial study. The stage of initial study was carried out to analyze the needs in the field and it was followed by studying the relevant theories and literature which were related to discovery learning model as well as the subject course intended in this research that is Office Technology. (2) The second stage was a planning. The stage of planning allowed the researchers to design and plan the required elements and instrument to develop the learning model. (3) The third stage was a development. In this stage, the researcher carried out an initial development of the module. (4) The stage of preliminary field testing was carried out to obtain a suggestion and critic from the experts on the developed instructional media. (5) The stage of revision was carried out during the main product revision and this stage was repeatedly carried out to obtain the finest and ideal module. (6) In the main field testing stage, the product was examined in terms of its feasibility and it was validated by lesson content and media experts. (7) During operational product revision stage, it revised the developed product based on the results obtained from the sixth stage, based on the suggestions from the experts. (8) After working on the revision, the next stage was operational field testing. This stage allowed the researchers to test the product feasibility to the students in control class. (9) If during the operational field testing stage students provided suggestions, then the product was continued to the final product revision stage. The result of this stage was tested to both experimental and control classes. (10) The next stage was dissemination and implementation. This stage allowed the researchers to use the product in the classroom, both experimental and control classes, to compare students' learning outcomes.

The subject of this research and development was a lecturer of Office Administration Education study program Universitas Negeri Malang as the module expert, the subject teacher teaching Office Technology at Vocational High School Muhammadiyah 3 Singosari as the content expert, six students from control class (X OTKP 2) as small group field trial subject, 27 students of X grade of Automation and Office Management (OTKP) 1 Class as the experimental class, 27 students of X grade of Automation and Office Management (OTKP) 2 Class as the control class. The data collection process was carried out by distributing research questionnaires to research subjects, the data obtained were in the form of qualitative and quantitative data. The sampling method was carried out based on the findings that class X OTKP 1 as the experimental class had lower learning outcomes than class X OTKP 2 as the control class. In addition, the control class is considered to have more initiative in exploring learning material than the experimental class.

## RESULTS AND DISCUSSION

The purpose of this research and development is to design and develop a vocational high school student's module for Office Technology subject based on Discovery Learning in Vocational High School Muhammadiyah 3 Singosari, East Java, Indonesia. This research also aims at examining the feasibility of module which was validated by the media expert, content expert, and was examined through small group field trial. Extensively, this research intends to compare students' learning outcomes from the experimental and control classes.

**1.      Discovery Learning-Based Module for Office Technology Subject**

The product of this research and development was a printed instructional media in the form of Module based on Discovery Learning for Office Technology subject vocational high school. This modul intends to improve the learning outcomes of students and promotes student's independence learning. This research and development designed two versions of module: Teacher's Module and Student's Module. The following figure presents the design of the developed modules.

**Figure 2. Teacher's Module Presentation**

**Figure 3. Student's Module Presentation**
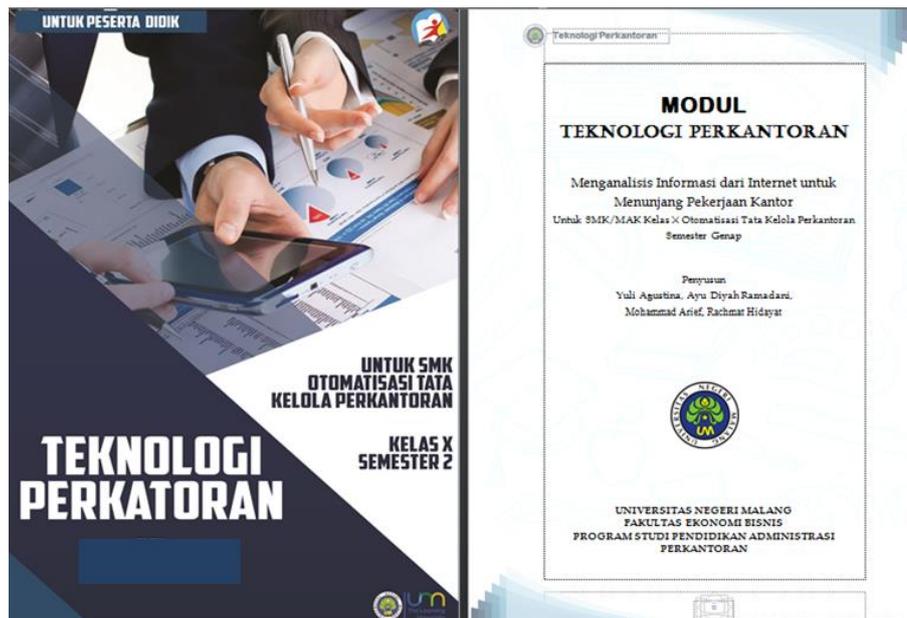


The components within the developed module are: (a) front cover; (b) cover; (c) preface; (d) table of contents; (e) presentation model; (f) general description; (g) instruction for use; (h) core competences; (i) basic competences and indicator; (j) conceptual map; (k) glossarium; (l) learning activities which consists of two primary activities which include student's activity and lesson summary; (m) learning activities evaluation; (n) bibliography; and (o) authors' biography. A complete component within a module is able to promote good quality of learning process obtained by students (Dewi & Primayana, 2019).

The lesson content in the developed module based on Discovery Learning for Office Technology Subject consists of six sub-lesson contents and was divided into two learning activities to make it easier for students to understand the lesson content. In every learning activity there is a glimpse of the latest important information that is interesting for students to know. This is the main attraction for students when using modules as their own instructional material and is similar to the research products conducted by Subandiyah (2017). Each learning activity is carried out in one face-to-face session, and at the end of the lesson, students will be asked to work on evaluation questions for learning activities to measure the level of understanding of students in teaching and learning activities at the meeting. This is an advantage of the module that was developed by the researchers when compared to the research products conducted by Wahyudi, Rukmini, & Bharati (2019) where the module only focuses on the assessment aspect without any in-depth discussion of the lesson content.

This research and development was based on the needs of teachers and students at Vocational High School Muhammadiyah 3 Singosari for an instructional material. Module development to meet this need is the right choice and in accordance with the conditions of the school, teachers and students and it is in line with the statement of (Dewi & Primayana, 2019; Swandhana et al., 2016). The results of this research and development have contributed to the procurement of a number of teaching materials in the form of discovery-learning-based modules that schools really need in implementing the 2013 Revised Curriculum in Indonesian education (Sofeny, 2017). Students have learning guidelines in exploring learning material so that they can improve the quality of the learning process and learning outcomes. The teacher also has guidelines in conducting teaching and is able to provide independent learning space in a structured manner to students.

## 2. The Results of Validation and Feasibility Testing

The validation process was performed by modul and lesson content experts. To test whether the module is feasible or not, it involved six students for small group field trial. The results of validation from the module expert is presented in the following Table 1.

**Table 1. Quantitative Data from Module Expert**

| No | Aspect Examined | f | N | % | Remarks |
|----|-----------------|----|----|-----|------------|
| 1 | Relevance | 20 | 20 | 100 | Very Valid |
| 2 | Accuracy | 9 | 10 | 90 | Very Valid |
| 3 | Presentation | 24 | 25 | 96 | Very Valid |
| 4 | Language | 20 | 20 | 100 | Very Valid |
| **Percentage** | | | | **96,5%** | **Very Valid** |

Table 1 above indicates that the level of validity of the developed module according to the module expert in terms of relevance aspect was 100 percent, in terms of accuracy aspect was 90 percent, in terms of presentation aspect was 96 percent, and last but not least in terms of language aspect was 100 percent. The average percentage obtained from the module expert was 96.5. This result further confirmed that Discovery learning-based Module for Office Technology subject developed by the researcher is valid and can be used without revision based on the Validity Percentage Criteria. The results are more satisfactory compared to the previous research which had been carried out by (Ellizar, Hardeli, Beltris, & Suharni, 2018; Handayani, 2018).

Furthermore, the results obtained from the validation process by content expert is presented in Table 2 below.

**Table 2. Quantitative Data from Content Expert**

| No | Aspect Examined | f | N | % | Remarks |
|----|-----------------|----|----|------|-----------|
| 1 | Content suitability | 24 | 25 | 96 | Very Valid |
| 2 | Language | 15 | 15 | 100 | Very Valid |
| 3 | Presentation | 22 | 25 | 88 | Very Valid |
| 4 | Graphic design | 19 | 20 | 95 | Very Valid |
| | **Percentage** | | | **94,8%** | **Very Valid** |

Based on Table 2, it shows that the module assessment by content experts on the content feasibility aspect obtained a percentage of 96%, then it obtained 100 percent in terms of language aspect, and for the presentation aspect, it obtained a percentage of 88%, and it obtained 95 percent in terms of graphic design aspect. The average result of the module feasibility assessment by content experts was 94.8 percent. The results obtained was identical to the module expert validation.

Then, the feasibility test by a small group consisting of two high-ability students, two moderate-ability students, and two low-ability students was carried out. The quantitative data from the small group trial results is shown in Table 3 below.

**Table 3.  The Percentage Results of Each Indicator by Small Group Trial**

| No | Respondents | F | N | % | Remarks |
|----|-------------|----|----|-----|-----------|
| 1 | Student 1 | 45 | 55 | 82 | Valid |
| 2 | Student  2 | 47 | 55 | 86 | Very Valid |
| 3 | Student  3 | 49 | 55 | 89 | Very Valid |
| 4 | Student  4 | 52 | 55 | 94 | Very Valid |
| 5 | Student  5 | 47 | 55 | 86 | Very Valid |
| 6 | Student  6 | 50 | 55 | 91 | Very Valid |
| | **Percentage** | | | **88%** | **Very Valid** |

Based on the results presented in Table 3, it indicates that the assessment of feasibility on the developed module by the student 1 was 82 percent, student 2 and student 5 gave the assessment as much as 86 percent, student 3 gave the assessment on the module as much as 89 percent, student 4 and student 6 gave 91 percent. The average score of assessment by student during small group trial on the developed module was 88 percent. The results further confirm that most of the students were welcome to the module developed by the researchers as one available instructional material. The major reason was that the students considered the module facilitates their learning process and promotes independent learning (Savec & Devetak, 2013). In addition, students also feel they have guidelines in exploring learning material so that they are not confused in carrying out learning independently.The results of the research and development of module based on Discovery Learning for Office Technology to improve vocational high school students' learning outcomesis in line with the results reported by Marzuki, Ramli, & Sugiyarto (2017) entitled "The Development of Plantae Module Based on Guided Discovery Learning Integrated with Local Potency to Improve High School Students' Critical Thinking Ability in East Lombok". This research is also in line with the research by Isnaeni & Agustina (2018) entitled "An Increase in Learning Out come Students is Through The Development of Archive E-Module Based on The Flipbook With Discovery Learning Model" and similar to the research entitled "The Development of Office Technology Module Based on The 2013 Curriculum for X Grade Students of Office Automation and Management Program (OTKP) at Vocational High School PGRI 2 Sidoarjo" by Jannah (2019).

### 3. The Comparison of Learning Outcomes

The module that has been developed and validated were then used as an instructional material for teaching and learning activities in the experimental class in order to determine the differences in learning outcomes with the control class that did not use the module. An analysis of learning outcome data is presented in Table 4 below.

**Table 4.The Comparison of Learning Outcomes Between Experimental and Control Class**

|  | Experimental Class (X OTKP 1) | Control Class (X OTKP 2) |
|---|---|---|
| Number of students | 27 | 26 |
| Number of students attending *Posttest* | 24 | 23 |
| Maximum score of *Posttest* | 94 | 85 |
| Minimum score of *Posttest* | 69 | 41 |
| The total score of students | 2031 | 1532 |
| Class score average | 84,63 | 66,61 |
| The number of students achieved the minimum standard | 23 | 10 |
| **% The percentage of students achieved the minimum standard** | **95,83%** | **43,48%** |

Based on Table 4 above, it is indicated that the posttest score obtained by the students in X Grade OTKP, appointed as the experimental class which learnt by using the Discovery Learning-based Module for Office Technology, was higher than the control class which did not use the Discovery Learning-based Module for Office Technology. The average value of the experimental class was 84.63 and the control class was 66.61. Meanwhile, the percentage of students who achieved the minimum standard in the experimental class was higher at 95.83 percent and the control class was 43.48 percent. Thus, it means that the use of the Discovery Learning-based Module for Office Technology is effective and able to improve learning outcomes in the experimental class. This is in accordance with previous research conducted by (Ellizar et al., 2018; Isnaeni & Agustina, 2018; Swandhana et al., 2016; Wahyudi et al., 2019). Accordingly, it strengthens the opinion that the existence the Discovery Learning-based Module for Office Technology is important to be developed and implemented in the learning activities of students at school. In addition, from the different average value of learning outcomes, it can be concluded that the Discovery Learning-based Module for Office Technology can improve student learning outcomes. It is seen from the average score of the experimental class which was higher than the control class that did not use the Discovery Learning-based Module for Office Technology.

While the significance score of the differences in learning outcomes of the experimental class and the control class can also be seen in the data analysis using the independent sample t-test. It is known from the data analysis that the significance of differences in student learning outcomes and module classes was less than 5 percent, which means that H0 was rejected. This means that there is a significant difference in the learning outcomes of students in the experimental class and the control class. These results are similar to research by Perwitasari & Djukri (2018) entitled "Developing Thematic-Integrated Module Based on Guided Discovery to Improve Critical Thinking and Student Science Attitude". The difference in learning outcomes between the experimental class and the control class is because the experimental class obtained a learning activities with the Discovery Learning-based Module for Office Technology in which the lesson content is relevant to the 2013 revised Curriculum and is accompanied by instructions for using the module as well as a learning model that allows students to understand the lesson content. These results indicate that this research and development has an impact on the transformation of Indonesian education to produce more students who are able to find meanings from the learning material they are looking for themselves. This will help students hone their critical thinking.

### CONCLUSION

Through the research stages that have been carried out, this research has produced a development product, specifically the Discovery Learning-based Module for Office Technology to improve student learning outcomes. The module developed is very relevant and feasible to be applied in learning Automation and Office Management. The application of the Discovery Learning-based Module for Office Technology has been proven to improve the learning outcomes of students which are known through the comparison of the learning outcomes of students who used the Discovery Learning-based Module for Office Technology and those who did not. Through the use of this module, the teacher's role is more focused as a facilitator and guide students to discover their own understanding of the learning being carried out. Students are supported to carry out learning independently through the use of this module because they are facilitated to discover their own lesson comprehension in the lesson content presented. Lastly, it is recommended for further research and development to extend the development and research which takes place in several school and involve a larger research subject to obtain more accurate data.

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Yuli Agustina
*Universitas Negeri Malang*
*Email: yuli.agustina.fe@um.ac.id*

Agung Winarno
*Universitas Negeri Malang*

Ayu Diyah Ramadani
*Universitas Negeri Malang*