



Online Learning for Vocational Education: Students' Difficulties and Advantages in Automotive Electrical System Subject and General Issues

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Abstract. This research aims to study the difficulties and advantages of online learning, reveal student responses regarding the content of online learning materials, the tasks given, the learning strategies used, and the online learning systems used. This research is a casestudy research conducted in the automotive electrical system course. Learning is carried out 16 times face-to-face online in one semester. Of the 16 meetings, learning was carried out 14 times, one mid-semester exam, and one semester end exam. Research data were collected through open questionnaires given to students. The questionnaire includes the content of learning materials, assignments given, learning strategies, and the online learning system. The result shows that the contents of the material in online learning given for one semester are very clear, detailed, quality, easy to understand, very interesting. The exercises given online are clear, in accordance with the online material provided, very interesting, the exercises encourage and help students listen and understand the material. Students easily understand the material, the tasks given make it easy to understand the learning material, learning is very effective because the presentation of material starts from simple to complex. Systems used in online learning can deliver all of material through videos facilitated by web learning system, LMS and material linked to YouTube channel are very interesting, efficient for theory learning, and the online learning platforms used is very helpful in learning management. On the other hand, there are students' difficulties found, including the long video duration which causes boredom, fatigue, and consumes internet quota. The internet signal which is sometimes weak in an area makes it difficult to access online learning materials and manage the assigned tasks.

Keywords: Online learning · Vocational education · Students difficulties and advantages

1 Introduction

Learning by using the internet has become a necessity today, for the internet has become a very important technology, including its use for education [1]. The most important

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source of information as learning material at this time is the internet, because it is easily accessible at any time as a source of information and knowledge [2]. With internet-based learning, students feel satisfied because of the ease of interaction that can be facilitated by the internet in online learning [1]. Related to this, the internet has now become very important as a medium that can be used in learning.

Students who have strong self-regulated learning (SRL) skills, will have the ability to plan, manage, and control the learning process independently and have the motivation to repeat the previously studied subject matter. The student can also assess the extent to which he has learned in achieving the learning objectives [3]. Online learning via the web is very demanding on SRL. The experience gained by students through an online learning environment can lead to a learning environment that is more conducive to informal learning, so that students can develop their professional abilities to solve problems and learn independently [2].

Online learning systems can be given feedback by friends online and can also provide feedback to other friends. Through online learning, students use various cognitive processes and present process models to provide feedback [4]. The online learning approach should include understanding and diversity of student groups. The development of a learning system requires the application of quality standards on an ongoing basis. The content, curriculum and use of online learning must be specifically designed to be interesting, interactive, and to strengthen interaction among students [5]. Instruments for evaluating web-based learning include web page views, hyperlinks and navigation, online applications, class procedures and requirements, content delivery, instructor and peer interactions [6].

The learning environment created by the teacher can affect student behavior, the frequency and quality of student participation in class, group work, can trigger students' curiosity, learn to do independently, and show academic integrity in assignments and assessment of learning outcomes [7]. Kay [8] developed an interactive web-based learning system to support specific concept learning by emphasizing, strengthening, and assisting students' cognitive processes. This learning fosters students' independent learning abilities, is proactive, independent, patient, has a responsibility to learn, is able to learn independently, and has a high sense of curiosity. The advantages of learning with e-learning according to Antonis et al. [9], provide learning opportunities without being limited by time and place, can accommodate learning strategies and methods. This system can also be used in conventional classrooms by using an activity management system. Swan [10] argues that the web-based learning system has the characteristics of being independent, highly motivated, highly self-confident, self-regulating, and more sporty.

Online learning can be equipped with several kinds of media, such as text, images, audio-visual, and other media that can be accessed online. The use of audio-visual media in learning can lead to the involvement of students and teachers in discussions during learning. Audio-visual technology improves the quality of learning and student learning experience because concepts can be presented easily and thoroughly which involves writing equipped with pictures and animations [11]. Learning material presented in the form of audio-visual is very helpful in stimulating and facilitating learning. Media in the form of audio-visual has a positive contribution to learning [12].

However, apart from the conveniences provided by online learning, there are some difficulties encountered. Based on several research results, some of these difficulties include: first, the content of reading material delivered online may not be understood by all students because the material content is presented in the form of text, PowerPoint, and in the form of videos [13]; second, the teacher's ability to use technology in online learning. Not all teachers are capable of operating computers or gadgets to use in online learning activities [13]; third, the limitation in the learning controlling. Teachers are limited in conducting the control during online learning.

The first problem, some students do not have devices such as gadgets or computers as online learning media. The second problem, some students are less enthusiastic to participate in online learning even though they are supported by adequate facilities, such as computers, androids, and the availability of an internet network. The third problem is that a number of students live in areas that do not have internet access. They cannot receive lesson materials and assignments delivered by teachers via the internet network. In addition, the duration of online learning that has been going on for months has caused students bored and lazy [13].

Apart from teachers and students, parents also experience problems with this online learning. The condition of the students' parents also affects the implementation of online learning. They generally work outside the home, such as working in government sectors, private sectors, and self-employed fields, so that they can hardly monitor, guide, and assist their children in learning to solve the difficulties they face. In addition, some parents complain that online learning adds to their expenses, namely internet costs [13].

With regard to the studies above, this research aims to study the difficulties and advantages of online learning, reveal student responses regarding the content of online learning materials, the tasks given, the learning strategies used, and the online learning systems used.

2 Method

This research is a case study research conducted in the automotive electrical system course. Learning is carried out 16 times face-to-face online in one semester. Of the 16 meetings, learning was carried out 14 times, one mid-semester exam, and one semester end exam. This learning is carried out in the odd semester from September 2021 to February 2022.

Learning materials provided online include engine electrical systems (starting system, ignition system, and charging system) and body electrical (lighting system, power windows, power mirrors, and wipers). All learning materials are packaged in the form of learning videos by including text, images, animations, and audio that explain all the material in detail. All learning videos are uploaded via YouTube for easy access (<https://www.youtube.com/channel/UCWNlaOLN9JcYsA6LLsOEX5Q>). Online learning management utilizes a learning management system (LMS) called Elena. Online learning is also facilitated through the learning web dwiwidjanarko.com which contains automotive and vocational education instructions and other matters related to learning.

Each learning video that is made is inserted with questions and exercises that must be answered and done by students. The answers and the work that the students have

done, are uploaded via Elena for each meeting. Research data were collected through open questionnaires given to students. The questionnaire includes the content of learning materials, assignments given, learning strategies, and the online learning system. The number of students who participated in this study were 51 people. The data collected was analysed descriptively to describe the conveniences or advantages and difficulties faced by students during one semester of online learning.

3 Result and Discussion

Based on the results of observations and learning assessments carried out by students, the content of the material in online learning given for one semester is presented in solid video media, very clear, detailed, quality, easy to understand, very interesting, there is analytical material, the material can be replayed, and the material is in accordance with the semester learning plan. In the aspect of the exercises given online, the exercises are clear, in accordance with the online material provided, very interesting, the exercises encourage and help students listen and understand the material, varied (from lower to higher order thinking skills/critical thinking), there is a task of drawing an electrical system and analysis, it is not burdensome, and the time to complete the task is sufficient (six days). From the aspect of achievement in understanding the material, the tasks given make it easy to understand the learning material, the material in the learning video is easy to understand, learning is very effective because the presentation of material starts from simple to complex. From the aspect of the system used in online learning, the delivery of material through videos facilitated by web learning, LMS and material links through YouTube is very interesting, efficient for theory learning, and the online learning platform used is very helpful in learning management. There are things that students find difficult, including the long video duration which causes boredom, fatigue, and consumes internet quota. The internet signal which is sometimes weak in an area makes it difficult to access online learning materials and manage the assigned tasks.

Based on other the results of research, there are several things that need to be considered in implementing online learning related to students. Some of them are: **Learner Characteristics:** Focuses on understanding the learner characteristics and how online learning can be designed and delivered to meet their needs. **Online learner characteristics** could be categorized broadly into academic characteristics, cognitive characteristics, demographic characteristics, self-regulation, affective, and motivational characteristics. **Learner Outcomes:** Learner outcomes means statements specifying what the learners will achieve at the end of the program or course. Examining learner outcomes such as dropouts, retention, and success are very critical in online programs. **Engagement:** Engaging the learners in the online courses is very important for they are separated from the peers and instructor in the online learning setting. Engagement is evaluated through the lens of presence, participation, interaction, communication, community, involvement, and collaboration [14].

Some important things needed to be considered in online course/learning related to subjects and teacher or instructors are: **Program or Course Design and Development:** Program design and development is very critical in online teaching and learning as it assists and engages the students in completing the learner outcomes. Several processes

and models are utilized to develop the online learning/course, employing some different design elements to fulfil students' needs. **Course Facilitation:** The facilitation of the learning or course is as important as learning or course design. Facilitation strategies that are used in implementing of the program or course such as in modelling practices and communication are examined in program or course facilitation. **Course Assessment:** Course Assessments are delivered and adapted in an online learning setting. Formative assessments, differentiated assessments, peer assessments, learner choice in assessments, online proctoring, feedback system, alternate assessments such as e-portfolios, and plagiarism in online learning are examined. **Evaluation and Quality Assurance:** Evaluation is making a judgment either on a program, the product, or the process during or at the end. It is needed to have research on evaluation and quality in the online learning or courses. **Course Technologies:** A number of online learning technologies such as LMS (learning management systems), online audio and video tools, online textbooks, social networks, collaborative tools, to build online environment or community have been the research focus. **Instructor Characteristics:** Increase in online learning or courses, there has been an improvement in the number of teachers and instructors who teach online courses. Instructor or teacher characteristics can be evaluated through their satisfaction, experience, and roles in online course/teaching [14].

Related to institutions, several things that need to be paid attention in online learning are: **Institutional Support:** The online learning support is examined both as learner and instructor support. Online students have to be supported to be successful online learners. These include academic, social, and cognitive support. Online instructors have to be supported in terms of technology and pedagogy to become successful online teachers or instructors. **Access, Equity, Culture, Inclusion, and Ethics:** Cross-cultural online teaching and learning is gaining importance along with access in global settings. Providing inclusive opportunities for all students and in ethical ways is being examined. **Leadership, Policy and Management:** Leadership supports are essential for success of online teaching and learning. Leaders strategies, challenges, and perspectives used are examined. Policies and governance related research are also being studied [14].

Some studies showed the positive influences of e-learning from the insights of students. E-learning allows much flexible learning ways for students to go for classes reducing needs for travel. Students are able to get deeper outlook of the learning material through learning activities carried-out in the real or virtual classroom through interactive audio-visual facilities. This allows students to respond toward the activities promptly [15]. Other important benefits of LMS are, making it user friendly, provide ease in the management of courses, effective in managing time, facilities, teachers, and generate reports. Further, it provides timely reminder to all users which include; answering questions, date of deliveries, test dates etc. LMS is one of the efficient and effective tools. Some of the advantages include flexibility following the modules used and assist in any teaching through any style or mode of environment. Considering the design of modular and its user interface. Besides, easy installation process in Moodle and improvements in the user authentication options, help in improving the usage frequency [15].

Despite the many advantages, e-learning also causes some challenges and obstacles that lead to the negative. E-learning, resulting in a lack of student interaction, is less

effective because there is no face to face with the teacher, online assessments allow plagiarism, cheating, etc. to occur. The most obvious weakness is the absence of personal interaction between peers, as well as between teachers and students. Student involvement is much less than student-teacher interaction in the classroom. Most students work independently and do not interact with their classmates. Another disadvantage is student motivation in online learning. Students who are less motivated and less independent have lower success rates compared to their peers. Students who lack self-control tend not to spend enough time to complete assignments. Because of that, the quality of the work is poor or the assignment is late [15].

Other studies show that the advantages of online learning are media diversity. The Internet is the primary, multi-purpose tool for delivering learning materials to students around the world. Internet sites typically use a variety of media, including text, audio, graphics, images, videos, and downloadable software. With the ability to connect to information resources around the world, students can easily access the library and up-to-date learning resources. The main advantage of the internet is that it is easy to move within and between documents. By clicking, users can search for documents in various locations without leaving the computer. Through the internet too, students can have “conversations” with experts in certain fields, communication can take place comfortably, and allowing students to get ideas from various locations. Students can communicate with each other at various times and respond according to the opportunities that exist, and at low cost [16].

Otherwise, the limitation of online learning are: 1) some topics covered on computer networks, especially on the internet, sometimes are not suitable for students, 2) students may write papers or projects that are simply “co-fitting” (copy paste) and not their own work, 3) finding information more difficult for many information resources, 4) without good technical support and wise management, a network of computers may “shut down” quickly, 5) all users must be connected to the internet network with appropriate software and hardware installed in order to access the internet, 6) signal strength is also an issue in wireless connections, 7) lack of quality control to evaluate information because information can be unnecessary, wrong or untrustworthy [16].

Effective online education consists of teaching and learning that takes place online. Research works, principles, prototypes, theories, ethics and assessments with online learning designs need to be strengthened. Teaching and learning must be of high quality, because effective online learning is an implementation of well-planned learning design and planning [17]. Suggestions to improve distance learning are: 1) setting up distance learning by providing continuous guidance and improvement strategies for teaching staff, 2) Communication with students, use of asynchronous video communication, lack of personal contact, delaying responses to student messages, and poor communication require special attention, 3) Some teachers do not upload enough learning resources and appropriate testing for distance learning, 4) Teachers set deadlines for preparation of tests, midterm tests, and end-of-semester tests that are not suitable for all students [18].

The main advantage of online learning is that it has easy access to learning modules anywhere and anytime. This adds flexibility, reduces costs, stresses and saves time and effort. Furthermore, the drawback is the lack of direct clarification from the instructor

right away, as in conventional classes. Another weakness is the decreased level of motivation and lack of face-to-face interaction with teachers and students. The limitation of this research is that this research is only based on user perception. In addition, the scope of learning is limited to the context of students and teachers only. The contribution of this research is the identification of the advantages and disadvantages of online learning. The practical contribution of this study is the identification of causes due to low online student employment rates [19]. Digital learning and online learning are increasingly being used due to greater flexibility, lower costs, and wider access. However, the implementation of online learning during the COVID-19 pandemic also poses problems. Some parents have negative attitudes about the value and benefits of online learning. Students' self-control is not sufficient so that there are difficulties in online learning, lack of time and professional knowledge of parents in supporting online learning [20].

4 Conclusion

The contents of the material in online learning given for one semester are very clear, detailed, quality, easy to understand, very interesting. The exercises given online are clear, in accordance with the online material provided, very interesting, the exercises encourage and help students listen and understand the material. Students easily understand the material, the tasks given make it easy to understand the learning material, learning is very effective because the presentation of material starts from simple to complex. Systems used in online learning can deliver all of material through videos facilitated by web learning system, LMS and material linked to YouTube channel are very interesting, efficient for theory learning, and the online learning platforms used is very helpful in learning management. On the other hand, there are students difficulties found, including the long video duration which causes boredom, fatigue, and consumes internet quota. The internet signal which is sometimes weak in an area makes it difficult to access online learning materials and manage the assigned tasks.

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