The Development Of E-Modules Based on Adobe Flash For Indonesian Subjects At IAIN Bukittinggi

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Abstract. This study was done by the result of observation at IAIN Bukittinggi, it was found that Indonesian learning activities generally only use conventional media that are simple, in the form of a blackboard and powerpoint text. Learning tends to use lecture methods and conventional modules in the form of hardcopy modules in the learning process, it causes the students to feel bored, have difficulty understanding conventional modules and are less motivated during the learning process. The purpose of this study is to develop teaching material in the form of an Indonesian e-module that is valid, practical, effective and can motivate students to learn independently in improving student learning achievement. The development of this Indonesian e-module passes the ADDIE stages, namely (1) Analysis; (2) Design; (3) Development; (4) Implementation; (5) Evaluation. Products were developed include lecturer guidance book consisting of syllabus and SAP, students guidance book and Indonesian e-modules. Based on the results of internal consistency test and implementation, the product developed was categorized as very valid with a score of 86.47, the product developed was also categorized as very practical with a score of 90.40, and very effective with a score of 93.02. Based on the results of the validity, practicality, and effectiveness of the development of e-modules in Indonesian subject it can be concluded that e-modules have excellent validity, practicality and effectiveness.

Keywords: Indonesian learning, e-modules, Adobe Flash

1. Introduction
The 21st-century learning paradigm suggests that educators must be able to create the latest innovations in the learning process in order to improve learning achievement. One form of innovation is to create effective and technology-based learning resources. Technology-based learning can bring education to be a better and modern direction. Technology in the learning process is one of the means to develop an attractive learning model for students, so students are motivated to learn independently. Kurymbayev (2016) explains that technology has enormous potential as a means or tool for developing skills in the learning process. As an educator must be able to integrate these technological facilities into the learning process. Konokman (2016) emphasizes that educators/teachers are expected to be able to integrate technology and integrate it into technology-based learning environments in an effective way. This is confirmed by Hamonangan (2014), the competence of educators/teachers in the field of technology is an important need to improve learning achievement. With the rapid development of this technology, education practitioners are required to be able to integrate technology in the
Various ways can be used to integrate technology into the learning process one of them by developing media, technology-based learning sources such as e-books, web, e-modules.

According to Alakoc (2003), the current technology can improve the quality of learning, because technology has new concepts, such as computers, internet, multimedia, audio, video, and animation, which greatly affect the quality of education and teaching and students can learn independently by using this new concept. Hanell (2016) explains the use of digital tools such as electronics in the learning process can influence literacy practices Digital technology for learning, such as e-modules of self-learning, multimedia, simulation, video tutorials, can increase the independence of students in learning. Serevina (2018) also says that teaching materials in the form of digital modules stimulate students to learn independently. By using technology, educators can develop technology-based learning tools such as e-learning, e-books, and e-modules multimedia, on-line learning, internet-enabled learning, virtual learning, or web-based learning. Although the terms used are different, but all of them refer to one and the same concept, namely learning that is supported by technology and based on multimedia. Technology-based learning is very effective in bringing education to be a better, more effective use of time and lower costs. Kim (2016) argues that effective learning tools, significantly positive effect on students in the learning process, because students can participate more in class and educators get the opportunity to make their class more interactive and interesting. Geenu (2015) explains that there are significant differences in attitudes between students who are taught using technology-based modules with students being taught using conventional modules. Various electronic module components (text and pictures, videos, simulations, and feedback questions) are considered valuable by students as learning experiences, unlike textbooks, electronic module materials can be updated sometime before the learning process begins. Educational institutions as institutions that are in the midst of the community should provide enough space for the use of technology, which is expected to help smooth the learning process carried out in class. Alammary (2012) emphasizes that educational institutions must pay great attention to utilizing technology in the learning process, especially in the use of multimedia teaching materials, because it will be easier for educators to explain abstract learning material and it can be easily for students to understand it. Kim (2013) states that multimedia technology can function as a means of activation together with the visual and verbal system of receiving and processing incoming information. Learning material using multimedia has a positive effect on learning outcomes.

Technology-based learning media can foster positive attitudes of students towards the material and learning process. Yuong (2018) argues that multimedia provides opportunities for students and educators to develop learning techniques to achieve maximum results. In order to achieve the learning objectives, educators need to understand learning techniques that are useful in teaching and learning. Learning techniques are used to implement a specific method, for example, the use of multimedia-based learning resources. Tabbers (2004) explains the use of multimedia in learning to be an obligation in line with changes that occur in various fields of human life. By using the media, the learning process becomes more interesting so that it encourages students to love science and likes to find their own sources of knowledge and the learning process can be improved.

According to Domalewska (2014), the use of multimedia such as sound, animation, and images can involve students in learning and improve their knowledge and motivate them for better learning. The use of multimedia is aimed to make it easier for students to determine what and how they can absorb information quickly and efficiently. The ability of multimedia technology that is getting better and developing will add convenience in gaining student knowledge. Hamzah (2014) says that the use of multimedia in learning plays an important role in the academic value of student learning. Multimedia provides opportunities for educators to develop learning techniques so as to produce maximum results. With multimedia, it is expected that students will be easier to determine what and how students can absorb information quickly and efficiently because learning resources are no longer focused on textbooks.
Utilization of e-learning modules can present text, sound, images, films, and videos and the teacher can facilitate student learning through the student-centered model. Hartidini, Ramadhan, and Ratna (2018) explains that the low quality Indonesian learning caused by teaching materials, learning methods applied by teachers, student interests. According to Getuno (2015), there are significant differences in attitudes between students who are taught using technology-based teaching materials and those who are taught using conventional teaching materials. From this description, it can be concluded that the success of an educational goal depends on how the teaching and learning process experienced by students.

Student learning achievement will improve if, in the learning process, an educator can apply various learning strategies. Cordova (2015) emphasizes that the application of various learning strategies can produce different results. Angin, Ramadhan, and Juita, (2015) also argue the low learning achievement caused by three factors, namely teachers, students, and teaching materials, when learning takes place the teacher's role still dominates over students so learning only takes one direction. By using the e-module based on Adobe Flash learning, it is expected to be able to explore the individual abilities of students and generate their interest in learning towards subjects, so that it can give birth to motivation in improving achievement and learning outcomes. According to Jingjit (2015) there are significant differences in attitudes between students who are taught using e-learning modules and those who are taught using conventional methods. In addition, the learning multimedia e-module is also expected to be able to bridge the problem of students' limited absorptive capacity and teacher limitations in the learning process in the classroom, so that materials that are less understood can be explored again through this learning multimedia e-module. The printed module makes the learning process less interesting, less interactive and has not been able to convey historical messages through pictures and videos.

Manongga (2009) argues that teaching media that were in the form of hardcopy previously made it difficult for education practitioners to access and receive information quickly and in real-time. Teaching in the form of multimedia by utilizing technological facilities and infrastructure will facilitate educators and students in carrying out activities and teaching and learning process. Domalewska (2014) says that technology helps students in the learning process. Technology-based learning media is also able to make students interested in learning independently so that it helps a lot of education especially students in understanding and deepening a subject matter.

Development of an electronic prototype module as a source of independent learning in Indonesian courses, it is hoped that learning orientation will no longer be teacher-centered but instead leads to a student-centered learning system. Competence of graduates who are able to develop a concept of visual communication in digital media. The focus of development in this research lies in the form of presentation of independent learning materials in which there is management of material, display, and control of learners. Learning resources in the form of multimedia e-modules are expected to attract students' attention and interests so they are motivated to learn. According to Kurniawan (2014), e-modules have benefits for education practitioners, namely students. Thus the e-module based adobe flash is thought to be able to improve student competency.

2. Literature Review

Learning activities require learning resources. According to the Association for Educational Communications and Technology (AECT, 2008), learning resources are "everything that can be utilized by the teacher, both separately and in a combined form, for the purpose of learning with the aim of increasing the effectiveness and efficiency of learning objectives". Sadiman (2008: 5) defines learning resources as "everything that can be used for learning that can be in the form of people, objects, messages, materials, techniques, and settings". Thus the source of learning is also interpreted as any place or environment, objects, people that contain information that can be used as a vehicle for students to conduct the process of behavior change.
Based on some of these opinions, it can be concluded that learning is any joint effort between teachers and students to share and process information, with the hope that the knowledge provided is useful in students and becomes the foundation of continuous learning, and it is expected that there will be better chances to achieve a positive improvement marked by changes in individual behavior for the creation of an effective and efficient teaching and learning process. A good learning process will shape intellectual abilities, critical thinking and the emergence of creativity and changes in behavior or a person based on certain practices or experiences.

Prastowo (2013: 297), explains that teaching material is a set of material that is arranged systematically, both written and not so as to create an environment or atmosphere that allows students to learn. There are also those who argue that teaching materials are information, tools, and texts needed by the teacher or instructor for planning and studying in the implementation of learning. In line with this understanding, Panne (in Prastowo, 2013: 298), defines that teaching materials as systematically compiled learning materials used by teachers and students in the learning process. Mulyasa (2006: 96) also says that teaching material is one part of teaching resources that can be interpreted as something containing learning messages, both specific and general in nature that can be utilized for the benefit of learning. Wardhana (2010: 29) added that teaching material is a medium to achieve desires or goals to be achieved by students. Opara and Oguzor (2011: 66) explains teaching materials as learning resources in the form of visual and audiovisual which can be used as alternative channels for communication in the learning process.

Based on some understanding of the teaching material, it can be concluded that teaching material is a set of subject matter or a set of tools and materials that are systematically compiled by the teacher and used in learning activities so as to create an environment or atmosphere that allows students to learn and can achieve the specified goals. The term teaching material used in this study is a material/subject matter in the form of a systematically compiled electronic module that is used by lecturers and students in learning Indonesian at IAIN Bukittinggi to achieve the expected goals. Sudjana and Rivai, 2003: 132-133) convey that the module as one of the smallest learning program units contains in detail the following matters. 1) instructional objectives to be achieved; 2) topics that will be the basis of the learning process; 3) points to be studied; 4) module position and function within a broader program unit; 5) the role of the teacher in the learning process; 6) tools and resources to be used; 7) learning activities that must be carried out and lived by students in sequence; 8) worksheets that students must complete; 9) evaluation program to be implemented. The use of modules in learning is structured as one of the teaching materials to help students to be able to learn independently, be able to master the material optimally and the educational objectives can be achieved effectively and efficiently.

According to Sudjana (2002: 132) the meaning of the module according to its original term, is a complete measuring tool, a unit that functions independently, separately but can also function as a unit of all other units. Modules are a kind of planned learning unit that is unity, designed to help individual students achieve their learning goals. Modules can be seen as a package of teaching programs consisting of components that contain learning objectives, teaching materials, learning methods, tools or media, as well as learning resources and evaluation systems.

Based on the theory above, it can be concluded that the module is a printed learning unit designed for independent learning. The module is equipped with instructions for self-study, so that with the module students can study on their own without the presence of a teacher. Modules are arranged for learning purposes. Tools or modules for independent learning in the era of technological advances are needed in the learning process. Advances in technology make humans intentionally or unintentionally have and will interact with technology. Electronic media as a result of technological developments received a place and considerable attention for students and a large influence on the development of education. To streamline students' cognitive learning achievement, an interesting learning module facility is needed in the learning process and can improve the quality of learning. The need for teaching materials is a major factor that must be met in learning. Students display an attitude of being bored and tend to be passive, only accepting what is given by the lecturer without developing the knowledge, let
alone applying the knowledge gained in their daily lives. Students' understanding of a concept of learning material is not deep enough so that it results in the ineffectiveness of their cognitive learning achievement.

Electronic modules are learning tools that contain material, methods, limitations, and ways of evaluating that are designed systematically and attractively to achieve the expected competencies. Sugihartini and Jayanta (2017) explained that the electronic module (e-module) is the development of digital print modules which adapt many of the printed modules. Supriyadi (2013), digital books or e-modules is a publication that consists of text, images, videos, and sounds and it is published in digital form that can be read on computers and other electronic devices. From this explanation, it can be understood that an electronic book is a portable hardware and software system that can display information in the form of large amounts of text to the user to search for what is contained there. The development of e-module technology has encouraged the integration of print technology with computer technology in learning activities. Various print learning media, one of which is a module, can be transformed into electronic form. So that gave birth to the term electronic module, known as e-module. There is no definitive definition of electronic modules so far. By referring to various related terms, it can be identified that the electronic module is a combination of the term module in the form of electronic learning materials (e-books). Thus the electronic module can be defined as a form of presentation of independent learning materials that are arranged systematically into the smallest learning unit to achieve certain learning objectives. Students become more interactive with the program, equipped with video tutorials, animations, and audio presentations to enrich the learning experience. Based on the understanding of the manual module and the electronic module, it is seen that there is no difference in the principle of development between conventional (printed) modules and electronic modules. The only difference is in the physical presentation format, while the components of the module have no difference. Electronic modules adapt the components contained in print modules in general. The only difference is the physical presentation of electronic modules that require a computer device to use.

3. Method
The development model used in this study is ADDIE development model. The concept of ADDIE (analysis, design, development, implementation) Dick, Carey (2001: 4) is used to describe a systematic approach. All elements of the model are related to each other starting from the analysis, design, development, application, and assessment.

3.1 Analysis
Requirement analysis is an important process for program evaluation because through this activity a clear picture of the gap between real conditions and desirable conditions will be generated. This phase of the analysis is carried out by identifying the learning tools and Indonesian teaching materials used in the learning process at IAIN Bukittinggi and also identify learning processes that are taking place.

3.2 Design
Data obtained at the analysis stage is used as the basis for the design phase of the Indonesian e-module, lecturer manuals, and student manuals. The design of learning tools such as the Indonesian e-module, lecturer manuals, and student manuals lead to student-centered learning and constructivism learning approaches because they are considered to be able to contract students' understanding of Indonesian language material. This design stage is also the basic framework of e-modules which will be developed. For this reason, systematic and specific design is needed for the determination of e-module indicators, lecturer manuals, and student manuals to the preparation of validation instruments.

3.3. Development
The initial stage of the development is carried out several activities, including 1) conducting FGD (Focus Group Discussion) the material content of the three products that have been designed and collecting input/suggestions about the product, 2) conducting product revisions to improve the three
products (e-modules, lecturer manuals and student manuals) based on input / suggestions from the FGD, 3) validate the three products (e-modules, lecturer guidance book, and students guidance book) through the validation instrument filling by experts, 4) revise the product if it is needed to be fixed

3.4 Implementation

At this stage, the product that has been validated and tested then it is implemented with the aim of knowing the practicality and effectiveness of e-modules. Sugiyono (2012: 417-418) said that effectiveness testing was conducted to see the situation based on student learning achievement. For more details, it can be seen in the description below.e. Evaluation

At this evaluation stage, things that will be evaluated include student learning outcomes during one-to-one evaluation trials, small group evaluation trials, and implementation. In general, learning Indonesian using e-modules from trials to implementation illustrates that this has been done well. Students accompanied by lecturers can use e-modules in the learning process. The learning process in class is as planned. The lecturer forms guidance and motivation towards students experiencing difficulties in the learning process. The student also looks active, independent and there is an interaction between lecturers and with their peers.

4. Findings and Discussion

In this section the discussion of what has been done is presented, namely analysis, design, evaluation, evaluation and implementation.

4.1 Need Analysis

Need analysis is a very important first step in product development. There are several stages carried out in this needs analysis. First, analyzing the learning tools commonly used in the Indonesian learning process at IAIN Bukittinggi. Learning tools commonly used are syllabus, SAP and teaching materials. Teaching materials used in the Indonesian learning process at IAIN Bukittinggi only is conventional media that are simple, in the form of a blackboard, powerpoint text, and authentic media. Recently, learning process tends to use lecture methods and conventional modules in the form of hardcopy modules in the learning process, so students feel bored, have difficulty understanding conventional modules and are less motivated during the learning process. The main objective of this research is to develop a teaching material in the form of an Indonesian e-module that can motivate students to learn independently and can improve student learning achievement. Syllabus and SAP are tools that can reflect what the learning process will take place. However, based on an analysis of the syllabus and SAP that are commonly used at IAIN Bukittinggi in Indonesian courses have not shown a learning process that can plant, build and increase students motivation to learn. If the process cannot lead to an increase in learning motivation, the desired results cannot be reached. In addition to an analysis of learning tools that are commonly used, an analysis is also carried out on the planned learning implementation. The facts found show that classroom learning is often not in accordance with what has been planned. Learning tools that have been provided are rarely used as guidelines in the learning process. Based on these findings, it is very necessary to give serious attention to parties regarding this finding. For this reason, comprehensive learning tools have been developed that are intended to increase student motivation and learning outcomes. A good tool leads to improved student learning achievement, both thinking and motivation in improving learning achievement.

4.2 Product Design

Based on the results of the analyst described earlier, it can be identified the problem to be solved or the solution to the problem. The problems faced in the Indonesian learning process at IAIN Bukittinggi have not yet created learning that can motivate students to improve learning achievement. Based on this problem, a comprehensive learning tool was designed and indeed it was designed to increase student motivation in improving learning outcomes. The designed learning tool consists of lecturer guidance book, consisting of Indonesian learning syllabus, SAP Indonesian learning, students guidance book in the form of instructions for using e-modules and teaching materials in the form of e-modules for Indonesian learning.
4.3 Development
After designing, learning tools are developed which consist of lecturer guidance book, students guidance book and Indonesian e-modules that is aimed to increase student motivation in improving learning outcomes. After being developed, FGD was held at IAIN Bukittinggi attended by lecturers, colleagues, and students to provide input for product perfection such as lecturer guidance book, students guidance book and e-modules of Indonesian learning. After a revision was made based on input from FGD participants, an internal consistency/validation test was conducted by material experts, language experts, and design and technology experts. The results of the validation showed that the average score of the lecturer guidance book was 89.74 with a very valid category, the student's guidance book was 90.25 with a very valid category and the Indonesian e-module was 86.47 with a valid category.

4.4 Implementation
Before the implementation phase, the product is tested through a one-to-one evaluation. This trial is a test conducted individually involving a student who came from the tarbiyah faculty majoring in counseling guidance. Learning achievement using e-modules in Indonesian subjects in the one-to-one evaluation test increased with an average of 53.33 initial tests in the ‘not good’ category while in the final test an increase of 83.33 in the ‘good’ category. From this explanation, it can be concluded that there is an increase in student learning achievement after using e-modules as learning material.

After the one-to-one evaluation test is carried out then the small group evaluation test, the learning achievement using e-modules in the Indonesian subject in the small group evaluation test has increased with an average initial test of 62.91% the category is less effective whereas in the final test increased by 85.42% the effective category.

At the implementation stage, the pre-test value with 39 students received a minimum value of 13, a maximum value of 24, a mean value of 18.30 standard deviation of 2.59 and a variance value of 6.745 while the post-test value with a total of 39 students had a value of minimum of 17, a maximum value of 29, a mean of 24.05 standard deviation of 3.89 and a variance of 15.15. The value of sig (two tails) < of alpha (0.000 <0.05), there is a significant difference between the average pre-test and post-test.

4.5 Evaluation
The results of this study illustrate that the implementation of Indonesian learning at IAIN Bukittinggi by using e-modules is generally carried out well. Students accompanied by lecturers can use e-modules in the learning process. The learning process in class is as planned. The lecturer forms guidance and motivation towards students experiencing difficulties in the learning process. Student also looks active, looks independent and there is interaction both with lecturers and with their peers.

In addition, from interviews with students, it is known that they are more motivated in the learning process by using products. The students become more interactive because Indonesian e-module is supported by interesting videos and animations, so students are not fed up in learning this e-module. The results of the research described above are in line with Faishal (2015) technology-based learning materials that are needed by students. The use of technological facilities such as computers is expected to increase the motivation of students in the learning process. Seeing the facilities that enable and harmonize the development of the times, technology-based learning materials such as computers are the best options to develop. One of them is module development. The module can also be called an electronic module because of the use of electronic devices in the form of computers as presenters. The electronic module is expected to produce an optimal learning process.

References
[1] Angin, T.B.B., R. Syahrul, Agustina (2015) Pengembangan Modul Berbasis Pendekatan Kontekstual pada Menulis Iklan di Kelas VIII SMP 2 Padangsidimpuan Sumatera Utara. Jurnal Bahasa, Sastra, dan Pembelajaran. pp 27-35
[2] Alakoc, Z. (2003) Technological Modern Teaching Approaches In Mathematics Teaching. *The Turkish Online Journal of Educational Technology* - *TOJET* 2. (1)

[3] Alammary, J. (2012). Educational Technology: A way to enhance student achievement at the University of Bahrain. *JournalProcedia - Social and Behavioral Science*, pp. 248 – 257

[4] AECT Task Force on Definition and Terminology. (2008). The Definition of Educational Technology. Washington: Association for Educational Communications and Technology (AECT)

[5] Cordova, M.L.G., Zermeno, M.G.G., & Mejia, I.A.G., (2015) Perspectives on influencing aspects for students’ acceptance of multimedia materials in training programs. *Open Praxis*, vol. 7 issue 1, pp. 57–69

[6] Domalewska, D, (2014) Technology-supported classroom for collaborative learning: Blogging in the foreign language classroom. *International Journal of Education and Development using Information and Communication Technology* (IJEDICT), 2014, Vol. 10, Issue 4, pp. 21-30

[7] Getuno, D. M. (2015) Effects of an E-Learning Module on Students’ Attitudes in an Electronics Class. *Journal of Education and Practice*, pp. 80-86

[8] Hartidini S., R. Syahrul, Ratna E. (2018) Pengaruh Strategi Pembelajaran Inkuiri Berbantuan Media Audiovisual terhadap Keterampilan Menulis Karangan Argumentasi Siswa Kelas X SMA Negeri 2 Lengayang Kabupaten Pesisir Selatan. *Jurnal Pendidikan Bahasa dan Sastra Indonesia*. pp 63-69

[9] Hamonangan, T (2014) Factors Affecting Teachers’ Competence in the Field of Information Technology. *International Education Studies*. pp. 70-75

[10] Haniza, M.I., Rinaldi, & Razak, K.A (2014) Multimedia Usage among Islamic Education Lecturers at Higher Education Institution, *International Education Studies*, pp. 157-165

[11] Jingjit, M (2015) The Effects of Multimedia Learning on Thai Primary Pupils’ Achievement in Size and Depth of Vocabulary Knowledge. *Journal of Education and Practice*, pp. 72-81

[12] Kurymbayeva, S.G., Samashovah,G.E., Alshynabayeva, Z.E., Mukhametzhanovaa, A.O., Sharazdina, A.M., Kalybekovab, K.S., & Kosybaeva, U.A (2016) Development Principles of the Pedagogical System Aimed at Bachelor Training Based on Modern Information Technology. *International Journal Of Environmental & Science Education*, pp. 11771-11790

[13] Konokmani, G.Y & Yetken, T.Y (2016) Preparing Digital Stories through the Inquiry-Based Learning Approach: Its Effect on Prospective Teachers’ Resistive Behaviors toward Research and Technology-Based Instruction. *Kuram Ve Uygulama Eğitim Bilimleri Educational Sciences: Theory & Practic*, pp 2141–2165

[14] Lee, D.J & Sang Ho Choi (2016) Effects Of A Technology-Friendly Education Program On Pre-Service Teachers’ Perceptions And Learning. *International Conference ITS, ICEDuTech and STE*, pp. 344-346

[15] Kurniawan, (2014) Pengembangan Modul Interaktif Menggunakan Content Development System pada Materi Listrik Dinamis. *Jurnal Pembelajaran Fisika*, 3(1), 1–10.

[16] Kim, D, Kim, DJ, Wong, H.W (2013) Cognitive Synergy in Multimedia Learning. *International Education Studies*, pp 76-84

[17] Mulyasa, (2005) Kurikulum Berbasis Kompetensi: Konsep, Karakteristik, Implementasi, dan Inovasi, Bandung: Remaja Rosdakarya.

[18] Manongga, D (2009) Perancangan Modul Pembelajaran Berbasis Interactive Multimedia Learning. *Jurnal Teknologi Informasi-Aiti*, pp. 16-29

[19] Prastowo, A. (2013). Pengembangan Bahan Ajar Tematik. Diva Press. Jogjakarta

[20] Sadiman, A.S. (2008). Media Pendidikan, pengertian, pengembangan, dan pemanfaatannya. Jakarta:Raja Grafindo Persada

[21] Supriyadi, E. (2013) *Simmulasi Digital*. Semarang:KEMENDIKBUD

[22] Serevina, Vina (2018) Development of E-Module Based on Problem Based Learning (PBL) on Heat and Temperature to Improve Student’s Science Process Skill. *Journal of Educational Technology*, pp. 26-36

[23] .Sardinian, A.M. (2003) Interaksi dan Motivasi Belajar-Mengajar Pedoman bagi Guru dan Calon Guru. Jakarta: Rajawali. Pers

[24] Tabbers, H. K., Martens, R. L., & van Merriënboer, J. J. G. (2004). Multimedia instructions and cognitive load theory: Effects of modality and cuing. *British Journal of Educational Psychology*, pp 71-81.