

Online Learning for Vocational Education: Uncovering Emerging Themes on Perceptions and Experiences

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ABSTRACT

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The worldwide spread of the COVID19 pandemic has shifted the teaching of theory and practical sessions in all schools, including in the field of vocational education, to online learning. Theoretical and practical learning in vocational education become more flexible and is not confined to physical space. A systematic literature review of selected research articles was conducted using Systematic Reviews and Meta-Analyses (PRISMA) guidelines based on important keywords of online learning in vocational education. Initially, the research identified 89 articles from Scopus databases by using a specific keywords search. After the screening phase, ten articles were finalized to meet the criteria for review and discussion in this paper. The thematic analysis conducted reveals several exciting topics discussed in this paper; students' experiences, teaching and learning performances, and the teacher and students' perception of online learning for vocational education. The study implies the cruciality of understanding the role of teachers and students in vocational education so online learning can be optimized and conducted efficiently.

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Introduction

The recent global pandemic, which also hit Malaysia, had an impact on the teaching and learning system in every school around the world. The application of theory and practical sessions in every school was heavily disrupted because students are not allowed to go to school during this epidemic. It made it more difficult for them to master certain skills or knowledge, especially for students in technical and vocational schools. In addition, the use of information and communication technology (ICT) became vital during this pandemic for teachers to deliver their knowledge through online teaching and learning sessions. In COVID-19 conditions, teachers are facing a big problem to deliver their knowledge, especially in the vocational education field. Vocational education is one of the areas concerned with preparing students to work according to their field (Yudantoko, 2020). Vocational education consists of both theory and practical courses through which students can obtain skills and experience that are directly related to a future career. It assists students in becoming more skilled, which also leads to improved job chances. The practical support of their vocational education can be addressed by meeting the needs of information development (Zhang, 2020).

In addition, students that have a good vocational education are better prepared to thrive in their future workplace. The problem of unemployment could be solved by raising the standard of vocational education, which would result in higher-quality human resources (Tafakur et al., 2020). While analyzing the learning process in vocational schools that involves a balance of practice and theory, Silvana et al. (2021) discovered that students need to engage with their teachers and be supported in order to understand the material leading to attaining practical goals. According to Bain et al. (2002), students must be able to relate vocational practice to academic concepts in the course material, backed by a variety of educational and mobile resources, with ample time to use, critically examine, and discuss the content.

When the COVID-19 pandemic hit all countries globally, including Malaysia, teachers needed to shift to online learning methods to convey knowledge in terms of theory and practice. Therefore, teachers and students alike have to learn to use technology efficiently (Munastiwi et al., 2021). Good internet connection became necessary in this online learning session. There are several methods for implementing it, including full-fledged blended learning or web-based learning. The online learning process involves a change in cognitions and behaviors that place a greater emphasis on the learning process (Mohamad et al., 2022). According to Kholifah et al. (2020), true commitment is required to acquire 21st-century competency in vocational learning, which may be accomplished by incorporating ICT into the learning system (Hassan et al., 2014). A hybrid or blended learning model which combines face-to-face and online learning would be the result of such ICT integration (Sudin et al., 2022).

As Means and Neisler (2021) demonstrated, analysing students' experiences with online courses during the COVID-19 pandemic would provide us with a better understanding of their experiences, practices, and satisfaction. Amhag (2020) stated that students' learning can be developed through constant reflection, both academically and professionally, as well as self-assessment, which would enable them to achieve a high level of reflection by transitioning between theoretical and practical knowledge. However, in the composition of vocational learning, practical learning predominates over theoretical learning. Therefore, the goal of this paper is to conduct a systematic review of online learning implementation in the field of vocational education in order to better understand how they are researched globally during the pandemic. This review is motivated by the following questions: What methodologies, and journal choices for publication dominate online learning studies in the vocational education field? What common themes unfold in the implementation of online learning studies in vocational education? The remainder of the paper is laid out as follows: The research method is presented in the next section which is followed by the findings presented in the Results section. The detailed discussion takes place in the Discussion section and the work is concluded by discussing the ramifications of the findings, limitations, and recommendations for future research areas in the final section before reference lists.

Research Method

This study employs a systematic literature review method to examine various data sources related to online learning and vocational education. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach was used to conduct the systematic literature review (Moher et al., 2015). The articles were retrieved from relevant journals, international journals, and conference proceedings. A time frame of three years ranging from 2019 to 2021 was chosen because these are the period to check on the development of research and publications related to online learning during the pandemic.

Search Strategy

The following are the steps taken in the systematic literature review method:

- a. Planning: Identification of the objective is the first step in conducting this research. The primary research goal of this study is to learn about the advancements and research that have been conducted in the field of online learning for vocational education.
- b. Selection: The article selection process was carried out using the Scopus databases. 'Vocational AND Education AND Practical AND Online Learning' are the chosen keywords that are adequate for the database search. The suitability of the chosen keywords, objectives, and findings is taken into account in the selection of articles. Following that, the articles obtained are chosen in accordance with the review's purpose.

- c. Extraction: This step involves the investigation and extraction of information from articles that were chosen in the previous process. Using Google Spreadsheet, a research matrix is created for the extraction of information crucial to the research such as the title of the article, the author of the article, the year of the research, the emerging themes, keywords, objectives, types of journals, types of papers, and additional study results details.
- d. Execution: The process of synthesizing data and results discovered previously in the research matrix marks the final step. The results are then examined based on the review's purpose. Table 1 shows the summary of the articles that have been reviewed to achieve the objective of this study.

Shortlisted Review Articles

All of these steps can be summary from the selected articles as shown in Table 1.

Table 1: Summary of selected articles

<i>Author/s and Year of the study</i>	<i>Country</i>	<i>Research Methods</i>	<i>Themes</i>
Rabiman et al. (2021)	Indonesia	Survey	Student Perception
Wagiran et al. (2020)	Indonesia	Survey and Case Study	Teacher Perception
Kholifah et al. (2020)	Indonesia	Experimental	Teacher Perception; Student Experiences
Yudantoko (2020)	Germany	Survey	Student Perception
Zhang (2020)	China	Survey	Teaching and Learning performance
Edy et al. (2020)	Indonesia	Experimental	Teaching and Learning performance; Student Perception
Chen et al. (2020)	Australia	Survey	Teacher Perception
Tafakur et al. (2020)	Indonesia	Experimental	Teaching and Learning performance; Student Experiences
Amhag. (2020)	Sweden	Case Study	Student Perception
Muslim et al. (2019)	Indonesia	Experimental	Teaching and Learning performance; Student Experiences

Table 1 concludes the identified articles that have been chosen from the Scopus database search. These summaries indicate the authors and year of the studies, the country of the studies, the themes, and the research methods for each study. Based on the classification above, the majority of the research themes revolve around student and teacher perceptions in relation to their teaching and learning experiences.

Results

To identify the most relevant papers, certain inclusion and exclusion criteria were set. Several limitations were added to the search in the Scopus database: 'English' for the language, 'vocational education' and 'online learning,' for the fields of study, and '2021-2019' for the timeframe.

Following the application of the PRISMA approach, ten (10) articles were found as meeting the qualifying requirements as specified by the given criteria, as shown in Figure 1.

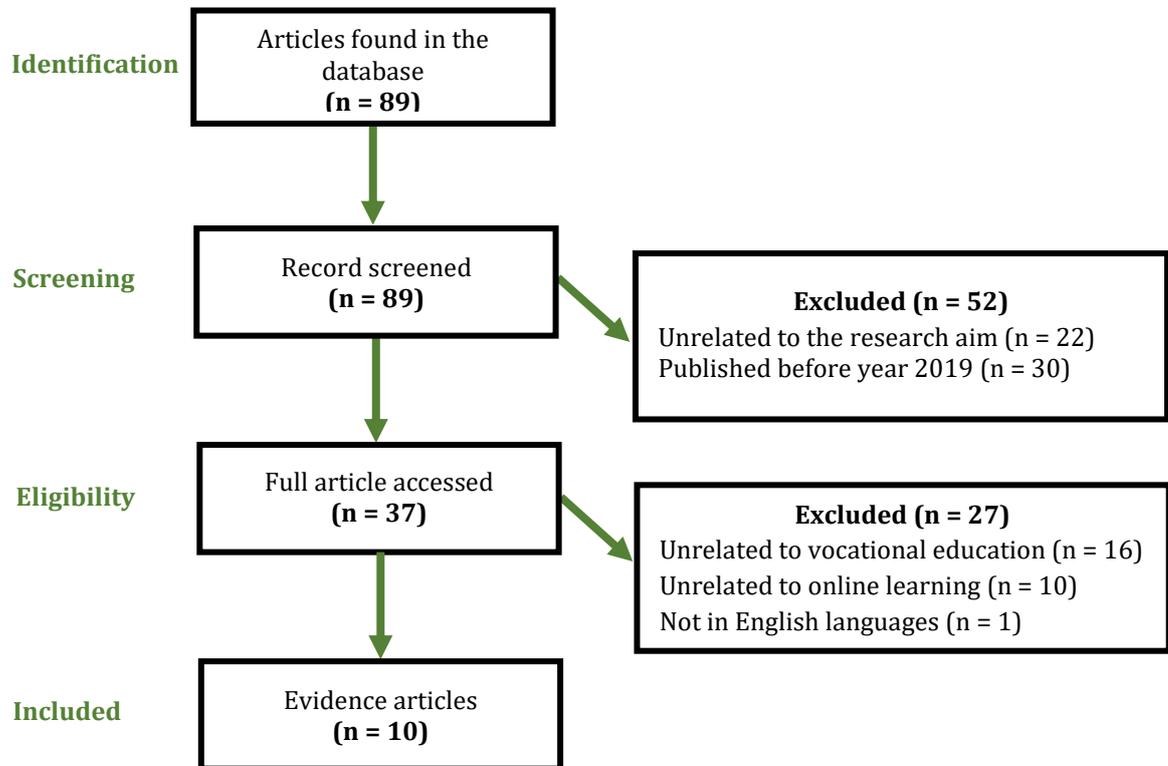


Figure 1. Depiction of the PRISMA-based systematic literature review process in a flowchart form.

Figure 1 represents the process involved in article selection from the Scopus database. The process in this flowchart is based on the PRISMA approach, which summarizes identification, screening, eligibility, and included papers in the systematic literature review. Authors largely utilize the PRISMA approach in producing systematic review protocols for publication, public consumption, or other purposes. The approach is also used by review funders to guide applicants through the review protocol inclusion process. Peer reviewers used PRISMA as a tool to determine whether the protocol contains crucial elements (Moher *et al.*, 2015).

The first phase is article identification in Scopus databases based on keywords that are closely related to the research study. These are the syntax of the keywords that have been identified in the Scopus database search (*TITLE-ABS-KEY (vocational AND education AND practical) AND TITLE-ABS-KEY (online AND learning)*).

Based on screening phases of the language, the field of study, and period, eighty-nine (89) articles were identified from Scopus databases. After title and abstract screening, fifty-two (52) were read in full-text, from which twenty-two (22) articles are not related to the research study and thirty (30) articles have not met the chosen period. Based on eligibility criteria, thirty-seven (37)

articles were examined, of which twenty-seven (27) articles were not related to the field of the study; 'vocational education' (n = 16) and 'online learning' (n = 10). Meanwhile, there is one (1) article that is not in the English language. Finally, only ten (10) evidence articles were included for in-depth analyses that met the assessment criteria.

As shown in Table 1, the review articles framework identified various concepts: authors and year of the study, country, research methods, and themes. Ten papers fulfilled the predefined inclusion criteria in this systematic literature review. The following three years, 2019, 2020 and 2021, were chosen because the Covid-19 pandemic began to spread in 2019, and many researchers researched online learning in both theoretical and practical aspects in the pandemic time. This is due to physical distancing, as one of the ways to break the spread chain of COVID-19. On the government's instructions, teachers were required to work from home, while students were required to study online or better known as learning from home. As such, there are many articles related to online learning that have been published in this period.

Discussions

This section underlines the analysis conducted on the articles that are steered by the research questions which are on the methodologies and journal choices for publication and the common themes that dominate online learning studies in the vocational education field.

a. Research Approach

This section will discuss the research approaches used in the chosen articles as to answer the first research question.

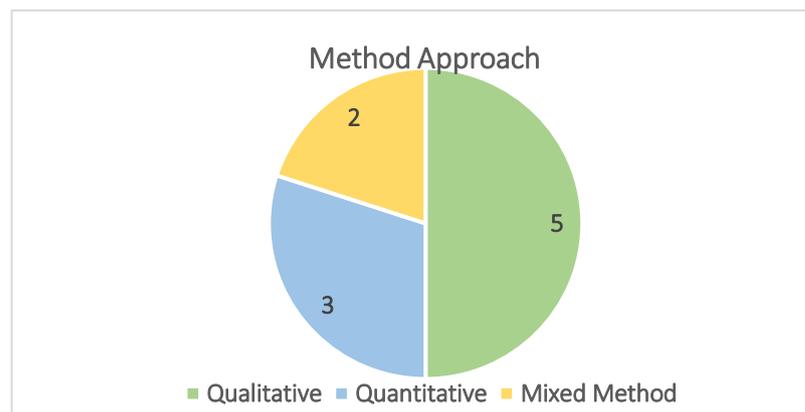


Figure 2. Research approaches used in the selected articles (n = 10)

Figure 2 shows the distribution of the method approach from ten (10) selected studies. Based on the studies, the approaches used in the papers were categorized into three categories: qualitative, quantitative, and mixed methods. Out of ten (10) selected studies, five (5) were conducted using a qualitative method, three (3) were focused on a quantitative method; meanwhile, only two (2) have used both mixed methods. Qualitative studies were the most chosen approaches in the study. Most

of these studied articles were published in different journals. Next, data collection methods that are used in selected articles can be seen in Figure 3.

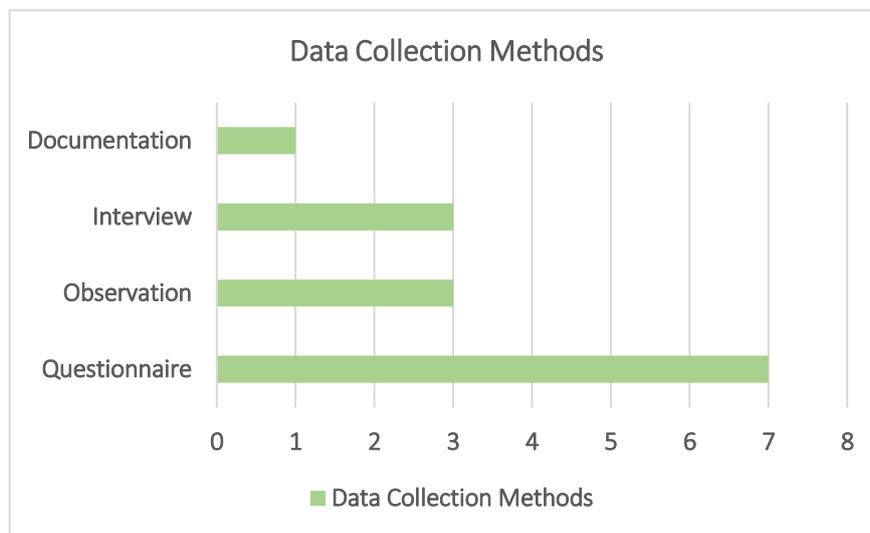


Figure 3. Data collection methods mentioned included articles (n = 14)

Figure 3 shows the number of articles that have used data collection methods such as questionnaires, observation, interviews, and documentation. There are seven (7) articles that use the questionnaire method, with most of them using Google Form as a platform for question distribution. Observation and interview methods were used in three (3) studies. However, a documentation method was used in one (1) of the study.

b. Published Journals

As an answer to research question one (journal chosen to publish the studies related to online learning in vocational education), it could be seen that the selected articles were published in a wide range of journals and proceedings. Researchers do not only focus on one journal because these vocational educations have a variety of courses including theory and practical. The journals that have been used for those selected articles are as follows:

- 1) International Journal of Interactive Mobile Technologies (n = 1)
- 2) International Journal of Mobile and Blended Learning (n = 1)
- 3) International Journal of Recent Technology and Engineering (n = 1)
- 4) PLoS ONE (n = 1)
- 5) Journal of Physics: Conference Series (n = 5)
- 6) 4th International Conference on Vocational Education and Training, ICOVET 2020 (n = 1)

Papers that have been published in the Journal of Physics: Conference Series were focused on engineering courses in the vocational field. Meanwhile, other selected papers that have been published by each published journal were focused on the online teaching and learning, and also technology and development field.

c. Emerging Themes

To answer the second research question, thematic analysis was performed to uncover several themes that emerge from studies on online learning in vocational education. Online learning and vocational education are two types of research related to teaching and learning systems. Thus, from the analysis conducted on the ten selected articles, themes that emerged were classified into four topics, as shown in Figure 4.

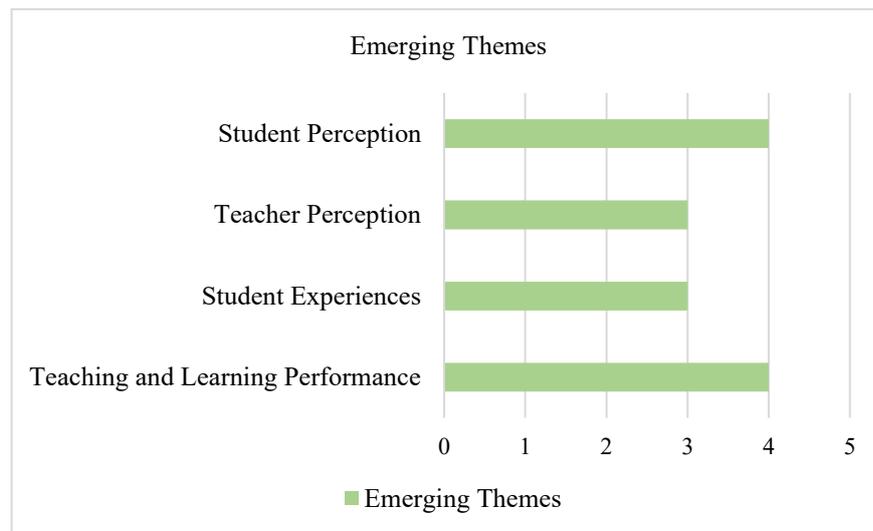


Figure 4: Themes identified from the reviewed articles

These ten (10) selected articles touched on several different themes: student perception, teacher perception, student experiences, and teaching and learning performance. Four (4) articles study student perception and teaching and learning performance. Meanwhile, three (3) articles study teacher perception, which is also the same number of studies on student experiences. These emerging themes are explained in detail in the next section.

Student Perception

Generally, student perception is about students' ideas, opinions, and emotions about people, activities, and situations. Teachers and educators can find out a lot about students' perspectives by conducting student surveys. If the message is accurately received, the medium can efficiently disseminate it. Rabiman et al. (2021) used YouTube-integrated online videos as the learning medium for their practical exercises on chassis and power maintenance competencies (MCP). They next assessed how well the pupils reacted to the online content. MCP is one of the courses offered in automotive vocational education. This course focuses on various technical components and competencies, which are divided into several sections that may be difficult for students to remember the terms for each component. The researchers looked at the effectiveness of the e-learning course and identified eleven external factors that influence its performance; those related to the websites

including the reliability, usability, speed, functions, content quality, design quality, and technical issues as well as the students and staff awareness, support by top management and the facility conditions. YouTube was chosen as the platform to host the videos for students to complete the MCP course. In the beta test of the online course for its practical learning sessions, four variables were used to assess the students' acceptance, namely presentation, language, utility, and graph. They found that such learning media is well perceived and accepted by students for practical competencies. It also can be concluded that this platform is effective in delivering messages since the message can be received correctly and also allows students to be in control of their learning.

Through doing activities collaboratively, students would gain the expertise needed to tackle a variety of challenges in their profession (Yudantoko, 2020). Furthermore, students' academic achievement is linked to their independence or self-learning skills. The learning environment should be adequate to assist and facilitate self-learning activities in order to promote self-learning skills. Based on the findings in Yudantoko's study, students prefer cloud computing technologies for a variety of activities, including collaborative learning online, blended learning, online networking with industry partners, getting excellent resources online, and digital learning material. Next, students showed preferences to be in situations that are comfortable, relaxed, and not stressful by having friendly vocational lecturers. It can be concluded that cloud computing technologies are preferred by the majority of students to improve their learning environment.

Suitable context of teaching and learning, according to Amhag (2020), would enable the transformation of theoretical knowledge into practical activities in their academic study and also professionally. To put it another way, students would do critical self-assessment after completing supporting assignments. Teachers can encourage students to reflect on the quality of their work, as this can help them progress in their studies. Critical self-assessment at this stage would assist students in distinguishing their thoughts and feelings from emotional input such as the relationship with their teacher, accountability towards their study as well as engagement in learning (Amhag, 2020). Their findings show students' ability to plan and anticipate future experiences for individual and career growth by highlighting their knowledge progression. Mobile and hybrid tools are needed to facilitate the self-assessment process concerning oneself, colleagues, and surrounding circumstances in online vocational training courses.

Teacher Perception

According to Wagiran et al. (2020), video usage may be customized to engage students in the learning process, making it a viable option for online learning tools. Hence, Google Meet, Google Classroom, and other learning platforms are also used to support learning. Concerning the finding in the study of Wagiran et al. (2020), teachers used a variety of learning strategies when teaching

students online, which are independent assignments with 68% sessions with theory explanations and 27% of videos for practical activities. These findings show that teachers' perception of social media may enable them to handle the online learning process more easily and, at the same time, help teachers raise their students' enthusiasm and encourage them to focus on learning sessions. These findings can relate to online learning for vocational education that requires significant adaptation, especially in theoretical and practical sessions, as it requires higher-order thinking for students.

The teacher plays a vital role as a facilitator and must serve as a link between student learning achievement and success. According to Kholifah et al. (2020), the attainment of affective and psychomotor aspects as the learning outcome in the process of vacuuming and refrigerant filling could be improved through good quality videos. This study indicates that teachers assume that online learning of subjects related to overcoming obstacles and difficulties is very dependent on internet networks. Therefore, teachers use online learning models via video learning media, sending video links to students via WhatsApp class groups. In order to improve the quality of vocational education, video is used as one of the learning media where it can deliver learning materials through the display of moving pictures that are projected to form a character similar to the original object. However, the study discovered that some students have difficulty with their online learning using videos due to a poor internet signal or network.

Online learning, which is not done arbitrarily, is a practical option for improving student competencies (Edy et al., 2020). In any online classroom learning process, teachers need to recognize students' interests and student's motivation. It's difficult to assess students' interest in online training because of the lack of a close connection between students and teachers. In line with the findings of Edy et al. (2020), teachers could encourage students to analyze learning outcomes as one of the steps in their project. This is a critical task in expanding the students' abilities in vocational education.

Furthermore, teacher perception is governed by their thoughts or mental impressions towards their professional activities and their students, which also are shaped by their underlying knowledge and life experiences. Most teachers are aware of the importance of visual aids in improving students' understanding of content. It is apparent that in creating a robust support system in teachers' training and professional network, it is critical to incorporate local officials such as education bureaus, and school headmasters (Chen et al., 2020). Furthermore, it is worth researching the relation between in-service teachers' training using the Massive Open Online Courses (MOOC) and their teaching practice. Community-based learning should also be one of the focus as well as facilitating interactions among the teachers. The study shows that strong links between the content of the MOOC and the teaching experiences are forged by teachers who

continued to return to this MOOC platform because this platform provides problem-solving in social activities. According to Chen et al. (2020), problem-solving skills can help facilitate the transition from earlier concepts of vocational education to new concepts such as "worker as learner."

Student Experiences

Student experiences can be described by students' interactions with the teaching and learning process. The relaxed and comfortable situations definitely appeal to the students as well as being in an atmosphere controlled by friendly vocational teachers (Yudantoko, 2020).

According to Kholifah et al. (2020), one way to ensure that students understand the topic matter is to employ online media or multimedia. In their study, they found several factors that cause the burnout that students experience in their classroom conceptual learning and in practical sessions, including unattractive media or material provided and multiple tasks that were given without detailed explanation. The results show that students grow bored with online learning, which results in indifference towards their learning, loss of enthusiasm, anxiety, insomnia, fatigue, and discontent with learning materials. Every day, students are exposed to the same teaching and learning approach, with no differences to stimulate their interest in taking classes with enthusiasm and passion. As a result, incorporating video learning media into vocational education can elicit positive responses from students while also improving the quality of education (Kholifah et al., 2020).

In general, the teacher continues to be the primary learning source in the face-to-face learning method (Muslim et al., 2019). Of course, this is a serious issue because it has an impact on students' learning competencies in vocational education. Findings in their study summarize that student motivation and interest in learning methods have improved due to using the Edmodo platform. However, it has not enhanced the student learning outcomes. Student learning outcomes, on the other hand, have not been enhanced. This is due to the fact that the online learning approach is still relatively new, requiring students to fully engage with it in a relatively short period of time. However, they concluded that using the Edmodo platform for conducting online teaching and learning sessions is a revolution in internet technology-based education. It is also suitable for supporting learners to achieve the competency outlined in the vocational education field.

In some learning environments, students are merely passive listeners in the classroom, taking notes on what the lecturers say. As a result, the lack of active communication involving teachers and students results in the classroom atmosphere being rigid and uninteresting. Pursuant to the findings in the study of Tafakur et al., (2020), three materials can be included; materials that describe the competencies that need to be mastered for each topic, guidance materials for practical lessons activities, and finally multimedia materials (presentation slides, videos, and articles) for imparting basic knowledge before the starts of practical sessions. However, time management and the educational environment continue to be the biggest obstacles for the students (Silvana *et al.*, 2021)

As reported by Kholifah et al. (2020), the selection and use of learning media for acquiring vocational skills must be tailored to the needs and efficiency of such media. Students would respond positively to the utilisation of these learning tools if they were used correctly, which would inspire them to learn and increase their grasp of the subject matter given (Kholifah *et al.*, 2020).

Teaching and Learning Process

Teaching can be defined as giving a group of students lessons on a specific subject known as teaching. Meanwhile, gaining knowledge by studying, being taught, and experiencing is known as learning. Because vocational education is purposefully focused on training students for specific vocations, Tafakur et al., (2020) underlined the importance of practical lessons in vocational education as a vital activity that is necessary for the learning process. Therefore, before attending the engine management system practical lesson, students are required to access information sources, watch simulation videos, and take the exam. However, educational media must pass a certain level of feasibility before they can be utilized in a practical lesson.

Zhang (2020) research shows that when physical education matches the needs of information development, more convenient support can be provided in higher vocational settings. Zhang proposed in this study that vocational colleges can optimize teaching resources and space by implementing a blended learning method, which will enhance students' motivation to learn and ensure that teaching activities are completed efficiently. Teachers have a vital part in the teaching and learning system, with a key role in understanding a student's capabilities so that learning may take place in a comfortable and measurable manner, notably during pandemic and post-pandemic times (Karakose et al., 2021). Students' views and online learning practices are shaped in large part by the interaction between students and teachers. Students' attentiveness and achievement in online learning are heavily influenced by course materials, planning, and monitoring (Silvana et al., 2021).

The learning process occurs due to interactions between people and information packaged in several different mediums. Muslim et al., (2019) studied the optimization of the effectiveness and efficiency of Edmodo's platform in education. According to the findings of their research, Edmodo's platform creates an atmosphere where teaching and learning could be enjoyable for students. Students become self-sufficient without losing sight of the performance goals. However, they discovered that this platform necessitates a robust internet connectivity, particularly while conducting online classes and administering examinations.

In vocational schools, students require interaction and guidance from teachers to understand the topic and complete the learning process, which requires a balance of theoretical and practical aspects. Edy et al. (2020) believed that teachers' involvement in the online learning process is crucial to the educational process's long-term effectiveness. Teachers, on the other hand, must

understand their learners' interests during the online course process by assigning a project that enables students to evaluate their learning goals. Through this learning project or any activity that involves problem-solving, constructivism, and evaluation theories can be integrated into the development of content and learning materials so they satisfy the standards of vocational education (Edy et al., 2020).

Adapting to the fourth industrial revolution (IR 4.0) is a significant issue, particularly in the sphere of vocational education. Using Scopus databases, the researcher found that the current issue plaguing vocational education is online teaching and learning and decided to take the issue of online learning in vocational education as a topic for a systematic literature review. The review of 10 selected articles from the total of 89 articles that were initially identified before the screening phases gave adequate views of the perspective held by students and teachers in online vocational education. Usage of digital learning tools in the learning and teaching sessions brings some excitement and a new outlook on learning vocational courses for both students and teachers. Teachers can also use this opportunity to diversify learning aids during online learning and, at the same time, can strengthen the learning and teaching sessions.

Conclusion

Our systematic literature review focused only on literature published for the past three years and specifically on online learning and vocational education articles. A limited number of articles about online learning conceptualized or measured within the criteria of vocational education. Therefore, it is anticipated that many of the ideas mentioned in online learning are considered to be important and applicable to the vocational education setting, rather than focusing solely on students or teachers. Thus, it becomes highly imperative for the researcher to identify critical issues plaguing vocational education other than online learning issues that are still debated today. Online learning can help students' desire to participate, enthusiasm, and interpersonal skills in knowledge acquisition, preparedness, usage, and experience. More evidence articles should be analyzed in the future to obtain a complete and more focused outcome. As with any research, those selected articles come with their limitations and recommendations which are presented here in detail.

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