

## **NORMATIVE ANALYSIS MODEL OF THE ROLE OF VOCATIONAL EDUCATION IN UNDERDEVELOPED, FRONTIER, AND OUTERMOST REGIONS**

**Ulang Mangun Sosiawan<sup>1\*</sup>, Sri Humana Lagustiani<sup>1</sup>, Soeryaniati Koesoemo<sup>1</sup>, Akhmad Yasin<sup>2</sup>**

<sup>1</sup>*Research Center For Law, National Research and Innovation Agencies*

<sup>2</sup>*Research Center For Domestic Government, National Research and Innovation Agencies*

**Author's email:**

<sup>1</sup>ulanmangun862@gmail.com, <sup>1</sup>srihumana@yahoo.com, <sup>1</sup>suryaniati.kusuma@yahoo.com,  
<sup>2</sup>akhmadyasin08@gmail.com

**\*Corresponding author:**

<sup>1</sup>ulanmangun862@gmail.com

**Abstract.** *This study aims to develop a normative analytical model explaining the role of productive vocational teachers in enhancing the availability of skilled labor in Indonesia's Underdeveloped, frontier, and outermost (frontier, outermost, and underdeveloped) regions. The research addresses persistent disparities in teacher quantity, distribution, qualifications, and digital competence, which contribute to suboptimal vocational graduate outcomes and limited workforce readiness. Emphasis is placed on examining the causal relationship between teacher competence, digital learning systems, and skilled labor supply. A qualitative descriptive approach was employed. Data were collected through in-depth interviews with key informants, surveys of approximately 50 purposively selected respondents, focus group discussions with experts and stakeholders, field observations, and document analysis of relevant regulations and statistical reports. Data were analyzed using descriptive qualitative techniques, triangulation, and empirical juridical analysis to assess regulatory implementation and practical conditions. The novelty of this study lies in integrating regulatory, human resource management, and digital learning perspectives into a single normative model that links productive teacher competence with skilled workforce formation specifically in Underdeveloped, frontier, and outermost contexts. Unlike prior studies that examine teacher competence or digitalization separately, this research synthesizes both dimensions within a regional development framework. Findings indicate that shortages of qualified productive teachers, inadequate infrastructure (laboratories and workshops), and limited ICT mastery significantly hinder vocational learning effectiveness and skilled labor production. Strengthening industry partnerships, blended and mobile learning adoption, and targeted professional development are critical strategies. Limitations include its qualitative scope and regional focus, which restrict generalizability. Future research should employ mixed-method or longitudinal designs to quantitatively measure the impact of teacher digital competence on vocational graduate employability outcomes across diverse Underdeveloped, frontier, and outermost regions.*

**Keywords:** *Teacher; Digital Learning System; Skilled Manpower; Underdeveloped, frontier, and outermost regions*

### **1. INTRODUCTION**

Possessing an area of up to 5,193,250 km<sup>2</sup>, Indonesia is an archipelagic nation. The majority of Indonesia's land area is covered by water, with 1,919,440 km<sup>2</sup> being land. The government bears a heavy burden of duty for its domain. Of course, the size of the area creates challenges for equitable development. Due to unequal access to development, certain places are still developing slowly or are even underdeveloped.

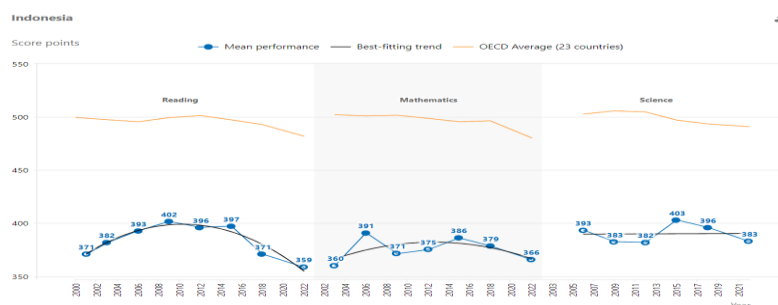
The Underdeveloped, frontier, and outermost area, which stands for Leading, Underdeveloped, Outermost, is the word used to describe this region. The term "Underdeveloped, frontier, and outermost areas" refers to locations that are constrained by a number of factors, including the infrastructure, economics, and education. Particularly when it comes to education, there is glaring disparity between developing and underdeveloped areas.

The problem of educator needs in Underdeveloped, frontier, and outermost areas can be complex and diverse, including:

- Infrastructure Limitations:** Underdeveloped, frontier, and outermost areas often have limited infrastructure, such as difficult transportation access, unstable electricity, and lack of internet access. This can be an obstacle in recruiting and retaining educators.
- Qualifications and Skills:** Qualified educators may not be available in sufficient numbers in these areas. In addition, they may not have the specific skills or experience needed to teach in different environments such as in Underdeveloped, frontier, and outermost areas.
- Social and Cultural Conditions:** Some educators may be reluctant or uncomfortable to work in remote areas due to differences in culture, language, or social conditions.
- Wellbeing and Professional Development:** Well-being and incentives to work in Underdeveloped, frontier, and outermost areas may be lower compared to more developed areas. This can reduce the interest of educators to move or work there. In addition, opportunities for professional development and training may also be limited.
- Lack of Resources:** Lack of textbooks, equipment, and other teaching materials can also be a problem in Underdeveloped, frontier, and outermost areas. This can affect the quality of learning and teaching in schools in the area.
- Isolation and Difficulty in Getting Support:** Educators in Underdeveloped, frontier, and outermost areas may feel isolated and find it difficult to get support, both from the government and from other educational organizations.
- Health Problems:** Health can be a problem in Underdeveloped, frontier, and outermost areas, including limited access to health services, poor sanitary conditions, and the risk of certain infectious diseases. This can affect the well-being of educators and affect their availability to teach.

Based on data quoted through Anis, (2022) by explaining that Indonesian society has a decline in the fields of mathematics, reading, and science. This test explores how well students can solve complex problems, think critically and communicate effectively or referred to as The Programme for International Student Assessment (PISA). The trend can be illustrated through the picture below:

**Figure 1.** Graph of Indonesian Community Competency Based on PISA Formula



Source : (Anis, 2022)

Given this issue, it is undoubtedly one of the phenomena that the Indonesian education sector needs to be aware of and actively seek out research on. The information in the image demonstrates how reading, math, and science proficiency actually and directly affect the labor market's availability of HR specialists. The picture's data deterioration reflects the necessity for educators' quality to be improved in order to produce graduate students who ready to enter the job field with superior HR competencies.

Furthermore, the main problem in the field of education in the Underdeveloped, frontier, and outermost area is the problem of teachers or teachers. The existing problems are related to the insufficient number of teachers, unbalanced distribution, substandard qualifications, lack of competence, and inappropriate qualifications with the field taught (Putri Shaina, 2022).

One of the programs carried out by the central and regional governments is to improve the quality of national education. This program is carried out to provide quality assurance to education stakeholders. The impact of improving the quality of education is an increase in human

resources nationally. Teachers become influential figures in improving student achievement. The presence of teachers is decisive in interacting and communicating directly with students. Teacher obligations include planning teaching and learning activities, implementing and carrying out teaching and learning activities, providing assistance, evaluating student learning achievement, conducting research, study, and developing and implementing teaching and learning activities, and establishing communication with the community, especially parents of students (Rahmatullah et al., 2021). Teachers are also required to master expertise, adaptability to new technologies and global challenges (Yuara et al., 2019).

Technology and information that develop so quickly penetrated in various aspects of life without exception in the field of education. This development is an effort to bridge the present and the future by introducing reforms that bring a tendency towards improving the quality of education. Renewal occurs along with the endless rotation of the times and continues to rotate according to an indefinite time limit. This relates to the demand for customized services for students, and various enhancements to their educational possibilities have emerged as the primary drivers of the educational reform movement. Since education is a complex field that is inextricably linked to other fields, reforms in this field can take many different shapes (Lestari et al., 2022).

The education sector has been rendered immobile by the COVID-19 pandemic, which also affects the global economy (Kumar et al., 2021). 90% of primary, intermediate, and tertiary students worldwide—roughly 1.5 billion pupils—are physically unable to attend school. The impact is revolutionary since educators anticipate that technology will enable remote learning and instruction. But post-COVID-19 online learning and education are not the only areas of the education sector undergoing digital transformation (Kang, 2021). The education sector is undergoing a digital transition that enhances learning for all parties involved—teachers, students, and other stakeholders (Ulas, 2019). The modifications are aimed at improving accessibility and engagement through interactive and adaptable learning. Consequently, the cost, scope, and inclusivity of online education have all increased (Caskurlu et al., 2021).

Subsequently, the unfulfilled competency of vocational teachers in the Underdeveloped, frontier, and outermost domain emerged as another problematic element. The problem's depiction serves as a guide for policymakers in achieving the competency requirements for vocational instructors in order to generate graduates who are ready to enter the workforce. The following figure provides a description of a snapshot of this issue:

**Figure 2.** Distribution of the Ratio of the Number of Vocational Students and Teachers in Indonesia in 2022



Source: Agustina, R. et. al. (2022)

The narrative in the picture above shows the abnormal ratio between the number of students and teachers at the vocational level, especially in underdeveloped areas with numbers below the ideal limit. This phenomenon can also have implications for ineffectiveness in the learning process which causes orientation in producing quality students to be hampered and stagnant within the limits of general students who do not have special competencies at the vocational level.

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The way educators perform becomes a crucial and very strategic factor. The achievement of national education goals and the identification of high and low educational quality are influenced by the role that teachers play in the classroom through their performance. But a number of things, both internal and external to the teacher in question, have a big impact on how well they do (Susanto, 2013). The following table illustrates the issue of teacher qualifications for professional level positions with the 2021–2022 academic year in all provinces can be seen in the following table :

**Table 1.** FY 2021–2022 Qualified Teacher Percentage by Province and Education Level

| Provinsi             | SD    | SMP   | SMA   | SMK   |
|----------------------|-------|-------|-------|-------|
| (1)                  | (2)   | (3)   | (4)   | (5)   |
| Aceh                 | 92,57 | 97,52 | 99,25 | 98,71 |
| Sumatera Utara       | 94,92 | 97,36 | 98,16 | 95,61 |
| Sumatera Barat       | 96,51 | 97,66 | 99,00 | 98,10 |
| Riau                 | 93,80 | 96,48 | 98,11 | 96,29 |
| Jambi                | 92,58 | 97,68 | 98,52 | 97,29 |
| Sumatera Selatan     | 93,91 | 97,23 | 98,58 | 95,12 |
| Bengkulu             | 94,55 | 97,46 | 99,11 | 96,51 |
| Lampung              | 93,45 | 95,98 | 97,67 | 93,36 |
| Kep. Bangka Belitung | 96,17 | 97,74 | 98,96 | 96,63 |
| Kep. Riau            | 94,50 | 96,95 | 98,47 | 96,54 |
| DKI Jakarta          | 96,44 | 97,81 | 98,80 | 96,63 |
| Jawa Barat           | 96,55 | 97,02 | 98,22 | 95,32 |
| Jawa Tengah          | 97,77 | 98,37 | 98,83 | 97,35 |
| DI Yogyakarta        | 97,51 | 98,09 | 98,67 | 97,55 |
| Jawa Timur           | 97,43 | 98,35 | 98,90 | 97,62 |
| Banten               | 96,02 | 97,13 | 97,97 | 96,33 |
| Bali                 | 98,02 | 98,80 | 98,82 | 96,62 |
| Nusa Tenggara Barat  | 94,42 | 98,02 | 98,93 | 97,38 |
| Nusa Tenggara Timur  | 92,52 | 96,87 | 97,65 | 93,25 |
| Kalimantan Barat     | 93,26 | 96,09 | 97,79 | 94,68 |
| Kalimantan Tengah    | 94,78 | 97,76 | 99,01 | 97,37 |
| Kalimantan Selatan   | 96,20 | 98,64 | 99,05 | 96,91 |
| Kalimantan Timur     | 95,87 | 97,88 | 98,81 | 97,18 |
| Kalimantan Utara     | 94,92 | 97,82 | 98,79 | 98,59 |
| Sulawesi Utara       | 93,46 | 96,21 | 98,48 | 96,53 |
| Sulawesi Tengah      | 88,40 | 97,74 | 99,09 | 97,47 |
| Sulawesi Selatan     | 96,11 | 98,52 | 98,80 | 97,93 |
| Sulawesi Tenggara    | 93,14 | 98,12 | 99,03 | 96,92 |
| Gorontalo            | 97,09 | 97,81 | 99,59 | 96,79 |
| Sulawesi Barat       | 87,46 | 95,78 | 99,06 | 95,32 |
| Maluku               | 84,59 | 94,75 | 97,77 | 95,19 |
| Maluku Utara         | 80,47 | 95,58 | 97,28 | 94,22 |
| Papua Barat          | 87,56 | 96,81 | 98,81 | 96,38 |
| Papua                | 77,03 | 91,97 | 97,63 | 93,88 |
| Indonesia            | 95,01 | 97,43 | 98,51 | 96,44 |

Source : Agustina, R. et. al. (2022)

In the context of 21st-century learning, creativity and innovation are defined as the capacity to create anything novel, intriguing, and unique. Teachers must improve their abilities to create new ideas and innovations for the field of education in addition to students. As part of the teaching competencies that must be owned, character competence, pedagogic competence, and reliable competence need to be enhanced (Hanik, Kumila et al., 2023).

In order to prepare students for each skill competency, teachers must also construct a multi-teaching strategy. The effectiveness and caliber of education are significantly influenced by the caliber and performance of professional teachers. Enhancing teacher competency can be achieved through training exercises, supervision strategies, and the development of a learning culture (Putra et al., 2020).

Based on the problem entity and several symptoms in the background which are then synthesized to formulate the problem, what can be new from this research is the analysis of the expertise of Productive Teachers of VOCATIONAL SCHOOL with the availability of skilled labor and its relation to the digitization of learning in the Underdeveloped, frontier, and outermost area. The variable that is used as a lever is a variable that is raised as the focus of the problem that makes it different from previous studies.

## 2. LITERATURE REVIEW

### *Productive Teacher of Vocational Education*

Productive teachers in VOCATIONAL SCHOOL have a very strategic position in educating the nation's life, where the availability of the number and quality of competent productive teachers will have a synergistic impact in realizing quality vocational education.

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Productive teachers of vocational schools are teachers who teach productive subjects according to expertise programs as a provision of skills to enter the world of work. From the definition of recruitment and productive teachers of VOCATIONAL SCHOOL, one definition can be drawn that the recruitment of productive teachers of VOCATIONAL SCHOOL is a series of activities carried out by the Government to find, attract and get a number of prospective teachers who will teach productive training courses in Vocational High Schools (VOCATIONAL SCHOOL) (Noviansyah et al., 2020).

In an effort to realize competent productive teachers, it is necessary to develop the professional competence of productive teachers of VOCATIONAL SCHOOL towards industry-based skill competencies in line with Sajidan et al., (2017) where there is a need for continuous competency development of productive teachers in VOCATIONAL SCHOOL to suit the needs of the Business World and the Industrial World (DUDI). The competence of productive teachers has special characteristics and provisions for professional competence, as follows: have sufficient practical skills in accordance with productive subjects, be able to design the implementation of vocational-minded learning, and be able to conduct learning (training) that is relevant to the competencies needed by the world of work (Sajidan et al., 2017).

Government Regulation (PP) Number 74 of 2008 concerning Teachers requires that all educators in secondary schools must have a minimum qualification of S1 / D4 by 2015. This qualification is needed so that educators have sufficient knowledge about the subjects held. Furthermore, there are several regulations governing the process of implementing the recruitment of productive teachers of State Vocational schools. through the D III GKT program, among others, as follows:

- a. Instruction of the Director General of Education Number: 122/C4/I/1980 dated September 15, 1980;
- b. Decree of the Minister of Education and Culture dated March 9, 1984 Number: 068/U/1984;
- c. Decree of the Director General of Education dated January 14, 1984 Number: 004/CAep/I.84;
- d. Decree of the Minister of Education and Culture dated May 12, 1980 Number: 0161 / U / 1980 concerning Type B Upgrading;
- e. Working Meeting between the Directorate of Vocational Secondary Education and Dirbinsarak on June 12-13, 1980

One of the main supporting principles in the development of the vocational education system in vocational school is the improvement of productive teacher competence. Teachers must have qualifications and competencies which include academic qualifications and educator competencies as well as learning agents. Academic qualifications are achieved through higher education pathways undergraduate programs (S1) or diploma four programs (D-IV) in accordance with their duties (Sajidan et al., 2017).

### *Digital Learning System*

The learning model of the current digital era has differences compared to conventional learning models. Concretely, the digital era learning model consists of 3 models: first, teachers / lecturers provide online learning materials to students then downloaded and studied manually (offline), second, teachers / lecturers provide online learning materials and students learn online as well, and third, Collaboration between learning that takes place between online and offline. Then there is also a learning model that is not tied to teachers / lecturers who provide learning materials but can access learning information personally with online learning resources (Azis, 2019).

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*a. Blended Learning*

Blended learning It is learning that is supported by an effective combination of different ways of delivery, teaching and learning styles and is found in open communication among all parts involved with training. By using blended learning, benefits are obtained in the form of advantages of face-to-face methods and technology-aided instructions (Noe, 2023). Not only that, other benefits lead to elements of social interaction namely (PT. Sevima, Agustus 2018):

- a) There is interaction between teachers and students
- b) Teaching can also be online or face-to-face
- c) Blended Learning = combining instructional workforce (or delivery media),
- d) Blended Learning = combining instructional methods (Sevima, 2020)

*b. Distance Learning*

The implementation of distance education is also regulated in Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education in Article 31 paragraph 1 stated that distance education is a teaching and learning process carried out remotely through the use of communication media. In line with these regulations, the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 24 of 2012 concerning the Implementation of Distance Education (PJJ) in Higher Education, n.d.) Article 2 paragraphs 1 and 2 include: Functioning as a form of education for students who cannot attend face-to-face education without reducing the quality of education, then distance education aims to increase the expansion and equity of access to quality education and relevant to need.

Rector of the Bandung Institute of Technology (ITB) and Chairman of the Council of Rectors of Indonesian State Universities (MRPTNI) Kadarsah Suryadi hopes that with the implementation of this distance education system, it can increase Indonesia's Gross Participation Rate (APK) which is currently still at 31.5%. "I think what the Minister said when he met in Medan, we can increase our low APK compared to Malaysia 37.2%, Thailand 51.2%, Singapore 82.7% and Korea 92.4% (Press Release KemenristekDIKTI Number: 56/SP/HM/BKKP/IV/2018)

*c. Mobile Learning (M-Learning)*

Mobile learning is a form of digital learning using technology to reduce costs, and increase the effectiveness of the learning environment (Noe, 2023). In accordance with Ally's opinion, (2009) through her book entitled, "Mobile Learning; Transforming the Delivery of Education and Training".

"Mobile learning through the use of wireless mobile technology allows anyone to access information and learning materials from anywhere and anytime. With mobile learning, learners will be empowered since they can learn whenever and wherever they want."

Mobile learning (m-learning) is learning that utilizes technology and mobile devices (Noe, 2023). In this case, such devices can be PDAs, mobile phones, laptops, tablet PCs, and so on. With mobile learning, users can access learning content anywhere and anytime, without having to visit a certain place at a certain time. So, users can access educational content without being bound by space and time.

Based on the results of research conducted by Afifah (2017), related to the development of mobile learning entitled "Development of Mobile Learning Media for the Introduction of Visual Basic Programming Language in VOCATIONAL SCHOOL 2017, received a very good and very feasible response. Then the same research related to mobile learning, Singgih Yuntoto, with the title of developing android applications as a learning medium for competency in operating electronic control systems at VOCATIONAL SCHOOLN 2 Pengasih, the results in the study are highly recommended to be used as one of the learning strategies of the current digital era. This means that the use of mobile learning models is one of the digital era learning strategies for today's digital native generation.

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*d. Skilled Workforce*

According to Law Number 13 of 2003 concerning Manpower Chapter I article 1 paragraph 2 it is stated that labor is everyone who is able to do work to produce goods and or services both to meet their own needs and for the community. And it could also be by definition that labor is a population that is in working age. Broadly speaking, the population of a country is divided into two groups, namely labor and non-labor. A resident is classified as a labor force if the population has entered working age. In Indonesia, the applicable working age limit is 15 years – 64 years old.

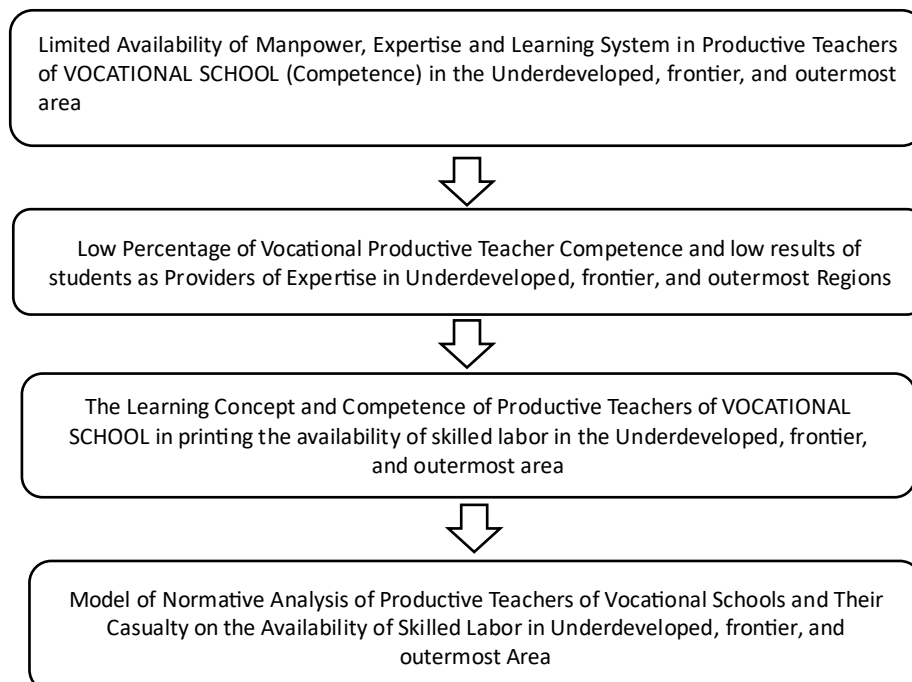
Human resources at all career levels need to have employability skills in order to work effectively and efficiently. Employability skills are generic skills that are applied and prepared to enter the work environment. Employability skills are required by individuals to be employed by business owners. Employability refers to a person's knowledge, skills and attitudes, as well as the way a person presents the skills possessed. (Munadi, et al., 2018)

Mismatch shows that there are difficulties between the company and the workforce in obtaining workers and jobs that match the skills in accordance with the needs and abilities between the company and the existing workforce. In accordance with the results of Alisjahbana's study, (2008) that the discrepancy for highly educated workers in Indonesia still remains high, especially men. Compared to university graduates, discrepancies are more experienced by graduates with vocational diploma degrees.

*Research Framework*

The research framework is an initial concept that becomes a reference point for researchers in conducting a study. related to Productive Teachers of Vocational schools and Their Causality to the Availability of Skilled Labor where the meaning is a variable entity in formulating the results of this research analysis. Based on the theoretical and empirical descriptions presented above, a framework of thought can be compiled as follows:

**Figure 3. Research Framework**



### **3. RESEARCH METHODS**

The qualitative descriptive method was employed in this investigation. Sugiyono (2012) defines the qualitative research method as an approach that looks at natural object conditions with researchers acting as the primary instrument. Triangulating (or combining) data collection techniques, inductive data analysis, and an emphasis on meaning rather than generalization characterize the results of qualitative research. The goal of research is to characterize current or past phenomena. Scientific journals pertaining to educational technology innovation provided the data that was gathered. Following data collection, descriptive analysis techniques are applied to the data. The employed analysis method involves the description of actual or factual findings from theoretical investigations of previous research findings. This research's data was gathered using strategies for observation and documenting in order to produce high-quality data analysis results.

#### *Identify Subsections*

Give specific instructions on how to handle the issue in order to get the desired outcomes. Give a thorough explanation of how each resource and suggested study agenda and schedule will be used in this particular research endeavor. The submission procedure cannot be used for suggested research materials that are not included in the methodology and are not reflected in it. In qualitative research, it is describing the meaning of data or phenomena that can be captured by researchers, by showing evidence. The meaning of the phenomenon depends a lot on the ability and sharpness of the researcher in analyzing it. Qualitative research is concerned with processes, not results or products. In contrast to quantitative research that is concerned with products or results. Qualitative research does not attempt to find evidence for testing theory-derived hypotheses, as quantitative approaches. However, researchers go to the field to collect various evidence through the study of phenomena, then formulate theories based on the results of the study of these phenomena (Abdussamad, Zuhri, 2021).

#### *Research Design*

The research team used a qualitative research method approach. The research team needs to explore the role of productive vocational teachers in digital technology-based learning and its impact on the availability of skilled labor, in several regions, especially Underdeveloped, frontier, and outermost areas.

The research team tries to get success in the research to be carried out, of course, it is based on the relevance of conditions and facts in the field to existing problems. The accuracy of research results in the field makes scientific materials to become potential discoveries based on the object of research obtained related to the optimization of productive vocational teachers in their role in creating expert labor needed by the labor market. The initial step in this study, it can be seen that the conditions and facts of human resources (teachers) still require increased competence and expertise in learning.

Based on the object of research studied, there are secondary data. Secondary data is obtained from the results of a review of documents or archives that are relevant to the problem and research objectives. Secondary data sources include the results of studies and scientific publications.

The data collection technique used in this study is divided into collected secondary data through documentation studies by collecting written evidence related to the research theme, for example through websites, activity reports, annual reports, photos of activities, laws and regulations (Decree of the Minister of Education and Culture dated May 12, 1980 Number: 0161 / U / 1980 concerning Type B Upgrading.).

Data analysis in this study is descriptive qualitative with unstructured data from the research section, so that this qualitative data will be interpreted as a result of mutual understanding between researchers and research objects. Data analysis will begin from the beginning of the

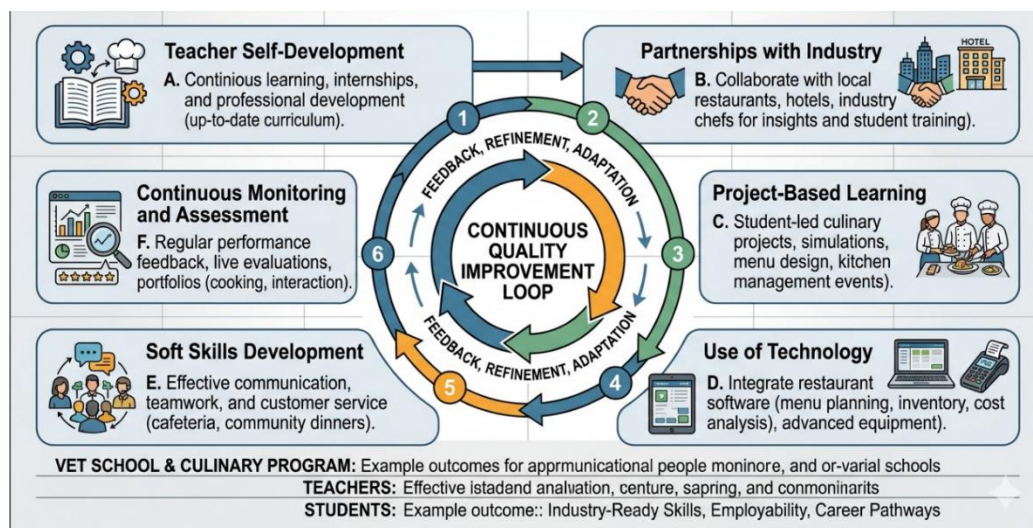
study. Data analysis is carried out through several stages, namely classifying data based on time, place, name and topic of discussion according to data analysis needs. The next stage is to validate the data by looking at the similarity of data and information from different sources.

The technique in empirical juridical research analysis is a method that examines the enactment of legal provisions and what happens in reality in society. This analysis is needed to examine national regulations and their supporters, as well as their practices.

#### 4. RESULTS AND DISCUSSION

The paradigm of productive teachers in vocational school includes various aspects previously mentioned, such as focusing on practical skills, industry involvement, project-based learning, the use of technology, soft skills development, continuous monitoring and assessment, and teacher self-development. To provide a more concrete picture, here is an example case that reflects the application of the productive teacher paradigm in Vocational school:

**Figure 4.** The Productive teacher paradigm : Strategies and Practices  
in Culinary Vocational Education



Sources : data collected by researcher, (2025) elaborated to Decree of the Minister of Education and Culture dated May 12, 1980 Number: 0161 / U / 1980 concerning Type B Upgrading.

Through this approach, students in the culinary skills program at vocational schools not only learn cooking techniques, but also develop the skills and understanding needed to succeed in the food and beverage industry. This is a clear example of the application of the productive teacher paradigm in the context of vocational schools. Competency platform curriculum has the following identities:

- a. Emphasize the achievement of good student competencies in individual and classical ways.
- b. Leads to learning outcomes and diversity.
- c. Delivery in upgrading using various procedures.
- d. The base of practice is not only the teacher but also the base of other practices that are full of educational factors.
- e. Evaluation emphasizes the ways and results of training in business, ability, or income (Hanik, Kumila et al., 2023)

The Underdeveloped, frontier, and outermost region's educational paradigm change has grown significantly, posing a significant challenge to local governments in their efforts to maximize teacher effectiveness and generate capable students with the credentials and abilities needed to absorb available labor in the workforce. Innovative, collaborative, and community-

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empowering approaches are central to the paradigm of productive teachers in Underdeveloped, frontier, and outermost (Leading, Outermost, and Disadvantaged) locations. These are a few things that can be display in some point :

- a. Pedagogical Innovation: Instructors in Underdeveloped, frontier, and outermost regions must implement cutting-edge, locally relevant teaching strategies. This could involve problem-based learning techniques, active learning approaches, and the use of educational technology.
- b. Collaboration: In the context of Underdeveloped, frontier, and outermost areas, collaboration between educators, schools, and communities is crucial. It is recommended that educators exchange best practices, resources, and experiences in order to raise the standard of instruction in the area.
- c. Community Empowerment: Teachers are change agents in the community in addition to being educators. To establish an atmosphere that promotes education, they might involve parents, neighborhood leaders, and other community members in the educational process.
- d. Capacity Building: Professional development and training tailored to the needs of teachers in Underdeveloped, frontier, and outermost regions are vital. Training in technology, problem solving, classroom management, and other learning techniques can fall under this category.
- e. Understanding the Local background: To provide relevant and meaningful learning experiences for their students, teachers need to have a thorough understanding of the social, cultural, and economic background of the area in which they work.
- f. Dedication to Student Welfare: Teachers in Underdeveloped, frontier, and outermost areas frequently engage in activities beyond the classroom. They can serve as mentors, caretakers, and inspiration for their pupils. As a result, it is critical that educators have a strong commitment to the mental, emotional, and intellectual health of their pupils.
- g. Flexibility and Resilience: Teachers working in Underdeveloped, frontier, and outermost settings need to be able to adjust to changing circumstances and overcome obstacles like scarce resources or infrastructure.

Teachers in Underdeveloped, frontier, and outermost areas can effectively influence change and improve access to and the quality of education for all students, regardless of their geographic location, by embracing this paradigm. In the digital age, educators have a duty and a willingness to rethink how we approach teaching and learning. Instructors must genuinely want to alter students' perspectives, zeal, inventiveness, and self-improvement initiatives gradually and on a regular basis. As a result, this endeavor will be able to actualize the perspective of innovative educators in the digital age, who possess a fresh spirit and a modern understanding of information technology.

In order to effectively address the educational issues of the twenty-first century, educators must possess information and communication technology (ICT) abilities. Specifically, teachers must be able to use ICT media to implement character education programs for pupils.

As participants in the educational process, vocational school teachers and students need to be proficient in making use of ICT. But there will be a lot of obstacles to overcome along the road, like technology limitations, doubts about the usefulness of ICT use, and the requirement for increased digital literacy.

Teachers in the digital era must be willing and obliged to change the way of thinking in the teaching and learning process. Teachers must really intend to change the mindset, enthusiasm, creativity, and self-development efforts gradually and planned periodically. Thus, this effort will be able to realize the mindset of creative teachers in the digital era who have a new spirit and literacy in information technology in the digital era (Rohmadi, Muhammad, 2021).

Teacher strategies in facing the challenges of the 21st century in the world of education require teachers to have skills in using Information and Communication Technology (ICT),

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requiring teachers to be able to use ICT media in carrying out character instillation learning in students (Lili Suryati et al., 2023).

Teachers and students of vocational school as parties involved in the educational process, must have adequate abilities in utilizing the potential of ICT. However, along the way, there will be many challenges to be solved such as technological barriers, uncertainty regarding the effectiveness of ICT use, and the need for higher digital literacy (Simanjuntak, Mutiara S. et al., 2023).

## CONCLUSION

Using social aspects of the community to determine the availability of skilled workers in training for the workforce through the Optimization of Productive Teachers of Vocational schools in the Underdeveloped, frontier, and outermost Regions, the research on Quo Vadis Productive Teachers of Vocational schools and Their Impact on the Provision of Skilled Workers in the Underdeveloped, frontier, and outermost Region is a modeling concept study. The Underdeveloped, frontier, and outermost area's per capita economic growth is clearly impacted by this.

The main problem in the field of education in the Underdeveloped, frontier, and outermost area is the problem of teachers or teachers. The problems are related to the insufficient number of teachers, unbalanced distribution, substandard qualifications, lack of competence, and incompatibility of qualifications with the field taught. Productive teachers in the Underdeveloped, frontier, and outermost area still face obstacles, especially educational infrastructure such as laboratories and workshops for practice and practical exams, which will certainly affect the birth of qualifications and competencies of expert workers who graduate from vocational schools.

Solutions to this problem could include incentive policies to attract educators to Underdeveloped, frontier, and outermost districts, improve education and transportation infrastructure, provide specialized training for educators who will work in these areas, and improve access to health services and social support. Collaboration between governments, non-governmental organizations, and local communities is also important to address this issue effectively.

Limitations include its qualitative scope and regional focus, which restrict generalizability. Future research should employ mixed-method or longitudinal designs to quantitatively measure the impact of teacher digital competence on vocational graduate employability outcomes across diverse Underdeveloped, frontier, and outermost regions.

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