Online Teaching and Learning Platform at Vocational Education in Semarang-Indonesia

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Abstract. The urgency of online teaching and learning in vocational education is class limitations, learning boredom, and interaction restrictions, and recently direct contact restrictions due to the pandemic. This study aims to analyse online teaching and learning platforms in vocational education in the city of Semarang-Indonesia. This quantitative research with a survey to collect the data was employed in this study. The research involved vocational education students at the Department of Automotive Maintenance Engineering and Management at Vocational schools in Semarang City as the population. The sample was selected by using probability sampling method taken by simple random sampling technique. Data collection was carried out through questionnaires, interviews, and documentation. The results of the analysis of research data showed that online teaching and learning platforms in vocational education in the city of Semarang-Indonesia are influenced by indicators of technical conditions, indicators of teacher skills, indicators of teacher teaching styles and student and teacher interactions on online teaching and learning platforms. Factors that make it difficult for teachers on the online teaching and learning platform consist of the limited supporting facilities; limited learning management skills; quality of digital media utilization. Limitations that occur to students consisted of poor internet connection, limited internet quota, limited communication devices, still poor quality of use of learning applications used by teachers in learning activities.

Keywords: Online teaching and learning platform · Vocational education · Teachers · Students · Learning technology

1 Introduction

The constraints to online teaching and learning are mainly related to resources, accessibility and infrastructure, presence of communication features, social factors of students and teachers. As a result of the Covid-19 pandemic, there have been rapid and extensive changes in the learning process in vocational schools in the form of digital transformation, including a radical change from face-to-face teaching learning activities to online teaching and learning platforms [1, 2]. Technological advances can counterbalance some

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of the negative impacts of the pandemic on education, the limitations of tools and methods still need to be thoroughly considered [3]. Differences in the socioeconomic status of students will strengthen the inequality of student learning opportunities [4]. The role of parental support [5], the leadership factor as a transformation process in educational institutions during the Covid-19 pandemic [6] important on the online teaching and learning platform. Based on this assumption, the research questions are,

a. How is the online teaching and learning platform at vocational schools in the city of Semarang-Indonesia?
b. How are students' perceptions and interactions on online teaching and learning platforms?

The online teaching and learning platform in vocational schools at the city of Semarang-Indonesia was measured by 4 sub-variables (1). Technical conditions, (2). teacher skills, (3). teacher's teaching style, and (4). student-teacher interaction.

The purposes of this study are to analyse these followings; (1) Online teaching and learning platforms in vocational education in the city of Semarang-Indonesia is measured which includes; technical conditions; teacher skills; teacher's teaching style; and student-teacher interaction, and (2) student perceptions and interactions on online teaching and learning platforms.

2 Theoretical Review

2.1 Research Urgency

The characteristics of online teaching and learning utilize ICT – based learning [7], digitalization – based learning [8]. Social media, facebook, WhatsApp, lines used in online teaching and learning. Online teaching and learning are shifting the role of face-to-face learning. Online teaching and learning are cooperative, requiring a high level of interaction and collaboration [9]. Although it is realized that the emotional level of direct learning can decrease, the rapid development of technology encourages the application of online teaching and learning. The urgency is class limitations, boredom in learning, and limited interaction. This is supported by the results of a survey on e-learning at various universities [10] as well as a strong statement from the OECD about the urgency of implementing online teaching and learning. The application of online teaching and learning is in line with the needs and availability of facilities and is equipped in interactive multimedia, teaching materials, assignments, online discussions, learning videos and even interactive video conferences [11]. This finding is the reason that online teaching and learning platforms are strategic to be supported and developed according to the conditions of vocational schools in the city of Semarang.

2.2 Online Teaching and Learning in Vocational Schools

The rapid development of information technology supports learning activities, investment in online systems and devices [12]. The main challenge is the integration of innovative systems to strengthen and support teaching and learning processes [13].

Online teaching and learning are carried out based on web, electronic, internet, virtual world, virtual and distributed learning [14]. Online teaching and learning platforms need to be supported by technology, information systems and computers, electronic devices as an effort to build and design student learning experiences in vocational schools.

2.3 The Platform of Online Teaching and Learning at Vocational Schools

Preliminary studies on online teaching and learning for the quality of online learning systems on several countries showed the factors of the online teaching and learning framework model, such as P3 course evaluation model [15]; PDPP evaluation model [16]. The results of the study revealed that educational institutions are expected to participate in the implementation of online teaching and learning [17]. Although there are still doubts about changing the face – to – face learning pattern to an online format. Resistance is associated with a lack of support, assistance, and training of educational institutions [18].

This present study can become the basis for supporting the online teaching and learning platform in this study including (1) technical conditions, (2) teacher skills, (3) teaching style, and (4) student-teacher interaction and is associated with student perceptions and interactions on online teaching and learning platforms.

3 Research Methods

This quantitative research employed a survey model conducted at public vocational schools in the city of Semarang. The research involved vocational school students at the Department of Automotive Maintenance Engineering and Management (TMPO) at the public vocational schools in the city of Semarang as population. Sample selection was conducted by using probability sampling method with simple random sampling technique. The research data sources consisted of primary and secondary sources. Primary data was obtained through a questionnaire to measure strategies which included attitudes, opinions, and perceptions of teachers and students about indicators on the online teaching and learning platform, students' perceptions and interactions on the online teaching and learning platform.

3.1 Research Instrument

Research questionnaire consisted of questions about student demographics (age, gender, academic year, and school), previous and distance learning experiences, available technologies, learning benefits, disadvantages, teacher skills, challenges, attitudes, and their perceptions of online teaching and learning in education vocation.

3.2 Data Analysis Technique

The data were analysed using the Structural Equation Model. The first step was to analyse if the data were reliable and valid, then conducted a suitability test and instrument test on the research model, based on the suitability index and cut-off value.

Table 1. Reliability test results

Variable	Construct Reliability	Information
Online teaching and learning platform	0.805	Reliable
Student perceptions and interactions on online teaching and learning platforms	0.826	Reliable

3.3 Interpretation of the Determination Model

Steps to interpret the standard solution consisted of measuring the influence or contribution of indicator variables to latent variables and measuring the influence between latent variables.

3.4 Data Testing Techniques and Hypotheses

3.4.1 Validity Test

Validity test was performed with confirmatory factor analysis. Based on the calculation of Confirmatory Factor Analysis (CFA) using AMOS 20 software, the results of the validity test on the indicators of online teaching and learning platforms, and student perceptions and interactions on online teaching and learning platforms were obtained with significant regression weights value above 2,0 with ρ value less than 0.05. Therefore, all indicators that make up the variable construct were considered valid.

3.4.2 Reliability Test

The reliability test used Cronbach's alpha. The reference value of Cronbach's alpha is above 0.70 [19]. While the reliability value with the range 0.6–0.7 is still acceptable [20]. Based on the calculation of construct reliability with AMOS 20 software, the results are shown in Table 1. The value of the construct reliability coefficient >0.7 means that the research instrument is reliable.

4 Results and Discussion

4.1 Research Result

In Fig. 1, the goodness of fit index is interpreted as follows; (1) The chi square value of 443.086 with a probability of $0.000 < 0.05$ indicates a bad indication. According to Ferdinand (2002), the expected chi square probability is not significant because the probability shows a large deviation as indicated by the chi square value; (2) The value of CMIN/DF to measure the goodness of fit relationship between the model and the number of estimated coefficients expected to reach the level of fitness is obtained by a value of 2.227 and shows an indication of marginal fit because it is above the critical value of CMIN/DF ≤ 2.0; (3) Goodness of fit index (GFI) is the overall level of fitness, which the residual squared (R2) from the predicted data compared to the actual data but

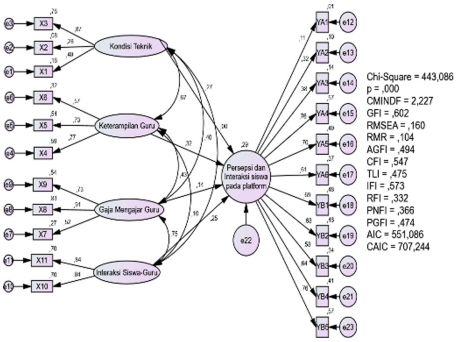

Fig. 1. Output of path diagram on online teaching & learning platform at vocational schools in Semarang-Indonesia

not adjusted to the degree of freedom. The higher GFI value indicates the better fit, in this study, the GFI value is 0.602 0.90 which means this value has a marginal fit; (4) Comparative fit index (CFI) is the comparison between the estimated model and the null model. This index is in the range 0–1 and a value close to 1 indicates the model has a good level of fitness. It is highly recommended to use this index because it is relatively insensitive to sample size and is less affected by the complexity of the model.

By considering the recommended value of 0.90, the CFI value of 0.547 indicates that this model has a marginal fit; (5). The adjusted goodness of fit index (AGFI) is a development of the GFI, which is an index that has been adjusted to the ratio of the proposed degree of freedom model that is 49 to the degree of freedom of the null model. The recommended acceptance value is AGFI 0.90, this model has an AGFI value of 0.494 so it is considered to have a poor level of fitness; (6) Tucker lewis index (TLI) is an alternative incremental fit index that compares a tested model against the baseline model. The recommended value is 0.90, in this study, it can be concluded that the model shows a marginal fit with a TLI value of 0.475; (7) The root mean square error of approximation (RMSEA) is a measure that tries to correct the tendency of the chi square statistic to reject the model with a large sample size. The acceptable value is 0.08, in this model the value is 0.160 so that it shows a marginal fit level of fitness. The overall conclusion of the measurement of the goodness of fit index model is presented on Fig. 1 is that the model has not been well received. Basically, researchers can consider modifying the model based on theory to form an alternative that has a better goodness of fit index [20]. However, in this study, the researcher did not modify the model because the researcher wanted to show actual results in the field, not results after modification.

4.2 Discussion

Research Questions 1

Online teaching and learning platforms in vocational education in the city of Semarang, Indonesia are successively influenced by teaching styles, teacher-student interactions, and student-student interactions, technical conditions, and teacher teaching skills, and can be explained as follows,

The sub-variable of the teaching style: the most influential sub – variables of the teaching style are; (1) balance of providing 'theory and practice' on the instructional materials [21]; (2) balance the number of tasks with the allocation of students' learning time [22]; and (3) adaptation of the teaching styles with online teaching and learning platforms [23]. The implementation of the comparison of theoretical and practical learning is recommended by the Indonesian Ministry of Education at Vocational schools of 70:30% is the right approach to strengthen the instructional materials. If the ideal balance is achieved, students are educatively and professionally prepared to contribute in the rapidly changing global business environment in which they will work.

The sub-variable of Interaction: the learning process on online teaching and learning platforms include (1) interaction between students; and (2) student and teacher. This interaction must be maintained properly because it can affect the quality of students' learning [24]. A good affective relationship between students and teachers can strengthen students' interest in learning [25]. The role of teacher - student interaction in the educational environment influences linkages, a sense of belonging, interpersonal support, and warmth. In line with interpersonal theory, Mainhard et al. (2018) argues that the level of closeness between teachers and students is determined by the behavior shown by a teacher during the learning process in the classroom [26].

Other research has focused on student-teacher relationships on students' emotional engagement which revolves around feelings of pleasure and joy. In addition, a meta-analysis of studies on teacher support and emotion [27], found that there was a positive correlation of support with positive emotions on the student-teacher relationship and learning quality [28].

The sub-variable of the technical condition: this sub variable is respectively influenced by; (1) Technology accessibility and (2) students' technology adequacy on online teaching & learning platforms.

The presence of technology in schools can strengthen online teaching & learning platforms. The completeness of digital technology does not mean that students and teachers can use it effectively for learning and teaching [29]. However, it still requires basic digital skills such as the skills to understand, evaluate, and communicate with digital technology in their daily routines [30]. In education, the integration of digital technology involves many interrelated factors such as curriculum, teacher characteristics, training and development, infrastructure, organizational factors (school leadership, school culture and framework) that support it [31]. Integration of Information and Communication Technology (ICT) relates to the application of technology to strengthen face-to-face learning (Grabe & Grabe, 2007) and online-based learning.

The success of ICT integration in the learning process is influenced by; (1) various structural elements such as availability of resources and classrooms; availability of ICT support and maintenance; and (2) cultures such as the school's mission and vision for the integration of ICT in schools. [32]. Bingimlas (2009) emphasized that several steps required to ensure that ICT integration can occur properly are as follows availability of ICT resources (both hardware and software); pedagogical approach training; sufficient time for daily lessons; and continuous supply of reliable technology [33]. Furthermore, Sarkar (2012) lists the elements that influence the application of ICT in learning including

leadership issues; equitable distribution of resources and ICT sustainability; and financial problems [34].

The Sub-Variable of the teaching skills. It is successively influenced by factors; (1) use of tools on online teaching and learning platforms; and (2) efforts to develop teachers' technical skills in the use of instructional technology. In addition to basic digital skills, the types of knowledge related to digital technology, teaching, and teaching content are required by teachers when teaching in technology features [35]. Teachers are required to have knowledge and teaching skills in using digital technology efficiently [36, 37]. Teachers are required to be able to provide technology – supported learning opportunities for their students, to use digital technology and be aware of how digital technology can support student learning [30]. Technology adoption on online teaching and learning platforms is complex because it is influenced by; school resources; friends of the same age; and beliefs of personal competence. Teachers are described as change agents in lifelong learning to successfully advance teaching through the inclusion of digital technologies. The integration of technology in online teaching and learning platforms can strengthen teacher's competence. Teachers are motivated to take advantage of tools/technology and continue to strengthen professional development and better competencies.

Research question 2

Students' perceptions and interactions on online teaching and learning platforms.

In online learning environments, teachers, and students play an important role in each other's experience [38]. Hartman et al. (2000) revealed that teachers' satisfaction and student learning are highly correlated. When instructors have better teaching performance, students tend to have higher satisfaction [39]. The extent to which teachers and students can interact and communicate well with each other has been considered critical to the success of online learning [40].

Student-teacher interaction and student – student interaction have been identified as significant contributors to learning outcomes and student satisfaction. Analysis of the results of the study concluded, students may feel isolated in the online environment, instructors should adjust teaching strategies by adopting a more interactive teaching style, encouraging more student interaction, and opening more channels of communication to students [41]. Facilitating effective interaction in an online environment is a challenge, especially if teachers do not build deep relationships with students. Compared to face-to-face interactions, computer-based communication transmits fewer social context cues such as facial expressions, tone of voice and body language.

Lack of social interaction becomes a weakness in the online model learning process [42]. Existing student-teacher and student-student interactions are positively related to student satisfaction in technology-mediated environments [43]. The use of technology to enhance student-teacher and student-student interactions helps overcome the lack of social interaction in online learning. The use of collaborative (Raspopovic et al. 2017) and personal (Kompen et al. 2019) tools and methods in online learning environments has been shown to improve student interaction and learning [44, 45].

Teacher's teaching skills are successively influenced by these factors; (1) use of tools on online teaching and learning platforms; and (2) efforts to develop teachers' technical skills in the use of learning technology. In addition to basic digital skills, the types of knowledge related to digital technology, teaching, and teaching content are required

by teachers when teaching in technology features [35]. Teachers are required to have knowledge and teaching skills in using digital technology properly.

5 Conclusion

Based on the results of the analysis on online teaching and learning platforms at vocational schools in the city of Semarang-Indonesia, several influential sub-variables consisted of (a) Teacher teaching style sub-variable including the balance of providing 'theory and practice' learning materials, balance the number of tasks with the allocation of student learning time and adaptation of the teacher's teaching style with online teaching and learning platforms, (b) Interaction sub-variables in the learning process on online teaching and learning platforms consist of interactions between students; and student-teacher. The importance of maintaining interaction matters because it affects the quality of student learning. A good relationship will strengthen students' interest in learning, so that it will increase the sense of connection; a sense of belonging; interpersonal support; and warmth, (c) the technical condition sub-variable is influenced by technology accessibility and technology adequacy of students on online teaching & learning platform. Completeness of digital technology must be followed by strengthening basic digital skills such as the skills to understand, evaluate, and communicate with digital technology applied in learning. The success of the integration of technology in online teaching & learning platforms is influenced by the availability of resources and support from the leadership of the vocational school for the achievement of the school's vision, mission, and (d) teaching skills sub -variable are influenced using technology on online teaching and learning platforms; and efforts to develop teachers' technical skills on the use of learning technology. Teachers are required to have good skills in teaching using technology. The quality of teacher skills is influenced by school resources; friends of the same age; and beliefs of personal competence. The integration of technology in online teaching and learning platforms can strengthen teacher competence.

Analysis of student perceptions and interactions on online teaching and learning platforms on student-teacher interactions and student-student interactions contributed significantly to producing learning outcomes and student satisfaction levels. The results of the analysis concluded that students who feel isolated in the online environment can be overcome by teachers implementing more interactive teaching strategies, encouraging more student interaction, and opening more communication channels to students so that learning is student-centred.

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