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Competency of Science Vocational Teachers in the Industrial Revolution 4.0 Era

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Abstract: Vocational education is used to prepare students to be ready to work both in their own environment or in the community, so the main mission of educators and policy makers is to form a strong foundation for students in the learning process, mastery and application of academic skills and the application of concepts that needed. The purpose of this study is vocational teacher competence in the era of industrial revolution 4.0 in SMKN 1 Sei Menggaris and vocational teacher competency in Indonesia today, especially in SMKN 1 Sei Menggaris. The method used in descriptive qualitative research, with data analysis techniques is the Interactive Model Analysis. The results of the research obtained are first: Competencies needed by Science vocational teachers in the current industrial revolution era 4.0 are global language mastery, teamwork, having competencies in accordance with DUDI, mastery of technology with familiarize themselves with ICTs using ICT, mastering teacher competencies, can teach effectively, have competencies in management and class organization, organize learning both theory and practice, and integrate theory with practice. Both vocational teacher competencies have been well implemented at SMKN 1 Sei Menggaris.

Keywords: Competence; Industrial Revolution**;** Science Vocational Teachers

Introduction

Regulation on the Public School System (UUSPN) No. 20 According to Article 3 and Elucidation of Article 15, Vocational High Schools (known with SMK) are secondary schools that specifically prepare students for employment in particular fields. Secondary education, or SMK, is the formal education pathway in Indonesia's education system. According to Suryadharma (2012), SMK aims to prepare students for entry into the workforce, cultivate professional attitudes, and prepare a middle-level workforce to meet the demands of the Business and Industrial World (DUDI), both as secondary and formal education institutions (Antera, 2021). In Indonesia, the SMK system is the formal education system for men and women. SMK is one of the formal and non-formal schooling programs. Its objective is to provide students.

The low quality of education at all levels and types of education, particularly vocational education, is one very serious issue in the field of education today. One of the obstacles to the supply of Human Resources (HR) professionals with the expertise and skills necessary to meet the demands of nation-building in various fields is the low quality of vocational education. Connected with this reality, Deal & Peterson (1999) states that the failure of various efforts to improve education quality is primarily attributable to structural improvement efforts that are not accompanied or supported by adequate cultural change efforts from education actors or practitioners. Vocational High School is evaluated in terms of its antithesis and concern for the educational system: Has not been able to maximize the potential and character of students; Unable to plan engaging Teaching and Learning Activities (known with KBM); Were unable to produce graduates with moral uprightness (Ilanlou & Zand, 2011). According to the findings of pre-

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observations that were carried out by researchers, the following are generally responsible for the low quality of vocational education, particularly SMKs in the technology and industrial groups: There are still not enough qualified teachers; Teachers do not keep up with technological developments or seminars in the technology field; the teacher's incorrect approach to instruction; Absence of accessibility of value books (writing); Incompatibility between educational and industrial equipment; Schools don't pay attention to how technology is changing the industry; and the curriculum isn't integrated with how people live their lives every day in their regions. Based on the statement above, how crucial it is to raise the quality of education and make it more relevant to DUDI's needs so that effective education, particularly vocational schools, can meet DUDI's development needs (Estriyanto et al., 2017).

Prosser & Allen (1825) argued that SMK would be successful if students were taught the same material wherever they would work, if tools and machines were complete, and if costs were sufficient. To acknowledge it is truly challenging between acknowledging ideal endlessly conditions where the financing carried out by the public authority can't be in a state of harmony with genuine requirements. Explicitly concerning outside pertinence or productivity in the professional schooling system, it very well may be estimated how much professional training can supply the requirement for gifted laborers in adequate numbers depending on the situation by different areas being developed. Not only does the gap between "supply" and "demand" in vocational schools contribute to the problem of relevance, but curriculum content that is not in line with DUDI's requirements, IPTEK's development of science and technology, and economic growth schooling specialists from the Public Place for Training Measurements in the USA (Tilaar, 1991; Hoachlander & Kaufman, 1992).

The main goal of this opinion is to establish a solid foundation for students in the teaching and learning process, mastery and application of academic skills, and application of the necessary concepts because vocational education is used to prepare students for work either in their own environment or in the community. Finch & Crunkilton (1979) describes the following characteristics of vocational education: A greater emphasis on one's capacity for work; Readiness to find a new line of work; and putting the development of skills first. According to the requirements for vocational school graduates, they must be able to demonstrate social and emotional knowledge and skills as well as specific field knowledge and skills. The notable standards of professional instruction are Prosser's sixteen speculations which are involved by numerous nations in creating professional training (Wardiman, 1998). Based on the structure of the program in terms of how SMK brings its program closer to DUDI. Partitions SMK into five classifications to be specific: A program for vocational counseling; Occupation readiness programs (employability arrangement training); The general education program for occupational area preparation (occupational area preparation education); A program for occupationally specific educational preparation; and specialized programs for vocational education (education specific to jobs) (Nurhadi, & Lyau, 2017).

Prosser's sixteen principles of vocational education, which serve as a foundation for vocational education, are as follows: Professional schooling will be powerful for society in the event that understudies are prepared and confronted with similar issues or impersonation (replication) of the climate wherein they are prepared later will function (Usmonova, 2019); Effective vocational training can only be provided if the training tasks are carried out with the same machine tools and equipment as the work that will be done later; Individuals will benefit from vocational education if they are specifically and directly trained to become accustomed to regular thinking and working; Professional instruction will be powerful in the event that it assists people with accomplishing their objectives, capacities and wants at a more elevated level; It will only be effective to provide vocational education for a particular type of expertise, position, and skill to a group of people who believe they need, want, and would benefit from it; Vocational education will be successful if the training experience engenders the habit of regularly working and thinking, making it an effective tool for enhancing workplace performance (Billet, 2009). The effectiveness of vocational education will depend on the teachers' and instructors' ability to successfully put their skills and knowledge of operations and work processes to use; In order for a person to continue working in that position, they must possess the bare necessities for each type of work; Vocational education must comprehend its place in society, the market, and the environment, as well as educate individuals to meet the needs of the labor market and improve working conditions; Students will only develop productive work habits if the training they receive is based on actual work rather than just training (Zakirova, 2016); Just preparation material that is well defined for a specific sort of work is finished involvement with that work; Each kind of work has exceptional qualities so a material that is ideal for a specific sort of work essentially doesn't work in that frame of mind of work; If the organization of training is given to a group of people when they need it and they succeed in the program, vocational education will result

in efficient service; If the learning methods and personnel relationships with students take into account the characteristics of the groups served, vocational education will be socially effective; The administration of vocational education will be effective if it is implemented in a standardized, flexible, and dynamic manner; Even though every effort needs to be made to use as little money as possible, education funding that is less than the minimum amount cannot be used effectively. If vocational education cannot be provided at the lowest possible cost, teaching cannot be provided (Triyono et al., 2020).

In a number of nations, the theory of Prosser has a significant impact on vocational education and training. Taiwan uses a simulation system in which practical work workshops are built in industrial facilities or vocational schools that are similar to them. The second option is on-the-job training in which the workplace doubles as a classroom. Moreover, Germany utilizes a double framework, TAFE in Australia carries out work-place figuring out how to carry professional training nearer to the universe of work. Professional schooling in Indonesia as per Sukamto (1988) has been narrowed down to vocational secondary education (SMK), a type of education whose graduates are expected to have integral personality and abilities, the potential to develop in line with technological advancements, and a high level of social responsibility (Kholifah et al., 2021). The execution of professional school training is an instructive program that as well as working on the nature of graduates should likewise focus on the necessities of clients of graduates and their relationship with the job of different gatherings who straightforwardly or in a roundabout way can possibly play part in the training of understudies, educators and other schooling staff. The formation of students', teachers', and other educational personnel's competencies is an educational process that necessitates the involvement of a variety of related parties outside the SMK in question, including other SMKs, LPTKs, local governments, local education offices, industry, educational professional associations, and other educational institutions. other organizations of interest (Wu et al., 2018). Having and maintaining a long-term partnership network between SMKs and each of these components is therefore essential. The "mutual benefit" principle must guide SMK partnerships with partner institutions in order to enhance partnerships and partner parties' performance quality (Sorge et al., 2019).

Woog (2004) makes sense of that SMKs, particularly the modern innovation bunch, are schools that depend on modern information and at present the business is confronted with the fast improvement of new information and innovation, particularly in the field of data and correspondence innovation and this is likewise a test looked by SMKs and can't be stayed away from. The motivation behind SMK is instruction that explicitly plans understudies to enter the labor force. Students are expected to have the ability to work to support themselves after graduation. According to Cece & Tabrani (2018), SMK aims to: Supply the workforce that the community requires; Expanding individual educational options; and, thirdly, increasing enthusiasm for lifelong learning. Competence is necessary for effective teachers to perform their duties. Competence is a capability is a hidden quality of a person that is nonchalantly connected with rules referred to powerful as well as prevalent execution in a task or circumstance.

The abilities and skill (capability) in terms of the following skills: Skill: the significant information and experience expected to play out a particular undertaking or work as well as the result of schooling, preparing and experience which, along with important expertise, is a quality of specialized information. Skills are the relevant knowledge and experience required to perform particular jobs or tasks, or they are the result of relevant education, training, and relevant experience with "know-how," which is a feature of technical knowledge. In the meantime, competence is defined as: Competence: the demonstrated and individual ability to utilize expertise, abilities, capabilities or information to meet both natural and advancing word related circumstances and prerequisites. Competence is a person's capacity to respond to job demands with know-how, skills, and knowledge (Prasetyono et al., 2021).

Based on the issues and hypothetical premise over, the motivation behind this examination is to uncover information about: Competence of Science vocational teachers during the fourth industrial revolution. The qualifications of vocational educators in Indonesia today. It is hoped that this study will help theory developers in the field of education, particularly vocational teachers, improve their competencies (Orazbayeva, 2016).

Method

Research approach

This study employs a descriptive qualitative method. The "technical" research language of qualitative research is used to write research objectives (Cresswell, 2013). This method is utilized because it is simpler to deal with reality and because it directly reveals the nature of the relationship between researchers and respondents. Respondents are also more empathetic and better able to solve their own problems with a lot of sharpening the joint influence on the value patterns they face (Moleong, 2010).

Research subject

The subjects to be studied in this study were divided into two parts: as a wellspring of data, specifically a school head and educators at SMKN 1 Sei Menggaris who can give information about how professional instructor skills are required at SMKN 1 Sei Menggaris in the time of the modern upset 4.0 and how are the ongoing instructor capabilities at SMKN 1 Sei Menggaris; as a source of informants, or other data sources that can provide additional information about aspects of the research subject that are not revealed. Research subjects were chosen purposively (as per targets) (Emzir, 2010).

Place and time of research

The research location is at SMKN 1 Sei Menggaris which is located at Tabur Lestari, Nunukan District, Nunukan Regency, North Kalimantan. Research time starts from April 1 to April 16, 2023.

Data collection technique

The data collection technique used in this research is the researcher himself as a key instrument (key instrument) supported by interview guidelines, observation and documentation (Milan & Schumacher, 1997).

Research Stages

Information is gathered through the accompanying stages: orientation to find out what is most important to find; exploration to find something specific; and member check to make sure results are in line with procedures and get a final report (Borg & Gall, 1979).

Data analysis technique

To make the information more significant and straightforward, the information examination step utilized in this study is the Examination Intuitive Model from Milles & Huberman (1994) what isolates the investigation into a few sections: data collection, component grouping, reduction, data presentation, separating outliers from the data, and drawing conclusions or verifying the data are all shown in Figure 1.

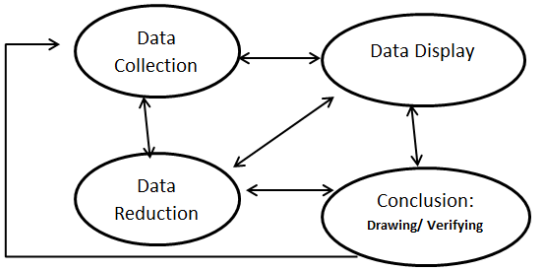

Figure 1. The flow of qualitative data analysis based on an interactive model

Data collection (data collection) involves making observations, conducting in-depth interviews with research subjects and information sources, and looking for documentation regarding vocational teacher competence. Reviewing all observation, interview, and documentation records is data reduction (data reductional). Display data (display data) is the collection of the main points that have been systematically summarized so that clear themes and patterns about the research problem can be identified and easy conclusions drawn. An attempt to find meaning from the data collected and solidify the conclusion through member cheek or triangulation, which is carried out both during and after the data collection, is referred to as conclusion and verification (conclusion/verifying).

Result and Discussion

SMKN 1 Sei Menggaris always makes various new breakthroughs and improvements so that it has high quality and can compete with other SMKs in Kalimantan and nationally. Efforts to improve are carried out in various ways, both by improving the facilities and infrastructure as well as the quality of learning. SMKN 1 Sei Menggaris led by Mr. Rusmini Hakim is expected that from year to year SMKN 1 Sei Menggaris must continue to improve service to all parties as well as possible. The vision of SMKN 1 Sei Menggaris is to create the best SMK. While the mission is to excel in appearance, professional in their field, excellent in service and optimal in resource utilization. SMKN 1 Sei Menggaris is committed to being disciplined and responsible as well as having a big and independent spirit (Saidova, 2021).

Vocational teacher competence in the era of the industrial revolution 4.0

In terms of teacher competence in Indonesia is the ability to carry out tasks that are obtained through education and training. Law of the Republic of Indonesia number 20 of 2005 concerning Teachers and Lecturers explains that competence is a set of knowledge, skills and behaviors that must be owned, internalized and mastered by teachers and lecturers in carrying out professional tasks. Government regulation number 19/2005 concerning national education standards article 28 paragraph 3 teacher competencies include personal competence, pedagogical competence, professional competence and social competence obtained through professional education. The competence of Science vocational teachers in the era of the industrial revolution 4.0 at SMKN 1 Sei Menggaris already has the characteristics of being a professional teacher in their

respective fields. In this case, if the teacher teaches as in the past, then student learning outcomes are no longer relevant to the needs of students in the future, because in other words, Science vocational teachers must gain additional new knowledge in order to be able to guide students in learning or practice with a curriculum that collaborates with DUDI and SMK. The competencies needed by Science vocational teachers in the current era of the industrial revolution 4.0 are Mastery of global languages, Teamwork, Have appropriate competencies in DUDI, Mastery of technology by familiarizing themselves with ICT using ICT, Mastering teacher competence, Being able to teach effectively, Having competence in class management and organization, Organizing learning both theory and practice, and Integrating theory with practice (Gilmanshina et al., 2015).

Competence is the most essential existence in vocational education. Based on these considerations, it is appropriate for the Government to establish a Training Center for Vocational High Schools according to their study program. The location and zoning are arranged according to the industrial potential and development of the local potential of the area. The Training Center is a form of excellent service in vocational education, besides that it is a real implementation. Vocational education is education for the mastery of knowledge and skills that have economic value, according to market needs with a high education labor coefficient (Ridei, 2021).The implications for vocational education are: Programmed internships must be part of the vocational education system, because many technical skills, attitudes, habits, and emotions can only be acquired through on the job training; In on the job training the skills learned include those that are both general and specific; General training has a longer economic value and becomes a foundation, so it needs to be strong; Specific training must always be up to date in accordance with market needs; Training to have skills in how to obtain and dig up information is important for updating (Muljani, 2017). The global era occurs and processes in the 21st century, thus the educational design or pattern of education planned also refers to the process of change in the 21st century era, the educational institutions that play a role are termed 21st century education. 21st century education demands many skills that must be mastered by students, with the hope that one day they can compete at the local and global levels. The curriculum must be designed taking into account the principles of life in the global era, so that students can learn independently, think globally, play a role in global society, and can make life choices according to the progress of the times (William, 2003).

Table 1. Number of teachers and employees based on educational level at SMKN 1 Sei Menggaris

Education Level	Science Teacher	Employee
Graduate/SI	26	4
Master/S2	3	
Amount	29	4

As a reference material regarding the condition of the number of teachers and employees, the author will describe through the data below. SMKN 1 Sei Menggaris as a vocational secondary education institution that is oriented towards educational goals has been determined by 98% of teaching staff with bachelor's degrees (S1), 3 people with masters/S2 degrees (3 teachers). Meanwhile, to support learning, 4 employees and 29 teachers are needed. Table 1 shows the number of teachers and employees by education level at SMKN 1 Sei Menggaris. The essence of vocational education is educating people of use value, meaningful for life, competent, emphasizing the role and function of educators or trainers in the learning process, as experts who master the subject matter, able to develop skills through various training, repetition, conditioning, and developing good habits of student behavior. Student learning is carried out progressively from less complex skills to more complex skills (Sudira, 2012) . Vocational education has special characteristics that are different from general education, therefore the competency of Science vocational teachers in particular is also different from general education.

For this reason, SMKs must immediately improve the productive learning system that has been implemented, namely with the following provisions: The learning system uses a block system; The learning strategy is competency-based and production-based; The principle of using 1 machine 1 student facility; Practical learning time of 1 lesson hour = 60 minutes adjusting the use of time in the industry; Assistance system, 1 teacher accompanies 8 students (if the number of students is 32/class); The machine/equipment used must be in accordance with the variety and type, and suitable for use; Practice materials used in accordance with electrical work standards; The treatment program uses a student-based treatment system; Empowerment of technicians must be optimal; The evaluation is carried out openly, the aspects assessed include objective, subjective and process aspects; In order to equip students with aspects of soft skills, they need to be given guidance; Vocational/vocational training will carry out practice by practicing teachers; In order for the practical learning process to run optimally and effectively, school principals and workshop heads must enhance the supervisory function attached to all academics and workshop technicians (Sukardi, 2018).

The best school is a school that is able to create a social community that invites all its citizens to develop the culture of its community members. According to Dewey, only true and genuine experience allows students to develop theories through the process of connecting various incidents or events. Students together with educators must make joint research efforts and then carry out a reflective thinking process. According to Dow (2002), Dewey proposed a semi-vocational approach, with the belief that all students need to develop industrial intelligence in order to participate fully and freely amidst the flow of industrial democracy (Gill et al., 2000).

Current competency of Science vocational teachers at SMKN 1 Sei Menggaris

Vocational secondary education, especially SMK Cluster Technology is a form of education in Indonesia, this education is programmed to produce middle-level workers in industry and services. Vocational High School is included in the vocational education level of secondary education which acts as one of the institutions that prepares the middle-level workforce, for this reason this institution is required to be able to produce graduates as expected by the world of work.

Pedagogic Competence

To ensure holistic development and effective teaching, educators must master various aspects. This includes understanding students' characteristics encompassing the physical, moral, spiritual, social, cultural, emotional, and intellectual dimensions. Proficiency in learning theory and educational principles is essential. Developing a curriculum tailored to the subjects being taught promotes effective education. Organizing educational learning processes systematically contributes to a conducive learning environment. Utilizing information and communication technology enhances learning outcomes. Facilitating the development of students' potential allows them to actualize various abilities. Effective, empathetic, and polite communication with students fosters a positive learning environment. Regular assessment and evaluation of learning processes and outcomes aid in understanding progress. Utilizing assessment results for the benefit of learning enhances educational strategies. Reflective action is crucial to continuously improve the quality of learning.

Personality Competence

To ensure effective teaching in Indonesia, educators should adhere to various principles. This involves aligning actions with the religious, legal, social, and national cultural norms of the country while embodying honesty, nobility, and acting as a role model for both students and society. Additionally, educators should project an image of steadiness, stability, maturity, wisdom, and authority. Demonstrating a strong work ethic, high responsibility, pride in being a teacher, and self-confidence is crucial. Moreover, teachers must uphold the code of ethics associated with the teaching profession. By integrating these principles into their professional conduct, educators contribute to a positive and impactful learning environment in line with Indonesian norms and ethical standards.

Social Competence

To ensure holistic development, educators must adopt inclusive practices, acting objectively and avoiding discrimination based on gender, religion, race, physical condition, family background, and socioeconomic status. Effective communication is crucial, involving empathy and politeness when interacting with fellow educators, educational staff, parents, and the community. Additionally, educators need to adapt to the socio-cultural diversity present throughout the Republic of Indonesia. This includes fulfilling duties in various locations and engaging in effective communication not only within the professional education community but also with other professions through oral, written, or other forms of communication.

Professional Competence

To ensure effective teaching, educators must master the material, structures, concepts, and scientific mindsets supporting the subjects taught. Additionally, they should have a strong command of competency standards and basic competencies related to the subjects. Creatively developing and utilizing innovative learning materials is essential for engaging students. Moreover, educators must cultivate professionalism through sustainable practices, incorporating reflective action to enhance their teaching skills continuously. The integration of information and communication technology is crucial for educators to stay current and continually develop their capabilities.

At SMKN 1 Sei Menggaris all teachers have done their job well so that professional competence gets the highest score of 98%, pedagogic competence gets a score of 95%, social competence gets a score of 89% and professional competence gets a score of 85%. Educators at SMKN 1 Sei Menggaris respect each other, greet each other, have a high sense of kinship with all school members in the school environment at SMKN 1 Sei Menggaris as stated by Sht as an electrical engineering teacher at SMKN 1 Sei Menggaris in the following interview:

"*Yes, the positive attitude is to respect each other, greet each other and teach in accordance with the knowledge occupied by the students of SMKN 1 Sei Menggaris (Results of Interview, 8 April 2023).*

Vocational education in Vocational Schools as education for the development of HR work competencies will be successful if it is able to develop human essence and existence through vocational education that is socialized, has a culture of competence in a life order with local, national, regional and global dimensions. As a product of society, vocational education cannot be separated from the society in which vocational education is developed. Vocational education grows from the community, develops with the culture and traditions of the local community, pays attention to local wisdom, local excellence, regional potential, community support, community participation and cooperation, there is a strong consensus between the community and vocational education institutions. The vision of vocational education should be congruent with the vision of the society where vocational education is developed (Tilaar, 1999).The same thing was also expressed by Har and Iwa as teachers of building engineering and grade 2 students of computer and network engineering at SMKN 1 Sei Menggaris as in the following excerpt of the recording:

"*Yes, you have to be disciplined, educate students in the right direction so they can succeed in achieving the desired goals (Interview Results, 8 April 2023).*"

To realize good vocational education, a vocational process is needed. The main objective of vocationalization is to increase the relevance of vocational education and guidance to developments in the world of work in realizing a prosperous society that is competitive and oriented towards sustainable development. This planet earth is not for one generation but for posterity without limit. Therefore, vocationalization should not be trapped only in a narrow market orientation. Vocationalization must build a prosperous society now and in the future without a time limit. Vocationalization must not be trapped in narrow momentary needs let alone threaten survival. This is the moral message of the vocationalization of society through vocational and vocational education. Vocational education is not solely for obtaining pleasure, convenience, comfort, temporary safety, but for the further goal of being happy and peaceful living together on this planet earth. Besides seeking to prepare the community to become more literate, to become a productive workforce, vocationalization has great potential in developing a learning society and continues to be committed to developing efficiency in various forms of thought. Understanding is done by the teacher for students so that they can be well received and can absorb the knowledge conveyed in class as stated by Sht in the following interview:

"*When viewed from the understanding of teaching, it is certain that students can absorb the knowledge that has been conveyed in the PBM process. If you look at the students' understanding, it is certain that some will understand and some will not so that with the interaction between students and teachers they can understand in depth about the knowledge conveyed (Results of Interview, 8 April 2023).*"

The average age of teachers at SMKN 1 Sei Menggaris ranges from 22 to 45 years and over for long teaching experience, some have served for 10 to 15 years and over. The number of educators and educational staff at SMKN 1 Sei Menggaris can be seen in Table 2.

Table 2. Number of teachers and employees of SMKN 1 Sei Menggaris

Description	Teacher	Employee	Amount
Civil Servant	17	2	19
Honorary Teacher	8	2	10
Amount	25	4	29

Table 2 above can make a comparison between teachers who are Civil Servant (PNS) and teachers who are Honorary Teachers. The number of teachers and education staff at SMKN 1 Sei Menggaris is 29 people. The number of teachers who have become PNS are 19 people and Honorary Teachers are 2 people while the number of employees who are PNS are 19 people and Honorary Teachers are 10 people so that it can be said that SMKN 1 Sei Menggaris is an excellent school in the field of technology and industry. The number of teachers who teach has also gone through screening or selection so that they are truly professional teachers in their respective fields.

Figure 2 below can be compared to the fact that there are a lot of teachers and educational staff compared to Honorary Teachers Educators and educational staff are a set of those in SMKN 1 Sei Menggaris. Student success is due to teachers who are professionals in their respective fields. The teacher is the heart of the school as a change from knowing to being able so that it can be said as a teacher at SMKN 1 Sei Menggaris has been effective. Teachers must work together with employees to achieve success in PBM or in the SMKN 1 Sei Menggaris environment in Table 3 says that the education of teachers and employees is viewed from the type of education as follows.

Table 3. Number of teachers and employees based on education level at SMKN 1 Sei Menggaris

Education level	Science Teacher	Employee
Graduate/S1	26	4
Master/S2	3	
Amount	29	4

Figure 2 shows that the number of teachers and the last educational level of teachers at SMKN 1 Sei Menggaris are as follows.

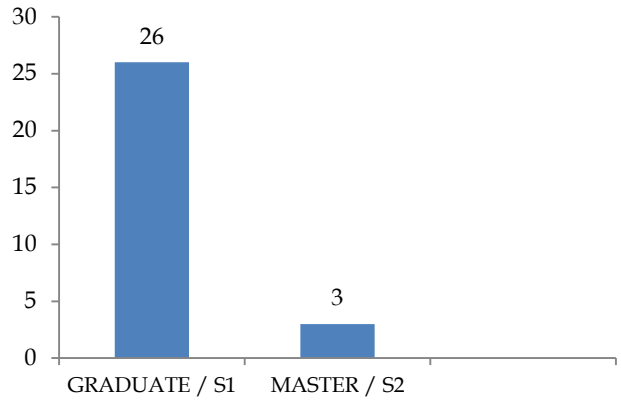

Figure 2. Number of teachers and employees based on education level at SMKN 1 Sei Menggaris

Teacher education is dominated by 26 undergraduates, while 3 graduates are postgraduates (S2) so that teacher education has qualifications as professional educators in their respective fields. The income or salary earned by teachers is good because of teacher certification so teachers must be truly professional in their field, especially in PBM, as stated by Sht in the following interview:

> *"Yes, the problem of income, Alhamdulillah, is enough to pay for school children. If there is no award, sir, even though the salary of civil servants is mediocre, it really helps with teacher certification (Interview Results, 8 April 2023)."*

The structure of the vocational education curriculum before the 2013 Curriculum recognized the grouping of normative, adaptive and productive programs. In fact, this grouping contains a pragmatic meaning whereby vocational education should always be adaptive to changes and normatively its graduates have moral competence and a good attitude. Unfortunately, this grouping is interpreted as a lot of teacher groups in obtaining the number of teaching hours after the implementation of the certified teacher burden. Vocational education as education for the world of work is very important in its function and position in meeting the objectives of employment policy. A country's employment policy is expected to cover four main points, namely: providing job opportunities for all the workforce in need; jobs are available in a balanced and equitable manner in each region and region; provide sufficient income in accordance with the feasibility of living in society; education and training are able to fully develop all the potential and future of each individual; matching men and jobs with minimum losses, high income and productivity. Employment policies may not favor only a group or part of the community. The number and types of jobs are available, evenly distributed, balanced and appropriate for the life of the whole community. According to Rojewski (2009) Prosser's view is more towards social efficiency, not for meeting the self-needs of individual communities, but for meeting the needs of a country's workforce. The stronghold of vocational education for social efficiency is the preparation of an educated and trained workforce that is always subject to the employer. According to Prosser's view, the social efficiency of vocational schools is said to be effective only if the vocational school can demonstrate the same school climate as the climate in industry, users and alumni are satisfied with the results of their education, ready to produce skilled workforce to meet job needs in a country.

Conclusion

The competence of Science Science vocational teachers in the era of the industrial revolution 4.0 at SMKN 1 Sei Menggaris already has the characteristics of being a professional teacher in their respective fields. In this case, if the teacher teaches as in the past, then student learning outcomes are no longer relevant to the needs of students in the future, because in other words, Science vocational teachers must gain additional new knowledge in order to be able to guide students in learning or practice with a curriculum that collaborates with DUDI and SMK. The competencies needed by Science vocational teachers in the current era of the industrial revolution 4.0 are Mastery of global languages, Teamwork, Have appropriate competencies in DUDI, Mastery of technology by familiarizing themselves with ICT using ICT, Mastering teacher competence, Being able to teach effectively, Having competence in class management and organization, Organizing learning both theory and practice, Integrating theory with practice. Educators and education staff at SMKN 1 Sei Menggaris have fulfilled bachelor's degree qualifications and implemented and have sufficient personal competence, pedagogic competence, professional competence and social competence as Science vocational teachers in SMK. What's more, most of them have an undergraduate degree and are already certified teachers. With teacher certification, the quality of education at SMKN 1 Sei Menggaris can produce graduates who are ready to use DUDI.

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Author Contribution
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The authors declare no conflict of interest.

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