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DEVELOPMENT OF YOUTUBE INTEGRATED GOOGLE CLASSROOM BASED E-LEARNING MEDIA FOR THE LIGHT-WEIGHT VEHICLE ENGINEERING VOCATIONAL HIGH SCHOOL

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Abstract

The purpose of this research is to produce the e-learning media for the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject. The type of this research is the research and development. The procedure applied in this research is the ADDIE model. Construct testing by the expert is done by curriculum expert, practitioner and teaching media expert. Construct testing and content testing were also conducted to 23 students as the user. Qualitative data were analyzed using an iterative step that is reading/memoing, describing, and classifying. Quantitative data were analyzed with descriptive statistics. The research result shows that YouTube Integrated Google Classroom Based E-Learning Media has been produced and tested for Light-Weight Vehicle Chassis and Powertrain Maintenance subjects. The construct testing shows that this e-learning media is "feasible" based on an expert's judgment, and based on the user response shows that the reliability of the construct is "good". The content testing shows that students who use the YouTube Integrated Google Classroom Based E-Learning Media have significantly greater learning outcomes compared with students who use the internet to access the website without control.

Keywords: *the 2013 curriculum, learning media, e-learning, google classroom, youtube*

INTRODUCTION

Electronic learning or e-learning is a general term that is used to demonstrate learning process by utilizing electronic technology including information and communication technology. E-learning content can be text, image, video, and audio. Nichols (2008, p. 2) explained that "E-learning is learning that is enabled or supported by the use of digital tools and content. It typically involves some form of interactivity, which may include online interaction between the student and their teacher or peers".

The purpose of e-learning is to shorten the schedule of learning time targets and also save the cost to be incurred by an educational program. The development of e-learning, however, can also be more expensive than traditional face-to-face learning, especially when using an excellent interactive multimedia method, but actually, the cost of network services and technical support can be cheaper than the class facilities, time spent, and the cost of travel used during conventional classroom learning sessions.

The 2013 Curriculum prioritizes e-learning. This curriculum instructs online learning so that students are able and accustomed to look for information independently through the utilization of information technology and internet communications. Regulation of Indonesia's Minister of Education and Culture number 70 in 2013 in Rational Development of 2013 Curriculum, Improvement of Mindset section number 3 explains that, in the 2013 Curriculum, the previously isolated learning scheme becomes a networking learning by utilizing internet technology (Menteri Pendidikan dan Kebudayaan Republik Indonesia, 2013).

Students can obtain learning materials from any learning source and from anywhere through the internet, but this does not rule out the possibility that students will get learning materials from the untrustworthy resources on the internet if teachers do not organize the structured and reliable learning materials according to the syllabus on the internet to support the process of guided learning (instructor-led) as well as self-paced learning. Even though the internet is a very important and indispensable source for students, the issue of whether the referenced source is trustworthy and/or credible, has been raised. This is because there is no control on any particular piece of information published through the web.

Many of the sites on the internet enable anybody to submit any kind of information without being controlled, and many of the sites known as reliable are restricted to open access for commercial purposes or security requirements (IP restriction, membership). This limits the accessibility for students and deprives them of these sites. Because of these constraints, information resources used by students are generally untrustworthy or students have been inaccurately forwarded.

Work by Sahin, Balta, & Ercan (2010, p. 241) has shown that the students use more accessible and less secure internet sites in courses because of their careless, and consequently get low marks for term projects and home-works. The result demonstrates that resources which are easily accessible are not those which provide reliable information. Accessibility into highly reliable and credible resources is only possible with some constraints, so that it is very difficult to use these resources efficiently.

Similar conclusions have been noted by other researcher. Kriscautzky & Ferreiro (2014, p. 932) have noted that evaluating the credibility of information on the internet is a challenge for students, even at higher education level. Even when they have criteria for selecting credible information on the declarative level, when in action these criteria can compete with practical requirements or unique motivations.

The research conducted by Arnanto & Triyono (2014, p. 331) shows that the result of the analysis of teacher learning strategy in Vocational High School which has utilized the internet in teaching and learning has average 150,52, which is in "good" category with percentage 53,29%. It is clear that the teacher learning strategies have a positive and significant influence on the effectiveness of internet-assisted learning. These results indicate that it is necessary to design teaching activities that promote the development of one of the tasks of the current reader to distinguish what information is credible in contexts of internet search with several purposes, particularly with study ones.

Based on the author's observations and direct experience in the Professional Training Program at SMK Negeri 6 Bandung on the Light-Weight Vehicle Chassis and Powertrain Maintenance subject, the problems faced by students is the difficulty in obtaining learning materials from the internet that is true/valid according to the syllabus in the implementation of instruction given by the teacher. Because of this difficulty, many students suggest the teachers to use the conventional learning method in which teachers provide learning materials directly.

The interview conducted by the author to the Professional Training Program participants (temporary teacher) from Universitas Pendidikan Indonesia (UPI) in SMK Negeri 6 Bandung Department of Light-Weight Vehicle Engineering showed that seven out of sixteen (43.75%) participants found that students facing difficulties in obtaining valid (according to syllabus) learning materials from the internet, six out of sixteen (37.5%) participants say that students need guidance but not facing major difficulties in obtaining valid learning material from the internet, while the other rest of the participants are unsure.

Successful learning is directly related to the ability to discriminate between reliable and unreliable sources. It is a great need for a network-based e-learning media that can be utilized by teachers to overcome the problems faced by students. Organizing valid and structured online learning materials in e-learning media is useful in supporting the process of guided learning and independent learning conducted by students so that students have no difficulty in obtaining the valid learning materials according to the syllabus. Learning materials are published in the announcement, assignment, or question posts given online to eliminate the difficulties faced by students in finding online learning materials, so that students have a correct understanding of learning materials in accordance with the achievement of targeted competencies.

Google Classroom and YouTube are the sites on the internet that can be used as e-learning media authorware. Google Classroom is a network-based platform that integrates a G Suite for Education account with all G Suite services like Google Docs, Gmail, and Calendar. Teachers can create a virtual classroom with Google Classroom as an online learning medium. With Google Classroom, teachers are able to share study materials, announcements, quizzes or questions, tasks and task assessments and feedback for students online. The use of Google Classroom in learning enables teachers to be more effective in presenting content or online learning materials for students, controlling online learning assignments to be more organized, and facilitating indirect communication with students. All content in the form of text, images, audio or video presented by teachers in the Google Classroom virtual classroom is under the control and organization of teachers and virtual class administrators, so that only valid learning materials will be learned by students.

Google Classroom can be integrated with YouTube to be used as the primary authorware in e-learning media. A set of learning materials presented in a web presentation format in Google Classroom, and the element of learning video content on YouTube embedded into the Google Classroom platform as the main content. Documents, images, and audio can be uploaded and shared with students in the Google Classroom virtual classroom to deliver a learning topic, while videos uploaded to YouTube are attached to posts published by teachers to students on the main page of the virtual classroom for guided and independent learning materials.

YouTube is a database platform on the internet that can be used by users to upload, share and watch videos. In education, YouTube can be used as an e-learning platform that allows teachers and students to publish videos that demonstrate an understanding of a topic, thereby creating a social and digital community that specializes in a skill. Watching an educational video on YouTube allows the flexibility to learn things procedurally, which will increase students' understanding of the knowledge and skills that are being learned. Snyder & Burke (2008) found that students who watch learning videos on YouTube will improve their understanding of the subject matter.

Online learning with the valid and structured material is important for students in the achievement of learning objectives, especially if the learning content is presented in the form of video in addition to text, images, and audio because it can create a more interesting learning atmosphere and support the

learning process as a whole. Based on the problem that needs to be solved through research and development, the purpose of this research is to produce a YouTube Integrated Google Classroom Based E-Learning Media for the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject.

Ghirardini (2011, p. 21) explains that there are several sequences of activities that can develop e-learning, such as the ADDIE model which contains five stages: Analysis, Design, Development, Implementation, and Evaluation. In this research and development, the analysis stage is done at the beginning of e-learning development to find the gap and also identifying general learning objectives. The design stage involves the activity of formulating a set of learning objectives, determining the sequence of steps in the goal acquisition effort, and selecting lesson materials, media, evaluation, and delivery strategies. The result of the design stage is the blueprint used as a reference for the development stage. The e-learning content is produced in the development stage. The development of interactive multimedia content consists of content development, storyboard development, and courseware development. Lessons are delivered to students at the implementation stage, courseware is installed on the server to be accessible to students. This stage also includes managing the activities of students in the process of guided learning. E-learning is then evaluated for a specific purpose. The evaluation focused on the reactions of students, the achievement of learning objectives, as well as the completion of the delivery of knowledge and skills.

RESEARCH METHOD

The type of this study is research and development (R&D). The resulting product will then be field-tested and revised until a certain level of effectiveness is obtained. In this study, the authors develop and test the product (YouTube Integrated Google Classroom Based E-Learning Media) for the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject. The procedure applied in this research is the ADDIE model which contains five stages: Analysis, Design, Development, Implementation, and Evaluation.

Analysis stage consists of needs analysis, target audience analysis, and task and topic analysis. Design stage consists of designing objectives, sequencing, instructional, delivery, and evaluation strategy, and initial product design. Development stage consists of content development, storyboard development, courseware development, first-stage product testing, and the first-stage product revision. Implementation stage consists of installation and distribution, student activity management, second-stage product testing, second-stage product revision, and third-stage product testing. Evaluation stage consists of evaluating reliability in terms of construct and content.

Participants in the test in terms of constructs is the Vice Principal of Curriculum at SMK Negeri 6 Bandung as a curriculum expert to assess the appropriateness of learning objectives, sequencing, instructional, delivery, and evaluation strategy; the Light-Weight Vehicle Chassis and Powertrain Maintenance teacher at SMK Negeri 6 Bandung as a practitioner to assess the appropriateness of needs analysis, target audience analysis, and task and topic analysis results; lecturer of Learning Media course at Universitas Pendidikan Indonesia as an expert of learning media to assess the appropriateness of content, storyboard, and courseware, including the elements of interoperability, compatibility, performance, navigability, structure, security, and usability of developed e-learning media. Research subject in construct and content test of e-learning media are 23 students of Toyota Technical Education Program (T-TEP) eleventh grade of Light-Weight Vehicle Engineering in SMK Negeri 6 Bandung as users.

Testing stages are as follows: (1) first stage product testing, i.e. testing in terms of constructs by experts; (2) first stage product revision; (3) second stage product testing, to determine the reliability of the construct based on the response of students as users of the product; (4) second stage product revision; (5) third stage product testing, to determine the reliability of the content based on the test that passed by the student as a product user; (6) evaluation of product reliability in terms of content and construct; (7) product improvements.

The data collection instruments used in this research are Structured Formal Interview One-on-one Interviews type, User Experience Questionnaire (UEQ), and Posttest-Only. Structured formal interviews are conducted as

a test of the construct by the curriculum expert, practitioner, and learning media expert to obtain qualitative data on product reliability in terms of construct and improvement or development recommendations. User Experience Questionnaire is used to obtain quantitative data on product reliability in terms of constructs based on the response of students as users of the product. Posttest-Only is used to obtain quantitative data on product reliability in terms of content based on the tests that the student passes as a product user.

The qualitative data of Structured Formal Interview results were analyzed by iterative reading/memoing, describing, and classifying. Quantitative data from User Experience Questionnaire were analyzed using UEQ Data Analysis Tool developed by Laugwitz, Held, & Schrepp (2008, pp. 63–76), while Posttest-Only quantitative data were analyzed using SPSS 16.0 to compute data. These computations include descriptive statistics, normality tests, homogeneity tests, and independent-samples t-test (two-sample t-test) to compare the mean of one variable for two groups.

FINDINGS AND DISCUSSION

Analysis

The analysis conducted at the start of the development by direct observation method. This process is outlined in the following steps: (1) select a site (school and particular classroom) to be observed, (2) ease into the site, getting a general sense of the site, and taking initial notes, (3) identification of who, what, when, and how long to observe, (4) conduct multiple observations over time to obtain the best understanding of the site and the individuals, (5) record descriptive and reflective fieldnotes. Findings and discussion of analysis stage are described in the needs analysis, target audience analysis, and task and topic analysis section below.

Needs Analysis

The problems faced by students is the difficulty in getting true/valid (according to the syllabus) learning materials from the internet. Based on the observation, students merely place a search term in Google, enter the first result, copy and paste it, almost without reading what they have selected and without considering any questions about the validity of the information obtained.

Students of those ages seem to be unwilling, under certain conditions, to consider the complex problematics concerning the credibility of information, even though they get low marks for their works. Consequently, it seems appropriate to maintain the distinction between the credible and uncredible information (learning materials). It can be done by organizing accurate and structured online learning materials in e-learning media, so that students have an exact understanding of learning materials in accordance with the achievement of targeted competencies according to the syllabus.

Target Audience Analysis

Target audience analysis is another crucial step. The design and delivery of e-learning will be influenced by key characteristics of the learners (e.g. their previous knowledge and skills, geographical provenience, learning context and access to technology).

Based on the observation, knowledge and skills that have been obtained by students prior to learning the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject are included in the Basic Skills Program Subjects (C2), consist of Automotive Engineering Drawing, Basic Automotive Technology, and Basic Works of Automotive Engineering.

Student's computer technical skills and competence prior to the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject online learning is covered in the Basic Subject of Expertise (C1), students have taken Digital Simulation subject as a basic subject in the field of expertise.

Locations of students will participate in e-learning is in the classroom in guided learning, and outside of the classroom in self-paced learning. Students can access the internet in guided learning in the classroom using mobile phones, smartphones, or laptops by utilizing Wi-Fi connection or personal internet data. Whereas in the independent learning outside the classroom, students can also use mobile phones, smartphones, or laptops utilizing Wi-fi connections if students are in the school's Wi-fi zone, or by using school computers in the computer lab or in the Self Access Study (SAS) room.

From these findings, it can be concluded that the students as target audience have enough potential as prospective users of e-learning media that will be developed.

Task and Topic Analysis

According to the syllabus and the lesson plan, the main task of students in the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject is to apply the understanding of component, component function, and how the vehicle chassis and powertrain system work to provide basic knowledge of skills in vehicle periodic maintenance. Basically, this task consists of applying the knowledge and skills of vehicle chassis and powertrain maintenance that is consists of a series of components starting from the clutch, manual transmission, propeller shaft, differential, axle shaft, wheel and tire, brake system, suspension system, and steering system.

Furthermore, these task and topic as the findings on this step will be considered in the design stage. These findings will be used to define content for job-oriented learning courses that aim to develop or reinforce job-related skills, as well as to provide information or achieve educational objectives.

Design

Learning Objectives

The overall interpretation of the learning outcome objective from the specific learning objectives is done by reviewing the tasks and content elements identified in the previous task and topic analysis. Target learning outcomes of the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject is the achievement of basic knowledge (cognitive) up to the level of "applying", and the achievement of basic skill (psychomotor) up to the level of "manipulation".

Sequencing

The result of sequencing is a learning structure, each element in accordance with the objectives of the learning outcomes and contribute to the achievement of overall learning objectives. The learning sequencing diagram of the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject is shown in Figure 1.

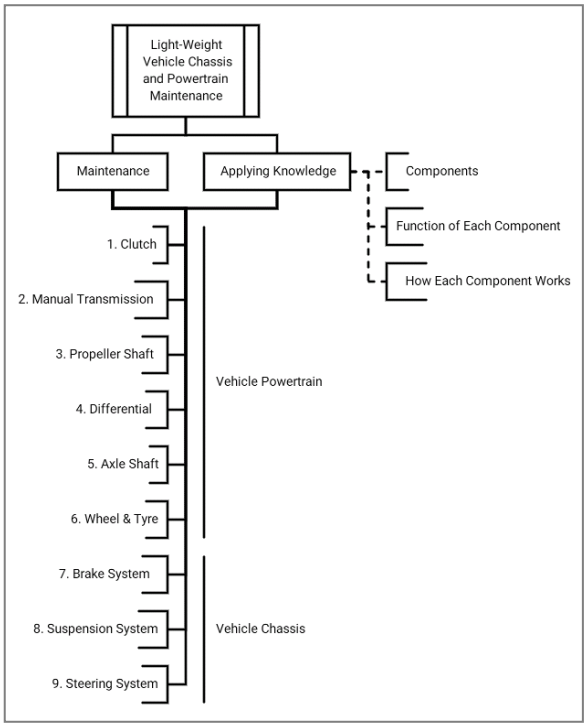

Figure 1. Learning Sequencing Diagram.

Instructional, Delivery, and Evaluation Strategy

The design of learning strategy in this e-learning media uses the expositive method which includes presentation and demonstration. The delivery of learning materials in the form of presentations and demonstrations in e-learning media is done through the recorded video, then uploaded to YouTube for further embedment in the post that is sent to Google Classroom. An online quiz is published in the form of a post that contains multiple choice or written answers questions. Quiz questions in this post require the cognitive domain in implementation level answers of students that are accommodated by the reference answers from the previous posts that contain presentation or demonstration videos.

Assessment of learning is done by assessing the video summary papers that is done by students in the form of .docx or .pdf submitted through the related assignment post, as well as assessing the quiz answers that are sent by the student through the relevant question posts.

Initial Product Design

The main pages of the YouTube Integrated Google Classroom Based E-Learning

Media is the Stream page, Students page, and About page. Figure 2 shows the structure of this e-learning media design.

Development

Content Development

Content in the YouTube Integrated Google Classroom Based E-Learning Media containing information and knowledge is developed in two ways: (1) Content is produced and uploaded, and (2) existing content or learning materials are reused (uploaded).

Storyboard Development

The storyboard describes all components of the YouTube Integrated Google Classroom Based E-Learning Media interactive product for the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject, including text, images, interactions, and assessments. In this e-learning media, the developed storyboard consist of: web structure, references, courses, competencies, author, screen, post, topic, screen type, screen heading & screen subheading, body text, media description and notes to the programmer.

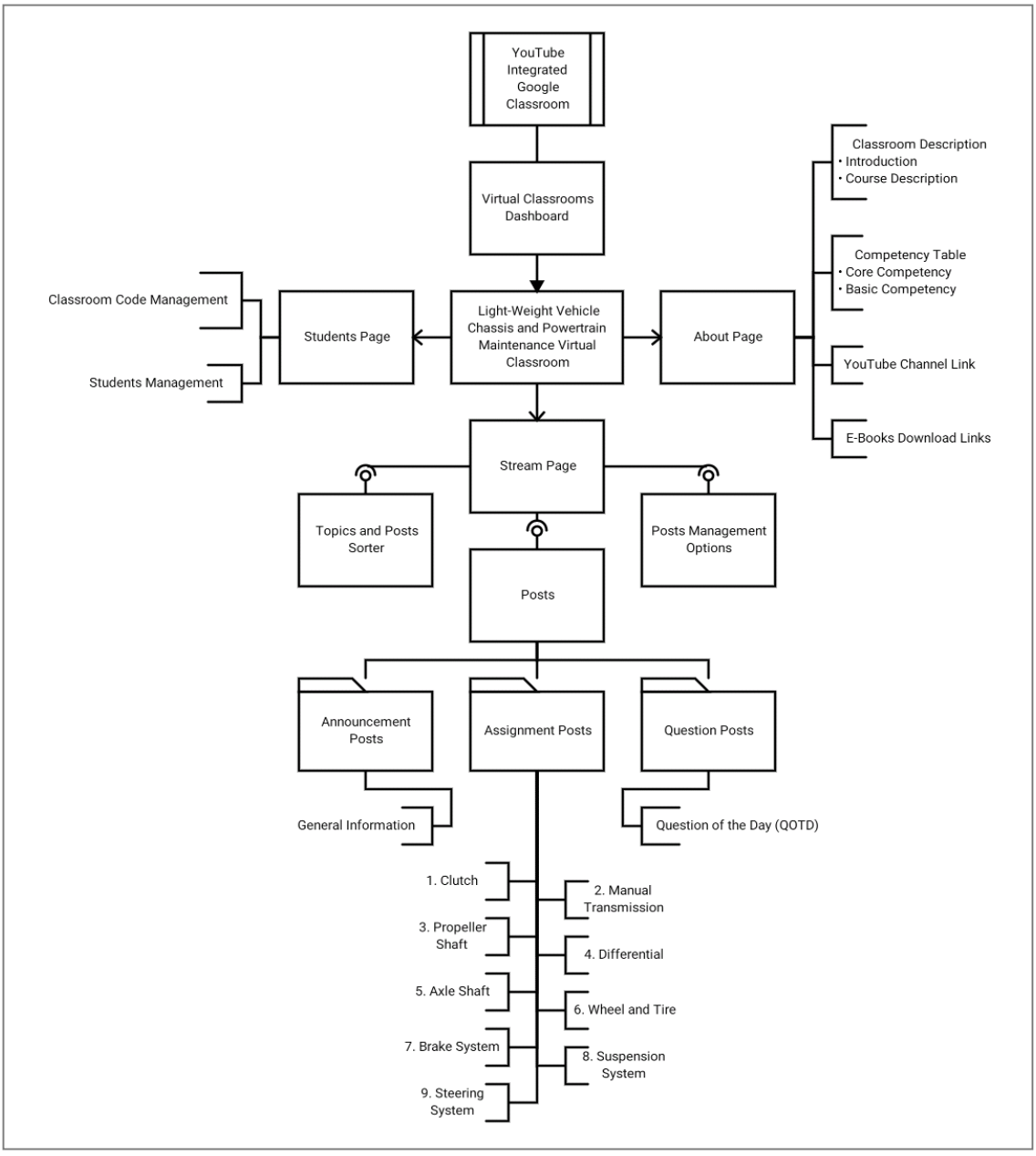

Figure 2. E-Learning Media Structure Design

Courseware Development

Elements that build the integration of e-learning media such as text, images, audio, and video were assembled in courseware, this process is done by utilizing authoring tools or authorware that have been created specifically to develop e-learning without the need for in-depth programming. Google Classroom and YouTube serve as the primary authorware in this developed e-learning media, a set of learning materials presented in a web pre-sentation format in Google Classroom, and the elements of learning video content on YouTube are integrated into the Google Classroom platform by embedding as the main content.

The arrangement that is implemented in the YouTube Integrated Google Classroom Based E-Learning Media is a timeline-based in which online learning is implemented in steps from one learning post to the next learning post on the Stream page. Lessons start from assignment post access which contains YouTube presentation and demonstration video and instructions of summary paper assignments with video reference in the assignment post package, then access proceeds to the Question of the Day (QOTD) question post with the same learning topic as the previous assignment.

First-stage Product Testing

Structured formal interviews including checkpoints in the interviews are given to curriculum expert, practitioner, and learning media expert to obtain qualitative data on product appropriateness as well as product improvement recommendations.

Table 1. Interview Checklist for Curriculum Expert.

	Not Feasible	Quite Feasible	Feasible
Learning Objectives			√
Sequencing			√
Instructional Strategy			√
Delivery Strategy		√	
Evaluation Strategy			√

According to the interview result, which was also stated on the Table 1, curriculum expert judges that the learning objectives of the Light-Weight Vehicle Chassis and Power-train Maintenance Subject with the use of developed e-learning media have been feasible and appropriate to complement the learning needs in the application of the 2013 Curriculum. The distribution of content posts and sequencing of materials in the achievement of the learning objective according to curriculum expert has also been feasible as it corresponds to the core material in basic competence. This is in accordance with Ghirardini's (2011, p. 14) explanation which says that e-learning quality can be better if e-learning content is fragmented to facilitate the reception of new knowledge and enable flexible scheduling. The curriculum expert also considers that the exposure method in e-learning media that includes pre-sentations and demonstrations with this video has been feasible. This is in line with research that says watching video learning content from YouTube will increase students' understanding of the knowledge and skills being learned (Lee & Lehto, 2013, pp. 193–208).

Table 2. Interview Checklist for Practitioner

	Not Feasible	Quite Feasible	Feasible
Needs Analysis			√
Target Audience Analysis			√
Task and Topic Analysis			√

According to the interview result, which was also stated on the Table 2, practitioner judges that the developed e-learning media is feasible and useful in the implementation of the 2013 Curriculum, where the instruction is given by teachers for students to learn with learning material resources from the internet in guided and independent learning. He also considered that the set of lessons developed in this developed e-learning media has been feasible as it corresponds to the core material in the basic competence of knowledge and skills of the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject. According to Ghirardini (2011, p. 14) which says that the quality of e-learning can be better by considering relevant and specific learning for the needs and roles of students, including skills, knowledge, and information.

Table 3. Interview Checklist for Learning Media Expert

	Not Feasible	Quite Feasible	Feasible
Content Development		√	
Storyboard		√	
Courseware		√	
Interoperability		√	
Compatibility		√	
Performance		√	
Navigability		√	
Structure			√
Security		√	
Usability		√	

According to the interview result, which was also stated on the Table 3, the learning media expert judges that the content in the developed e-learning media is feasible. He recommends organizing content to be separate from one subject to another with different web navigation pages, and this element has been revised as shown in the first-stage product revision explanation. The compiled storyboards have been quite feasible in describing all components of interactive e-learning media. The courseware structure is also considered feasible and other courseware aspects of interoperability, compatibility, navigation, security, and usability are considered quite feasible by the expert.

However, he recommends to enrich courseware with other courseware and consider alternative connectivity if online access cannot be arranged. Implementation of the media expert's recommendation corresponds with Ghirardini (2011, p. 128) that explains "Solutions for low-cost Internet connectivity can be considered, such as LAN-based LMS, offline players, and mobile-learning technologies".

First-Stage Product Revision

In this stage of product (e-learning media) revison, some virtual classrooms page that organizes each Competency Skills Subject (C3) are added. Other than that, the alternative offline video connectivity that is previously produced, organized in a folder, and then distributed to the students in soft copy form is prepared.

Implementation

Installation and Distribution

Google Classroom and YouTube have been installed on Google servers. Design and development have been done at the design and development stage. Access distribution is done by distributing virtual classroom code to students. This class code is used as a password for students to be able to enter the virtual classroom of the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject.

Management of Student Activities

The YouTube Integrated Google Classroom Based E-Learning Media for the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject was self-paced accessed by students outside the classroom (home, computer lab, or SAS) after the guided learning in classroom with the teacher, and continued with the lab workshop at the next meeting.

In this research, the implementation planning with the divided study time in each meeting for two semesters cannot be fully implemented due to the limited research time. Consequently, the YouTube Integrated Google Classroom Based E-Learning Media was only accessed by students at the end of the overall guided learning in the classroom in the second semester as a guided learning review supplement for the students, as well as a supplement before the lab workshop at the next meeting.

Second-Stage Product Testing

Figure 3 shows that the response of students presented by UEQ on 26 aspects of assessment in the YouTube Integrated Google Classroom Based E-Learning Media utilization generally resulted in a positive value. Attractiveness (point 1, 12, 14, 16, 24, and 25), Perspicuity (points 2, 4, 13, and 21), Efficiency (points 9, 20, 22, and 23), Dependability (points 8, 11, 17 and 19), Stimulation (points 5, 6, 7, and 18), and Novelty (3, 10, 15, and 26) are positive with details of 26 items of positive values, 0 items of neutral values, and 0 item of negative value.

Schrepp (2015, p. 5) explains that the standard interpretation of the scale means is that values between -0.8 to 0.8 represent a neural evaluation of the corresponding scale, values >0.8 represent a positive evaluation and values <-0.8 represent a negative evalua-

tion. The second-stage product testing shows that the mean value on the Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation and Novelty scale is >0.8, this positive rating interpretation indicates that the reliability of the YouTube Integrated Google Classroom Based E-Learning Media in terms of construct aspect is considerably "good".

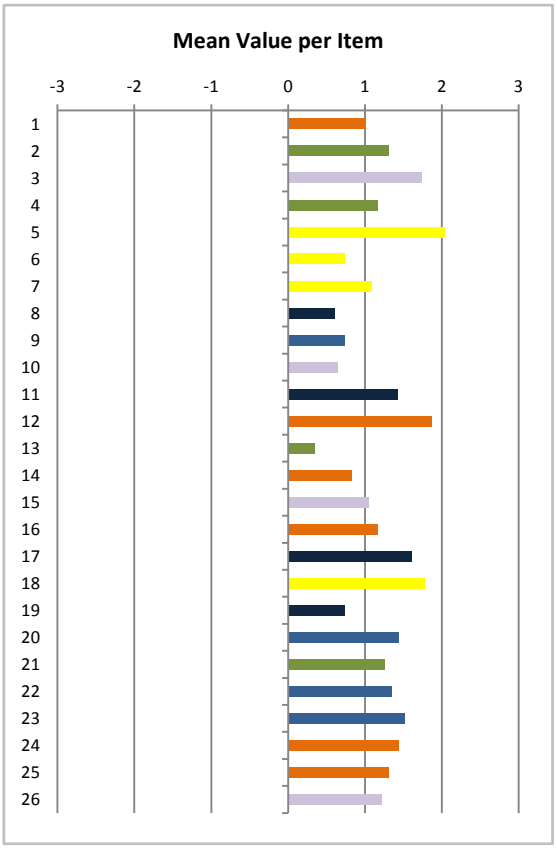

Figure 3. Mean Value per Item

Schrepp (2015, p. 11) also explains that the result is considered "good" (reliable) if the confidence value is <0.5. The result of the second-stage product testing shows that the whole scale confidence value is <0.5, thus it can be inferred that the users rating on the whole scale can be "trusted". Schrepp (2015, p. 9) recommends that the scale Alpha value should > 0.7 to be able to say that the user rated the scale "consistently". The result of the second-stage product testing shows that the Attractiveness, Perspicuity, Dependability, Stimulation, and Novelty has >0.7 Alpha value, it can be concluded that the users rated the scale "relatively consistent". On the other hand, the Efficiency scale has 0.69 Alpha value, therefore it can be said that the users rated this particular scale relatively "less consistent". However, predominantly, user judgments on the whole scale are done "consistently", "not randomly", or "conscientiously".

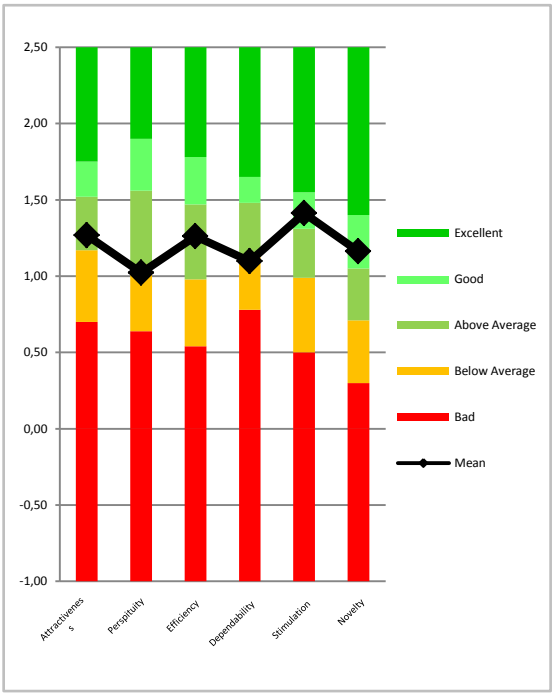

Figure 4. Benchmark Graph

Figure 4 shows a comparison of the YouTube Integrated Google Classroom Based E-Learning Media with other products in benchmark data (Schrepp, 2015, p. 5). The Attractiveness scale result is "above average", Perspicuity scale is "below average", Efficiency scale is "above average", Dependability scale is "below average", while Stimulation and Novelty scales are "good".

The result of the second-stage product testing shows that the reliability of the YouTube Integrated Google Classroom Based E-Learning Media in terms of the construct is predominantly "good". As a learning platform, this e-learning media has provided access to information for students to support the delivery and management of learning through the internet, therefore this media can be utilized in the guided and self-paced learning process in the Light-Weight Vehicle Chassis and Powertrain Maintenance subject. This is in line with the explanation of Ghirardini (2011, p. 118) who says that "Learning platforms are used by organizations and institutions to deliver and manage their learning processes. A learning platform provides students with access to information, tools and

resources to support educational delivery and management".

Second-Stage Product Revision

Based on the second stage test result by the User Experience Questionnaire, the overall user's impression on the product is "good" as described previously in the second-stage product testing section, therefore the second-stage of product revision is not necessary.

Third-Stage Product Testing

The normality test of posttest data on the third stage of product testing shows that the posttest results of both groups are normally distributed. The significance value of student group that uses the YouTube Integrated Google Classroom Based E-Learning Media (YIGC) is 0.495, whereas the student group that uses the internet websites without control (non-YIGC) is 0.531. The homogeneity test of this data shows that the posttest data result has the same variant (homogeneous) with 0.068 significance posttest value. The mean of the YIGC group is 8.25 and the Non-YIGC group is 6.63. The distributed data is normal and homogeneous, independent-samples t-test shows the result that the Sig. (2-tailed) is 0.024. This means that there is a significant difference between the mean of the YIGC and the Non-YIGC group's posttest result.

Evaluation

Reliability of the Construct Aspect

Expert assessments and user responses to the implemented e-learning media are done to find out its reliability in terms of the construct. It was measured using Structured Formal Interviews in the first-stage product testing given to experts and User Experience Questionnaire in the second-stage product testing given to students.

Based on the first-stage product testing, the experts consider that the YouTube Integrated Google Classroom Based E-Learning Media as a whole in terms of the construct is considered "feasible" for the learning process. Recommendations from the learning media expert are: (1) organizing separate content from one subject to another with different web navigation pages, and (2) considering the alternative access connectivity; has been implemented in the first-stage product revision to increase the assessment elements that are "fairly feasible".

Based on the second-stage product testing, Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation and Novelty scales have positive ratings with reliable and consistent results. Hedonic quality is the highest, indicating that students consider learning by using the YouTube Integrated Google Classroom Based E-Learning Media is relatively "entertaining". It can be concluded based on the results of construct test in the second-stage product testing shows that the reliability of the YouTube Integrated Google Classroom Based E-Learning Media in terms of the construct is considerably "good".

Reliability of the Content Aspect

The test in the third-stage product testing for the YIGC and Non-YIGC student group was done to find out the reliability of the YouTube Integrated Google Classroom Based E-Learning Media in terms of content. It was measured using the posttest-only instrument given to the user to measure the achievement of the learning objectives.

Based on the third-stage product testing, the YIGC group has significantly greater learning outcome based on syllabus compared to the Non-YIGC group. The mean of the YIGC group is 8.25, while the mean of the Non-YIGC group is 6.6364. With 18 items of posttest question by 13.5 (75/100) minimum grade, the posttest results of both student groups have a grade that is still below the minimum grade of completeness. However, it is clear that students who use the YouTube Integrated Google Classroom Based E-Learning Media have significantly greater learning outcomes than students who use the internet to access websites without control.

Product Improvements

The YouTube Integrated Google Classroom Based E-Learning Media was previously designed in Google Classroom that is integrated with G Suite for Education account of UPI, and it would be transferred to G Suite for Education account of SMK Negeri 6 Bandung to make accessible virtual classroom for SMK Negeri 6 Bandung students. However, because SMK Negeri 6 Bandung does not have a G Suite for Education account, then the transfer can not be done.

Figure 5. Preview of Stream Page

Based on these constraints, in this research and development the authors apply for the early access' Google Classroom for personal access to Google, so that authors can use Google Classroom with Google personal accounts. All of the YouTube Integrated Google Classroom Based E-Learning Media contents in the G Suite for Education account is redirected to Google's personal account. Along with it, Google finally opens Google Classroom access for all users of Google's personal account. Thus, at the implementation stage, all students can access the YouTube Integrated Google Classroom Based E-Learning Media using their personal Google account.

Final Product

The improvement of the YouTube Integrated Google Classroom Based E-Learning Media has been done on the first-stage product revision, second-stage product revision, and product improvement process. There is no content or construct that were significantly changed at the switching process from the G Suite for Education account to Google personal account except the interface language (English into Indonesian) and the customized background image of virtual classroom main pages. Figure 5 shows a final preview of the YouTube Integrated Google Classroom Based E-Learning Media on the Stream page.

CONCLUSION

Conclusion

The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) stages have been implemented in this research and development. The educational product result of this research is the YouTube Integrated Google Classroom Based E-Learning Media which contains the Light-Weight Vehicle Chassis and Powertrain Maintenance Subject. The learning material presented in this e-learning media is the material that is taught in the eleventh grade's first and second semester of the Light-Weight Vehicle Engineering Department in SMK Negeri 6 Bandung.

The result of content-test shows that students who use the YouTube Integrated Google Classroom Based E-Learning Media have significantly greater learning outcomes than students who use the internet to access websites without control. Students who use highly accessible internet sites (i.e., Non-YIGC) may give fast results, but the reliability of those results can not be ensured. This does not mean that all of these sites give unreliable information, but that these should be carefully reviewed. Competence of information resources, authors' experience and their academic qualifications should be considered carefully. Furthermore, the Non-YIGC students group must

be disciplined in keeping themselves away from trap websites and entertainment in order to obtain the best achievements in their tasks. Less accessible sites have the major disadvantage of difficult access, because of reviewing information carefully takes more time, this situation makes it difficult for students who use the internet without control to work on tasks within a limited time (e.g., tests in this research).

The negative effects of accessibility in e-learning have been decreased by using the YouTube Integrated Google Classroom Based E-Learning Media. Online learning materials are published by teachers for students on the Stream page as learning materials for instructor-led or self-paced learning. The Stream page contains an Announcement, Assignment, and Question posts that are published by the teacher. Students see information, announcements, tasks to be done, or questions to be answered on the Stream page, Student's Tasks page, or on a Google's virtual calendar. The teacher then examines the students' work, gives an assessment, and comments or feedbacks to the students. The use of YouTube Integrated Google Classroom Based E-Learning Media as trustworthy internet resources takes a vital importance for academic study. In addition to this, easy access opportunities for any students at the school to this media has been supplied by only using personal Google account. By utilizing the YouTube Integrated Google Classroom Based E-Learning Media, students were encouraged to use academic and reliable resources from their teachers in their tasks and homework for successful learning.

Suggestion

Limited time and cost are some of the problems that occurred in this research, therefore the implementation stage of the YouTube Integrated Google Classroom Based E-Learning Media is done limited only in Light Vehicle Engineering Department at SMK Negeri 6 Bandung. The YouTube Integrated Google Classroom Based E-Learning Media is recommended to be developed on other subjects or competency skill programs. More broadly, this e-learning media is also recommended to be developed to other vocational areas with some reasonable adjustments to optimize the implementation of the 2013 Curriculum.

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