FUTURE TEACHER COMPETENCY OF VOCATIONAL EDUCATION: LITERATURE REVIEW

Warda Indadihayati[1]
Universitas Negeri Yogyakarta
Email: Warda_indadihayati@uny.ac.id

ABSTRACT

Globalisation era without boundaries, Technological advancement modernises different factors in life and affects many areas, including vocational education. Therefore, TVET teachers should enhance their competencies to present vocational training that can facilitate future human capital and adapt to new technologies and global challenges in this digital era. Urgency development educational teacher competence vocation need noticed in ensure quality education expected vocation. Method in this article used in this literature review refer to Prisma method used to do literature review and meta-analysis activities so that make it easy in review goal roadmap structure. result of discussion this more carry on discuss about development trends technology, directions teacher vocational education competence development, development strategy vocational education competencies.
Keyword: Teacher Competency, Vocational Educational, Development Competency.

I. INTRODUCTION

Industrial revolution 4.0 is a globalization era, the more advanced not indisputable. one of them be marked with the emergence of the internet later create intelligence artificial (artificial intelligence). Impact transformative this could enter to all fields, including education (Prifti et al., 2017). Dynamic and very fast change for fulfilment need man by fast and quality. Innovation Becomes key success and existence change loaded super-fast technology including in field education. Teacher no can again with the old paradigm, namely the teacher only doing Duty teach teaching, conveying Theory or ingredient study to students (transfer of knowledge). along with development technology so consequences for change approach, strategy, model, method learning carried out by the teacher (Truijen et al., 2013) (Sánchez-Prieto et al., 2021).

Globalization era has change method think and way from how to manually become use machine automatic. Application technology in the educational process vocational signify

shift paradigm learning conventional going to more learning based on technology (Jafar et al., 2020). To present vocational education capable facilitate source power future humans to study competencies that meet need future change, vocational teacher must dominate competence new by comprehensive. (Wagiran et al., 2019).

Repair field education including education vocation need qualifications, competencies and efficient instructors to carry out responsibility. Identify knowledge, skills, values, and attitudes as competence the basis which is element professionalism and skills general required by a lecturer or instructor at TVET or organization another. In the field of TVET, competence as showing professionalism thoughts and attitudes personal (Chotimah et al., 2020), definition more wide related competence is readiness individuals to use , apply , and demonstrate mastery, knowledge, skills, and attitudes needed to carry out duties and responsibilities that can be measured with standard certain received at the level of certain level . This efficiency affects individual job responsibilities and on-site performance work and share becomes two categories are technical and behavioural. The

generic skills required by the construction technology lecturer are the basic skills required to perform tasks in related fields, namely, information communication skills, problem-solving skills, decision-making skills, leadership skills, group work skills, interpersonal skills, and management skills (Abdullah et al., 2019).

Teacher professionalism is increasing urgent in development character (character building) becomes the key. Teachers should also could develop ability herself the better, adapt with progress of the times. Professional teacher must capable doing inspiring learning student so that formed ability think creative, critical , and innovative with pattern learning to describe, to explain, to illustrate, to demonstrate (Sihotang, 2020). To adapt with need students and the labour market work in modern society, many school vocational has confess that interdisciplinary teacher team is condition important for implementation this. To provide student with the right competencies for the labour market work, eye teacher different lessons must work and study together and with do that must capable develop change (Truijen et al., 2013) (Muslim, 2019).

Teacher professionalism must be upgraded by planned and sustainable with increase competence through undergraduate program education for teachers who have not scholars, through seminars and workshops, develop character so that the teacher has ability think level tall that is ability analyse, evaluate, and create. Professional teacher will could produce tough graduate that is have knowledge , character , ability think level higher order thinking skills (Chotimah et al., 2020) (Ariyana et al., 2021)

II. METHOD

Literature review used in writing article this with search literature international using the Scopus database, Science Direct, World of Science, MendelayWeb, Google Schoolar and issues related in problem article. Then method used the PRISMA METHOD which method used to perform literature review and meta- analysis activities so that make it easy in review goal roadmap structure. Figure 1 below presents the Prisma stages applied in this study. Meta analysis used as source empirical proof to use summarize and analyse article, with stages identify article in accordance qualification, synthesizing, assessing proof quantitative or qualitative as ingredient reporting (Ulhaq & Rahmayanti, 2019).

1. Authorship

Based on the Mendeley Web site with search about Writer article in theme educational teacher competence vocation *teachervocational educational competence* in period five years' time last belong to many with distribution data in accordance Tables and Diagrams 1.

Tabel 1. Published Data Journal Related

No.	Year	Number of Author
1	Januari 2022	1
2	2021	151
3	2019	219
4	2018	394
5	2019	151

Diagram 1. Distribution 5 Years Journal last

Tahun

151 1 151

219

394

■ 2022 ■ 2021 ■ 2020 ■ 2019 ■ 2018
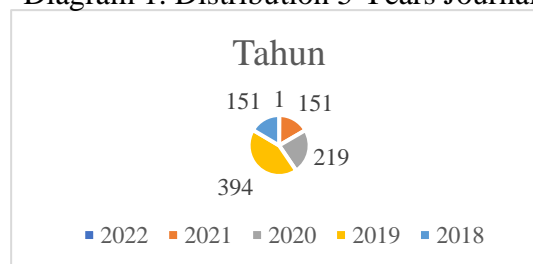
The data results in Table 1 and Diagram 1 show if writers who study about education teacher competence vocation until January 2022 there are most interest in 2019 and not enough five years' time last many authors are interested in fields and themes article related education teacher competence vocation.

2. Organises

Development article related vocational education already many published by international. At stage this, in look for article in accordance with theme article this namely on the competence of educational teachers' vocation, journal that publishes related article this of them in accordance with Table 2.

3. Citation Sources

Scope citation article from education vocation many on the theme of teacher vocational education competence, including in Table 3.

Table 2. Distribution Journal Related Teacher Vocational Education Competence

No.	Journal	Amount issue related Topics
1	Journal of Wind Engineering and Industrial Aerodynamics	145
2	Disability and Rehabilitation	66
3	Journal of Vocational Education and Training	24
4	Bulgarian Comparative Education Society	8
5	Advances in Intelligent Systems and Computing	7
6	Nusa	7
7	International Journal for Research in Vocational Education and Training.	6
8	SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference.	6

Table 3. Quantity citation Journal related to Teacher Vocational Education Competence

| No.	Journal	Number of Citations	Number of Readers
1	Procedia Computer Science (2015)	56	413
2	Journal of Curriculum Studies (2010)	34	81
3	International Journal of Engineering and Technology (UAE) (2018)	28	19
4	International Journal of Scientific and Technology Research (2018)	28	44
5	Teachers and Teaching: Theory and Practice (2012)	27	89
6	Teachers and Teaching: Theory and Practice (2012)	22	103
7	International Journal of Engineering and Technology (UAE) (2018)	22	21
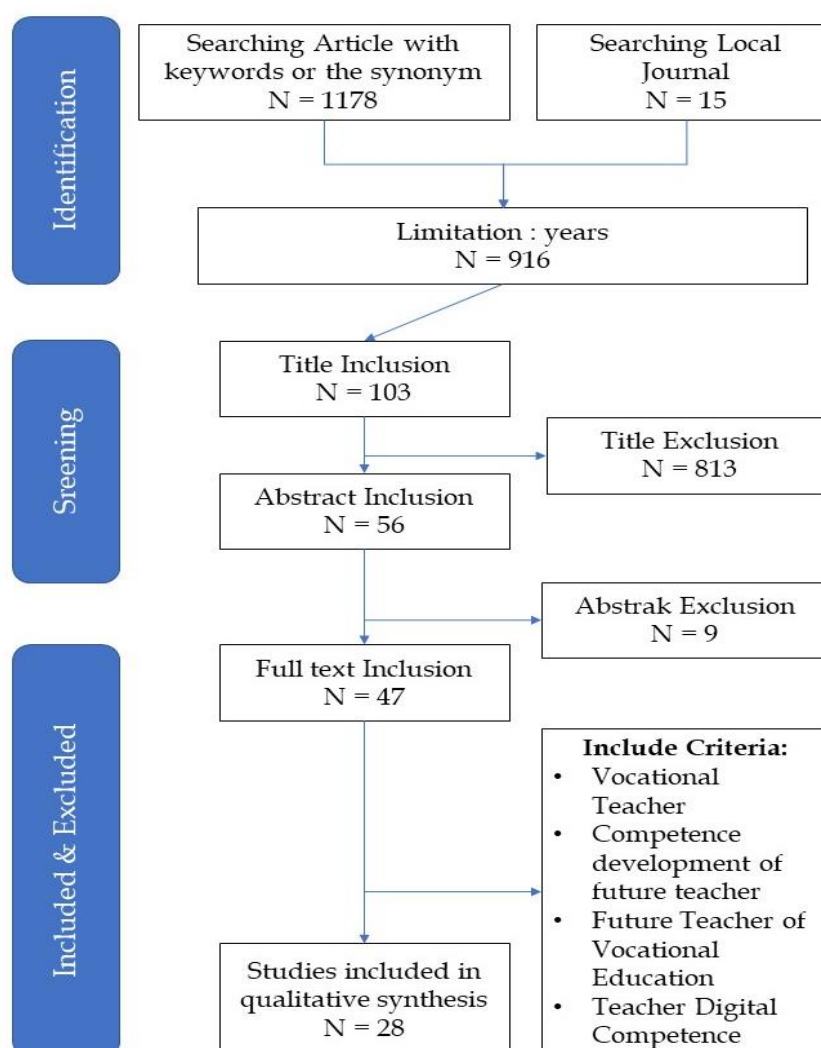
Figure 1. Systematic Literature Review Stages

III. RESULT AND DISCUSSION

1. Development Trend Technology

The field of education in the revolution industry 4.0 as century openness or globalization be in the age of knowledge (knowledge age) with acceleration enhancement great knowledge ordinary. Acceleration enhancement knowledge this supported by the application of digital media and technology called with information superhighway. Activity style learning in the age of knowledge (knowledge age) must customized with needed (Meisanti et al., 2020). Learning must give more designs authentic to go through challenges in which participants educate could collaborate create solution problem solving lesson. Solution problem lead to question and search answers by

participants teach later could searching for solving problem in context learning use source power available information.

The role of the teacher in education really urgent, because condition from study is there is a teacher. As a living teacher or being in the global era when this (Guillén-Gámez & Mayorga-Fernández, 2020), requirement to be creative and master technology so as not left behind by the times. Not could the era of globalization be denied demand our must active, creative, master technology. If not can follow current the development of modern times this, then our will left behind with others (Yunus & Mitrohardjono, 2020) (Mardhiyah et al., 2021).

Competence as something unified whole among knowledge, skills, and behaviours that must be mastered by teacher in doing his profession. To become a professional teacher who is able era of revolution 4.0 is needed something 4C skills (communication, collaboration, critical thinking and problem solving, and creativity), HOTS, literacy , and capable utilize technology (Abarca, 2021).

2. Direction Teacher Vocational Education Competence Development

Quality teacher is factor important and strategic in development and quality life nation by significant. In developed countries show, source power quality human more impact that makes his country proceed compared to with source power nature. Indonesia is rich in source power natural tend not enough exhilarating reflected The Human Development Index (HDI) in 2018 was 71.39. Quality system education measured and evaluated from 70 countries around the world by the Program for International Student Assessment (PISA), the results show Indonesia's ranking at position 63 of 70 countries, ranking aspect Mathematics 63 out of 64, 62 out of 70 Science countries, and 64 out of 70 countries reading (PISA, 2015). This thing describe quality Indonesian education is low (Hewi & Shaleh, 2020) (Haegg, 2020).

Modern education now this forcing condition new for teacher competence. This thing determine relevance determination goals and solutions problem to develop the

latest model to improve education and training teacher qualifications vocational (Burns et al., 2020). VET education is mainly institutional based without adequate connections to working life. Being able to integrate and use technology for VET and connect it to learning at work, involves VET teachers having a set of sufficient digital skills and appropriate pedagogical skills to support online learning in subject specific topics (Ifenthaler et al., 2021).

Learning technology and vocational must develop good development competence main nor competence solving problem. The European Training Foundation (ETF) advises that criteria competence is interface Among education technology and vocational, and the job market. In other words, to develop talent competent students for industry, institutions education technology must provide the right course that reflects job market demand. For purposes reduce gap competence and improve research, criteria competence will be best benchmark (Chung et al., 2016). Desired competency model could cover description competence single as well as indicator to measure performance result. this list could covers different levels of detail as well as explain connection Among competencies that have been developed (Prifti et al., 2017).

Development professional as a continuous process that must be driven by participants and includes experiment and reflection, based on experience teach the teacher himself. This leads to understanding about development professional as an emerging process from need learning individual teachers, and bottom-up approaches to professional development (Sandal, 2021). Therefore, the motivation and commitment of teachers is the core of development professional, as well get proof experience about the effect to learning student (Smith, 2011). Professional development for vocational teachers should be related to being a teacher and colleague in upper secondary school as well as a being skilled worker in a vocational profession since both identities constitute vocational teachers' knowledge and competence related.

Research results show that use method training information worker skillfully developed, application device soft pedagogy at school vocational school teacher training and techniques vocational method use technology information as well as development contribute to improvement competence professional graduate (Lytvyn et al., 2020) (Juuti et al., 2022) (Cattaneo et al., 2022) (Bacca et al., 2015). That thing if development teacher professionalism Vocational education with adopt technology close relation with success and quality Vocational education graduate. Even lately this development technology could make it easier for the education system except for vocational education in make it easy practice education (Afanasyev et al., 2020).

3. Development Strategy Vocational Education Competencies

Policy education and training this consider the competency model more relevant with professional teacher qualifications. A number of from they it seems beware a few other variables many influences success education professional based on the competency model. This thing

especially concerning preschool teacher professionalism because other " dimensional " influences such as quality environment study , condition work , and background behind culture this could influence Activation competence (Urbani, 2020) (Wulandari & Trihantoyo, 2020). Teachers are demanded have ability knowledge, ability analyse, so that solution could give. Destination education character basically is guide student as generation young to be smart and possess good behaviour and virtuous character. This thing strength a nation. for that in increase ability teacher professionalism in the 4.0 revolution era , teachers must notice things following (Nurkholis & Badawi, 2019)

a. **Educational competence**, Competence educates or learning based on internet of things as *basic skills.* Teacher of course must could operate computer, because in the current era this and later learning with computer will more in the fore and must also dominate the internet. Because in the current era this is the internet already Becomes primary needs in life. If no can internet and computer then

the teacher will leave behind by time.

b. **Competence for technological commercialization**, commercialization student has attitude -based entrepreneurship (entrepreneurship) technology and results creation innovation students. The teacher must could build student to direction-based entrepreneurship technology, as supplies they are later day. Internet will more easily promote product innovation student good that food, clothing, toys, or others. Because of front of course competition business will more awesome, for that need very for teachers to direct students to innovate without stop.

c. **Competence in globalization**, a world without bulkhead, no stutter to various culture, hybrid competence and excellence solve problem. Ability *life skills* student must build with good. Naturally construction the in various field like social, cultural, political and economic. here teacher 's duty fulfilled in the era of revolution 4.0 when this.

d. **Competence in future strategies**, easy world change and walk fast,

so you have competence predict with appropriate what will happen in the future following the strategy. The teacher must sharp in analyse. Predict to the future that will be happen and prepare how to get students educate later could face demands modern era or revolution 4.0 already started moment this.

e. **Counsellor competence**, remember to future problem child not in trouble understand teaching materials, but more related problem psychological, stress consequence pressure the situation is getting worse complex and heavy, it takes a teacher who is able play a role as counsellor/psychologist.

Professional vocational teachers led to get equip ability creativity, rationality, training solve problems, and maturity emotional. All supplies this meant create quality teachers as power successful professional in operate his job. Besides that, as a professional teacher must always increase knowledge good Theory field competence or knowledge technology, attitudes, and skills by keep going continuously.

Target attitude that covers attitude to legislation, organization profession, friend colleague, participant educate, place work, leader and work. As must - have position could answer challenge development society, teacher positions must be always developed and updated. In be a teacher must always stage update in accordance with demands his job.

Non-technical competence same importance with competence technical and strengthened with attribute the teacher 's personality, motives, and circumstances physique in TVET teaching profession. because of that , TVET institutions must open pathway for adaptation technology , learning along life , and a set future competencies to meet challenge change fast in condition competence professional for TVET teachers in this digital age (Burns et al., 2020) (Ifenthaler et al., 2021). Framework education teacher competence vocational in Industry 4.0 Era more carry on could distinguished Becomes a number of dimensions, included (Jafar et al., 2020):

a. **Technical Competitions**: Subject matter expert, instructional planning, instructional delivery, instructional evaluation, technology applications, classroom management, facilitate student, motivate student, student career development.

Teachers' roles are to prepare, advise, instruct, lead instruction, assess, and review students' achievement. TVET teacher involves theoretical and practical learning sessions in diverse ways. Hence, the emphasis in technical competencies is vital for TVET teacher professional development in the Industrial Era

b. **Non-Technical Competitions**: analytical, creativity, critical thinking, collaboration, communication, ethical, innovative, leadership, lifelong learning, professional development, research, social & culture awareness.

Competent professional TVET teachers must balance both their technical competencies and non-technical competencies to remain relevant. To achieve this, TVET teachers need to develop their professionalism with strong non-technical skills and essential skills. Due to the rapid change in

technological advancement that demands relatively new sets of skills, lifelong learning has become the essential skill for TVET teacher career development. TVET teachers need to keep up and be willing to learn and exploring emerging learning technologies used in education independently.

c. **Personal Attributes**: approachable, emotion control, adaptability, humanity, openness, risk taking, role model, team player.

Even though this digital era is focusing on the technology, TVET teachers should have the values of humanity in themselves.

d. **Motive**: meaningfulness of life, self-concept

With more teaching experience, teachers become more detailed and their self-perception as a successful person was formed; the emotional richness of life increases and the desire for professional self-development and independence become more important.

e. **Mental & Physical: Midstate**.

Physical fitness

Teachers should have a mental toughness to work under pressure high spirit, optimism and stability. TVET teachers also need to maintain their health and stamina and have working durability as part of their competencies.

Frameworks and factors affecting teachers' digital competence and VET teachers' profiles (Cattaneo et al., 2022)

a. **Teachers' digital competence**: Digital Resources' Creation, Data Protection, Teaching and Learning, Assessment, Learners' Empowerment, Learners' Media Education, Learners' Digital Competence, Digital Competence Total score

Competence refers to the mobilisation, combination and active management of situated, anchored-to-the-context resources (knowledge, know-how, values and attitudes) to cope with complex and constantly evolving professional situation.

b. **Teachers' personal characteristics and the role of the school context**

The Will Skill Tool Pedagogy model states that four main factors

contribute to the effective technology integration in education. These are the attitudes and beliefs towards instructional use of technology (Will), the ability to use technology and one's confidence, self-efficacy and readiness (Skill), the availability and accessibility of hardware, software and infrastructures (Tool), and, finally, the teaching style and pedagogical practice enacted (Pedagogy).

Based on Thing the could understood if direction development teacher competence on adaptation technology need pay attention to the education system vocation, other than that there is competence other influential in adapt to his personality and development strategy face industrial revolution 4.0.

IV. Conclusion

Identification appropriate professional competence and needed by education teachers vocational in the industrial era 4.0 use show competence important thing to do owned by education teacher vocation. That thing thinks that technology advanced created not to replace human to improve productivity but must there is collaboration between humans and technology. Institution technical and academic must create opportunities for adaptation technology, learning along life, and a set future competency to meet challenge change fast in condition competence professionals for vocational education teachers in Industry 4.0.

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