

TVET Leadership in the Education 4.0: Characteristics, Opportunities and Challenges

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Abstract

There are many factors that determine the success of vocational or vocational education, this research focuses on leadership factors in vocational education in the 4.0 education era. This research then examines matters relating to what are digital opportunities related to the presence of the 4.0 education era and analyzes the challenges that may be an obstacle to picking up opportunities or conveniences in the current digital era. The method used in this study is library research using three main stages in analyzing articles, starting from the stage of collecting, integrating and finally identifying the summary of the articles being analyzed. The results of this study reveal that transformational leadership, digital tools in the form of interactive multimedia and obstacles that often hinder education 4.0 such as internet access are the main points that often arise in answering research questions.

Keywords : Leadership, TVET, Digital Era, Education 4.0

INTRODUCTION

In general, the purpose and direction of vocational education and vocational education is to prepare a skilled workforce (Cattaneo et al., 2022; Keijzer et al., 2021). Indonesia uses the term vocational school for middle education such as SMK or MAK and the term vocational college for higher education within the scope of academies, colleges, institutes, polytechnics, and universities (Winangun, 2017).

Vocational education is an inseparable part in the development of society and has a large contribution to increasing the economic value of a country (Johan, 2015). The country's competitiveness relies heavily on the knowledge and skills of the existing workforce and to create a knowledgeable and well-skilled workforce, it all depends on the quality of existing education. (Wahyuni & Monika, 2016).

Vocational education is one of the key factors in economic development, winning the competition and becoming social stability in every country. This is based on the belief that the success of vocational education in producing a reliable workforce is the most important part of the strategy to develop human resources and provide the community with the knowledge and skills needed by the industry. (Wahyuni & Monika, 2016).

Vocational education is currently experiencing rapid development from time to time, in line with the changing of work (Y. Muhammad, 2018). However, what has not changed is that it is essentially a forum for preparing workers who are expected to have a set of knowledge, skills, and ideal personalities to meet the expectations of the world of work and industry. In line with this, vocational education graduates are expected to have the opportunity to fill available jobs with existing provisions and earn decent wages. But the current conditions are very different and not as expected (Azizah, 2019). There are so many vocational education graduates who do not get the opportunity to work or are unemployed, even those who have worked are not without problems (Buhari, 2020; Nugraheni, 2021; Wijaya & Utami, 2021). The stock of knowledge and skills possessed is not sufficient to survive in the work environment, many elements are suspected to be the cause, including from the side of the workforce provider (education), then from the side that asks for labor (industry), and finally from the quality side of graduates.

Many other factors are also determinants of the success of vocational education, in this study will focus on leadership factors in vocational education in the digital era. (Abdillah, 2020; Setiawan, 2009; Sitanggang, 2013). After that is to examine what are good opportunities related to the presence of the 4.0 education era which is in line with the presence of the 4.0 industrial revolution era. Finally, analyze the challenges that might be an obstacle to picking up opportunities or conveniences in today's digital era.

Why leadership? Leadership in organizations has a very vital role both in building relationships between individuals and forming organizational values which serve as the basic foundation for achieving organizational goals (Stogdill, n.d.). Leadership is about organizing and inspiring others to do a job for something that advances the organization, in this case educational institutions or schools. Leadership is related to behavior to direct, influence, and explain to subordinates, initiate and maintain group cohesiveness in the organization in order to achieve goals (Bashori et al., 2020; Nasution, 2016; Rusmawati, 2013). Good leadership is related to expertise and foresight to see the opportunities that exist.

Many digital opportunities are present in education, especially vocational education. This opportunity is present in line with the birth of the 4.0 education era as a balance for the 4.0 industrial revolution era in the business and industrial. With this convenience, Indonesia can advance the quality of all aspects in a faster, practical, equitable, and certainly affordable time throughout Indonesia. With digital technology, access to education should be easy to obtain by fulfilling several conditions (Surani, 2019). In addition, the use of digital technology certainly has a positive impact with beneficial development and application in the education sector, including the emergence of electronic media as a new variety of sources of knowledge. (Syamsuar & Reflianto, 2019). Technological advances create new and interesting learning methods that should be easily understood that the learning system is not solely face-to-face. (Pangondian et al., 2019).

Media in relation to education is an instrument that is so important in its role in determining the success of the teaching and learning process (Nurrita, 2018). The existence of the media can directly provide dynamics and separate learning experiences for students. With existing limitations, humans often have difficulty interpreting things that are abstract or that have never been recorded in memory at all. To bridge this process, media is needed whose function is to clarify and make it easier to capture educational messages that are being conveyed. Therefore, the more students are exposed to various kinds of media or supporting facilities and infrastructure, the more likely the meaning to be conveyed can be absorbed and digested.

Education 4.0 is not only about digital learning technology, but also about changing mindsets. Similar to education in the past, there are many definitions and theories about what education 4.0 is. However, the diversity of definitions or views cannot cover the challenges that must be faced in the future. When compared to conventional learning methods, digital era learning has very different goals and focus areas. Here are some things that become the basis for measuring these differences.

First in terms of independent learning. Learning with a digital system requires students to have a high level of discipline and learning independence (Aini, 2021; Rohaeti & Lusiyana, 2020). Students must of course be able to determine for themselves the goals of their learning outcomes and what material they want to understand more deeply. In addition, students are also required to determine their own study schedule according to what they want. Therefore, if studied more deeply, the ranking system is not very suitable for an e-learning-based education system.

The second challenge that often becomes an obstacle is the problem of facilities and infrastructure. The availability of devices that comply with specifications is a must in order to achieve equity in digital learning (Rumapea, 2019). Digital learning will not take place without digital tools. Then, one thing that is no less important is an internet connection. Internet access is one of the absolute things that cannot be ignored, smooth internet access supports smooth digital learning, of course with a note that there are some digital learnings that do not require internet access, but the results will not be optimal because the internet allows digital learning

to be more collaborative and flexible. The digital learning system will never work properly if the device and internet connection are not supported enough. Even according to data from the Ministry of Communications 2019, there are still around 24,000 more villages that have not been touched by an internet connection at all (Watrianthos et al., 2020).

The last factor that might be a barrier to digital learning in the 4.0 education era is teacher readiness, in this case related to the quality of teacher human resources. Not only internet access, digital learning systems are very demanding of qualified teachers in the field of technology (Jihad, 2013; Nahdi & Jatisunda, 2020). At a minimum, teachers must understand the basics of using technology and digital devices to teach. In addition, teachers are also required to be proactive and creative in making digital learning materials. Of course, this is so that students do not get bored when studying in online or offline classes.

Based on the introduction that has been discussed about some of the characteristics, opportunities, and challenges of vocational education, especially in the 21st century. Then a literature study was conducted which aims to: (1) describe the characteristics of leadership in vocational or vocational education in Indonesia in the 4.0 education era, (2) describe and analyze what factors are opportunities in vocational education in the 4.0 education era, (3) analyze What factors are obstacles as well as challenges in implementing leadership policies in vocational or vocational education in the 4.0 education era.

METHOD

This study uses the library research method, which is looking for relevant literature sources related to the topic being raised. This study examines theories that are in accordance with the subject matter, namely about leadership in vocational education in the 4.0 education era, leadership characteristics, vocational education opportunities in the 4.0 education era and what challenges are the current obstacles. This study uses secondary information collected in the form of research results, scientific articles, books and other sources that are considered appropriate to the discussion.

The data that has been collected is then analyzed. The data analysis technique carried out in this study consisted of three stages, starting from organize (grouping), synthesize (uniting), and identify with the description in Figure 1 as follows:

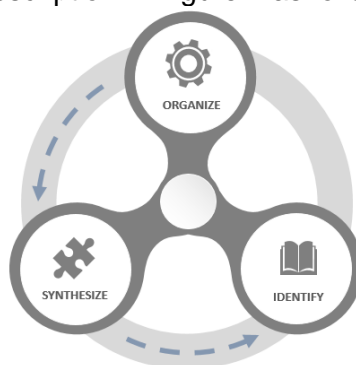


Figure 1. Library Research Cycle

Organize

This stage grouping the literature to be studied. The literature must first be reviewed before being used so that it is in accordance with the subject matter. In addition, the problems, objectives, and literature grouping are also formulated according to the subject category.

Synthesize

At this stage, the results of the grouping of literature are combined in a concise and coherent manner. The summary is structured to form new knowledge that contains meaning in accordance with research needs

Identify

At this stage, identifying relevant and important issues to be studied and analyzed, in order to produce a scientific study structure and draw general conclusions.

RESULT AND DISCUSSION

The results and discussion in this study were compiled based on the library research method in accordance with the three stages carried out, namely:

Organize

The results at this stage are the data obtained by the researchers in the form of scientific articles relevant to the research as follows:

Table 1. Quantity of article categorization

Category	Total
Leadership characteristics in the educational era 4.0	15 Article
Opportunities TVET in the education 4.0 era	15 Article
Challenges TVET in the education 4.0 era	18 Article

Synthesize

The results of the study of several scientific articles from relevant research based on the TVET "leadership" category in the 4.0 education era are shown in table 2 below:

Table 2. Summary of articles by leadership

No	Author/Year	Result	Key Word
1	(Nasruji, 2017)	Leaders have good communication skills and are able to make good programmed decisions.	Communication
2	(Ndapaloka et al., 2016)	The leader supervises and motivates to excel as an appreciation of the teacher's performance.	Supervision, Motivation and Appreciation
3	(Widodo, 2008)	Leaders apply transactional leadership style which is statistically proven to have a significant effect on school performance.	Transactional
4	(Rustamaji et al., 2017)	Leaders apply transformational leadership style which is statistically proven to have a positive effect on school performance.	Transformational
5	(Prasetyono et al., 2020)	Leaders improve subordinate performance by optimizing leadership effectiveness and task commitment.	Commitment
6	(Sukayana et al., 2019)	Leaders apply transformational style, supervision, and work motivation on teacher performance.	Transformational, Motivational, and Supervision
7	(Sampurno & Wibowo, 2015)	Leaders create a positive work environment and provide work motivation.	Environment and Motivation
8	(Keizer & Pringgabayu, 2017)	Leaders carry out supervision and provide exemplary attitudes.	Supervision and Model
9	(Osman & Kamis, 2019)	Leaders develop innovative thinking among team members so that they excel at work and stay competitive in the face of a rapidly changing world with the emergence of the latest technology	Transformational, Innovative, Entrepreneurial, Strategic, Authentic,

No	Author/Year	Result	Key Word
10	(S. N. H. Muhammad & Jaafar, 2015)	Leaders apply leadership personality to become good leaders in order to achieve organizational goals.	Participatory, and Democratic Personality
11	(Badenhorst & Radile, 2018)	Leaders apply distributed instructional leadership on vocational campuses in order to improve organizational performance.	Instructional
12	(Kedir & Geleta, 2017)	Leaders apply transformational leadership in implementing changes in institutions.	Transformational
13	(Mesfin & Niekerk, 2019)	Leaders perform transformational, transactional, and laissez-faire leadership styles.	Transformational, Transactional and laissez-faire
14	(Bonzet & Frick, 2019)	Transformation of women's leadership on gender equality issues at TVET.	Transformational and Gender
15	(Hassan & Sanusi, 2015)	Leaders apply a focus on innovation in leading because innovation is needed in the face of uncertainty.	Inovation

The results of the study of several scientific articles from relevant research based on the "digital opportunity" category on TVET in the 4.0 education era are shown in table 3 below:

Table 3. Summary of articles based on opportunities in the digital era

No	Author/Year	Result	Key Word
1	(Absor et al., 2019)	Opportunities for teachers when using technology, especially the internet in the era of the Industrial Revolution 4.0, ranging from using Whatsapp, Instagram, Edmodo, Prezi, Documentary Videos, to visiting cultural heritage sites and museums.	Internet, Social Media, Documentary Videos, and Museums
2	(Safitri et al., 2015)	Development of e-learning products with the Moodle application as an opportunity in the digital era.	Internet and E-learning
3	(Ni'mah et al., 2015)	Development of math modules with the help of flipbook maker and prezi.	Interactive Multimedia
4	(Wirawan et al., 2017)	Development of digital archival learning media to improve learning outcomes	Microsoft Access
5	(Wijayanti et al., 2016)	Project-based learning-based e-module development	Interactive Multimedia
6	(Patmanthara & Hidayat, 2018)	Improving the digital literacy of high school students through blended learning	Internet, Blended Learning
7	(Widiaty et al., 2018)	Learning to use 3D digital storytelling media in batik learning in SMK	3D Objects and Interactive Multimedia
8	(Megawaty et al., 2021)	Application of digital library for library administration automation	Digital Library, Web

No	Author/Year	Result	Key Word
9	(Yuliana et al., 2017)	Development of accounting digital comic media for SMK students	Digital Comics
10	(Indahini et al., 2011)	Development of multimedia mobile learning in the subjects of simulation and digital communication	Interactive Multimedia and Mobile Learning
11	(Radyuli et al., 2019)	Inquiry learning with google form on learning outcomes.	Google Forms
12	(Dewi et al., 2018)	The modeling of blended learning in the vocational field refers to the digital framework.	Blended Learning, E-learning, and Digital Classroom,
13	(Munarsih et al., 2020)	Digital marketing training in improving the competence of SMK students for entrepreneurship.	Digital Marketing, Facebook, Instagram, Email and Whatsapp.
14	(Novalia et al., 2018)	The use of Google Apps for Education to improve the quality of learning in the digital era in SMK.	Google App (Gmail, Classroom, Drive, Docs, Slides, etc)
15	(Kusumantara et al., 2017)	The use of e-learning schoolology to improve learning outcomes.	E-learning

The results of a review of several scientific articles from relevant research based on the category of TVET online learning challenges in the 4.0 education era are shown in the following table:

Table 4. Summary of articles based on challenges in the digital era

No	Author/Year	Result	Key Word
1	(Safford & Stinton, 2016)	Barriers to integrating distance learning digitally.	Internet Access, Bandwidth Constraints, Device Quality
2	(Utami & Cahyono, 2020)	Students' learning difficulties with lessons through the e-learning system from home.	Lack of Interaction, Internet Access and Difficulty Understanding the Material
3	(Winarti, 2021)	Learning difficulties in understanding basic science concepts.	Learning Motivation, Economics and Device Quality
4	(Mutaqinah & Hidayatullah, 2020)	Application of online learning during the covid-19 pandemic.	Internet Access, Difficult to Manage Time, Limited Quota and Device Quality
5	(Pebriani & Arbi, 2021)	The difficulty of online-based learning in construction subjects in SMK.	Internet access
6	(Leonanda & Silalahi, 2021)	Vocational school students' learning difficulties during online learning during the COVID-19 pandemic.	Lack of Motivation.
7	(Anugrahana, 2020)	Difficulty learning mathematics the concept of "logic" with an online learning model.	Internet Access and Difficulty Understanding the Material.

No	Author/Year	Result	Key Word
8	(Nabila & Sulistiyarningsih, 2020)	Difficulty learning math in Microsoft Teams-assisted online learning.	Internet Access, Lack of Interaction and Difficulty Understanding the Material.
9	(Mutmainah & Sari, 2019)	Vocational students' learning difficulties in matrix material in terms of mathematical communication skills.	Difficult to Understand Material.
10	(Yulia & Putra, 2020)	Students' difficulties in learning mathematics online.	Low Initiative, Unaccustomed, and Difficult to Manage Time.
11	(Albab, 2020)	Constraints of e-learning learning in the era of disruption in SMK.	Limited Quota, Internet Access, Difficulty in Understanding the Material, Obstacles in Submission.
12	(Hariyanti et al., 2020)	Application of online learning by using google classroom to support learning outcomes.	Internet Access, Lack of Interaction, Boring and Difficult to Understand the Material.
13	(Rahardja et al., 2019)	A study of student learning motivation towards online learning methods.	Lack of Motivation.
14	(Huzaimah & Amelia, 2021)	Barriers experienced by students in online learning of mathematics during the COVID-19 pandemic.	Internet Access, Lack of Interaction, Boring and Difficult to Understand the Material.
15	(Utomo et al., 2021)	Utilization of Learning Management System (LMS) To support online learning in SMK.	Teacher Quality.
16	(Nugraha et al., 2021)	Student problems in the implementation of online learning	Internet Access, Device Quality and Less Interaction.
17	(Herawati & Priyanto, 2021)	A study of the implementation of online learning during covid-19.	Internet access.
18	(Hamid et al., 2020)	Examine the problems that occur during online learning during the Covid-19 period.	Internet Access and Device Quality.

Identify

The results at this stage are in the form of conclusions obtained after synthesizing in the previous stage. To make it easier to read the conclusions, the data presented is displayed in the form of a word cloud. Word cloud is an image that shows a list of words used in a summary, generally the more often the word appears, the larger the word size and the thicker the color of the word in the word cloud menu (Jin, 2017).

From the summary of the results of the study of several scientific articles from relevant research based on the TVET "leadership" category in the 4.0 education era, the results are as shown in Figure 2 below.



Figure 2. Word Cloud by leadership

It can be seen that the word transformational appears most often and is at the top of the list when viewed from TVET's leadership philosophy in education 4.0. To survive in threats and crises, transformational leadership style is often considered as a strong driver for an organization (Kim et al., 2021). After the transformational leadership attitude, the most frequently used in the 4.0 education era are supervision, motivation and transactional. This usually tends to happen, where the transformational leadership style is closely carried out side by side with the transactional style by a leader in the vocational education.

Furthermore, based on the discussion of digital opportunities that were present in the 4.0 education era in vocational or vocational education, word cloud data will be obtained as shown in Figure 3 below.



Figure 3. Word Cloud based on digital opportunity

Interactive multimedia is dominantly a tool that is often used in the digital era in the world of vocational and vocational education. There have been various efforts to open access to education as widely as possible, including the use of multimedia technology in educational institutions, especially vocational education (Abdulrahman et al., 2020). After multimedia, it can be seen that the use of the internet for education, blended learning and e-learning has become increasingly massive in recent years.

Finally, when viewed from the obstacles or challenges that are often a problem when picking up opportunities in the 4.0 education era in vocational and vocational education, the main problem that is present is the limitations of internet access as shown in Figure 4, both internet access is still not smooth and internet access is even none at all. Figure 4 can be seen below.



Figure 4. Word Cloud based on challenges in the digital age

Internet access becomes a major issue when digital learning is carried out in the 4.0 education era. Learning with online schemes will only add to the psychological burden for students because it is so difficult to get internet access. This is an obstacle to the development of digital learning in the 4.0 education era, even though it can be felt that digital learning is very helpful in overcoming student learning problems that cannot be obtained through conventional learning.

CONCLUSION

Based on the results of the study, it can be concluded that: (1) The transformational leadership style is most often mentioned in the research summary. (2) Seeing the opportunities that exist, the development of interactive multimedia devices is the main alternative choice to welcome the era of education 4.0, besides of course preparing many things starting from the availability of facilities, devices and the ability of teaching staff to use interactive multimedia devices. (3) Finally, there will always be obstacles, the classic obstacles that often occur are limited internet access, unequal regional conditions, and community conditions which are certainly different, making it difficult to achieve equity.

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