The Effect of School Principal Leadership, Teacher Professionalism, Work Culture, and the Utilization of Information Technology on the Capacity of SMK in DKI Jakarta

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Abstract— **The influence of the principal's leadership is one of the main factors needed in improving the quality of Vocational High Schools (SMK). The purpose of the study was to determine how much influence the principal's leadership, teacher professionalism, work culture, and the use of information technology had on the capacity of SMK in DKI Jakarta. Methods This research was conducted using a quantitative approach with a survey method. The results achieved show that principals who use information technology in their leadership will be able to improve the quality of teachers in implementing work in vocational schools. Implementation of information technology is very necessary to improve the quality of vocational education**

Keywords— principal leadership, utilization of information technology.

INTRODUCTION

Education is the process of preparing students to be able to live properly in society. Each level and type of education has a different purpose. Vocational High School (SMK) is a type of education at the secondary education level that aims to prepare skilled workers who are ready to work in various employment sectors. The ability of schools to carry out their functions and achieve their goals is called school capacity. Vocational High Schools that have good capacity will demonstrate a quality learning process, high student learning outcomes, and characteristics (knowledge, attitudes, and skills) of graduates that are relevant to the needs of the world of work so that graduates can be fully absorbed by the labor market.

School capacity is an essential school ability and affects school performance. [1] stated that in response to the global trend towards equality and quality education, education systems around the world have devoted significant attention to expanding the capacity of schools for high-quality teaching and learning. The most central and crucial aspect of school capacity is learning capacity, or the expertise of teachers and teaching organizations that directly impact student learning [2]

In 2021, the DKI Jakarta Central Statistics Agency (BPS) stated that the number of unemployed in DKI Jakarta would reach 572,780 people 2020. Of that number, as many as 197,112 people were graduates of Vocational High Schools (SMK). The proportion reaches 34.41% of the total unemployment in Jakarta. [3]

Table 1 Table of Supply and Demand Gap of Vocational School Graduates with Manpower Needs

No	Areas of expertise	Vocational High School Graduates 2016	Opportunities for Labor Needs	Advantages (+) / Weaknesses (-)
1.	Technology and Engineering	441,561	611,644	170.083
2.	Energy and Growth	3.486	27.008	23,522
3.	Information and communica	277.545	327,813	50,268

	tion technology			
4.	Health and Social Work	60944	68,245	7.301
5.	Agribusiness and Agrotechnology	52,319	445,792	393,473
6.	maritime	17,249	3,364.297	3,347,048
7.	Business and management	348,954	119.255	-229,699
8.	Tourist	82.171	707,600	625,429
9.	Arts and Creative Industries	12.017	88.133	76.116
Total		**1,296,246**	**5,759,787**	**4,463,541**

Source: Ministry of Education and Culture (2017: 8)

In the regional context of DKI Jakarta, the problem of absorption of SMK graduates was identified. The number of State and Private Vocational High School students for the 2019-2020 academic year is 70,496 with a graduation rate of 99.49% or as many as 70,489 students. The absorption of graduates based on data in the first quarter of 2021 is 20,447 students.

The quality of SMK graduates can be assessed through student evaluations, such as UNBK which aims to assess learning achievement at the final level of SMK. The national exam scores of DKI Jakarta Vocational High School students increased, although in 2018 (62.90) they decreased by 2.01% compared to 2017 (64.61). In 2019, SMK students experienced an increase in grades 2018 from 62.90 to 68.63 in 2019. In 2020, the computer-based National Examination was abolished nationally due to the influence of the spread of COVID-19. The UNBK score that is not yet optimal indicates that the quality of the learning process in SMK is still not optimal, which also indicates weak learning capacity.

The rapid development of information technology and infrastructure has allowed Industry 4.0 to redefine how goods and services are produced. Based on the research results, the intelligence of the manufacturing environment produces four strengths, namely: (1) Internet of Things (IoT), increasing connectivity from everyday technology, (2) Industrial Internet of Things (IIoT), connectivity emerging from industrial machines and equipment, (3) the emergence of cloud-based manufacturing systems, and (4) the emergence of manufacturing [4] [5]

Rice and Croninger developed the concept of school capacity which includes five resources, namely financial capital, human capital, social capital, cultural capital, and information resources [6]. Malen and Rice mention that there are two dimensions of school capacity constructs to measure the impact of changes on school capacity, which consist of the resource dimension and the productivity dimension [7]. School capacity is an integrative approach to implementing the curriculum, learning process, and evaluation of vocational schools and other resources (social capital, culture, and information), including 21st-century skills in the face of revolution 4.0. Through this approach, we will test the SMK in DKI as an SMK that has 21st-century skills.

The principal's leadership variable is the variable that has been studied the most by previous researchers, showing that this variable is an essential variable that affects school capacity. Previous research has shown that principal leadership has an important and influential role on school capacity [8] [9] [10] Even though it has used the principal's leadership variable which is associated with school capacity, however, principal leadership is still needed in the SMK setting which has not been studied before. Three principal leadership practices are successful in developing school capacity, namely: (1) developing teacher learning in practical communities, (2) teacher participation in decision-making and promoting school-community relations to facilitate student learning; and linking external needs with the internal state of the school [11] [12] .

The problem of teacher professionalism can be seen in academic qualifications, competencies, and many teachers who do not master the use of information and communication technology. In addition, the teacher's industry experience is also part of the teacher's competence in transferring knowledge and skills according to industry needs. The unfulfilled data and analysis of the problem of teacher professionalism, including the competence of mastering information technology, places the problem of teacher professionalism as interesting to be investigated in depth in this study.

The research objectives are as follows. To analyze and construct the influence of the principal's leadership on work culture, use of ICT, teacher professionalism, and SMK capacity, at SMK in DKI Jakarta;

Research with a central variable on school capacity published in Scopus-indexed journals in 2016-2021 is still very limited, which is only 74 articles. The research methods used by the researchers are divided into 3 categories, namely 47% qualitative methods, 46% quantitative methods, and 7% mix-methods. Research on school capacity is all carried out in settings, locations, or samples in public schools, both primary and secondary education levels. No research on school capacity was conducted on the type of vocational education

"How much influence does the principal's leadership, teacher professionalism, work culture, and the use of information technology have on the capacity of SMK in DKI Jakarta?"

METHODOLOGY

The demand for digitizing work processes or work skills demanded by the industrial revolution 4.0 is a challenge as well as a threat to vocational education, especially vocational schools. These challenges and threats have been identified and then tried to be formulated in the 2030 Vocational High School Development Roadmap. 21st-century skills as the demands of the workforce in the 4.0 industrial revolution era are said to be not a real challenge for vocational schools. The main challenge now is how to integrate these skills into the curriculum, learning process, and evaluation [13].

In 2019, we can assess the National Standards for Vocational Education in DKI Jakarta below:
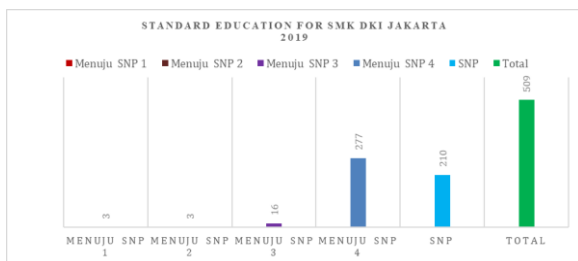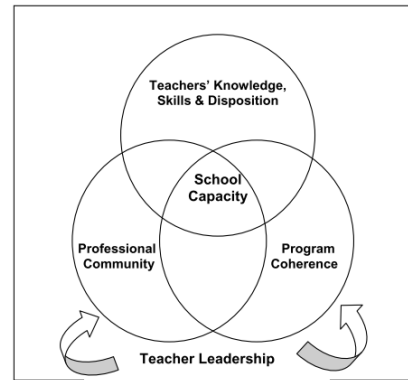

Figure 1 Graph of National Education Standards (SNP) DKI Jakarta 2019
Data source: lpmpdki.kemdikbud 2019

Criteria for National Education Standards (SNP)
Towards SNP level 1: score < 2.04
Towards SNP level 2: 2.04 < score < 3.70
Towards SNP level 3: 3.70 < score < 5.06
Towards SNP level 4: 5.06 < score < 6.66
SNP : 6.66 < score < 7.00
Picture. Graph of National Education Standards (SNP) DKI Jakarta 2019

Work culture is an intangible dimension that affects school capacity development. Capacity building will work optimally if the school has a productive work culture. On the other hand, various capacity-building efforts will not have a significant impact if a productive work culture has not been formed. Capacity development is influenced by school culture or work culture in schools [14] Work culture can be measured from the dimensions of the value system, work behavior patterns, and real artifacts (symbols) in schools.

Figure 2 School Capacity Dimension Drawing (Witherow, 2008:

The ability to use information and communication technology is the main strength of vocational education today. Education is also required to empower technological resources in the learning practices carried out. The internet of things, artificial intelligence-assisted learning, and the use of big data in various school activities are tangible manifestations of the use of technology in education. The teaching staff is required to be able to adapt to these technological advances [15]. Schools need to make adjustments in learning, namely using e-learning, education Penta helix ecosystem and blended learning [16].

Table 2 Table of Frequently Researched Variables

No	Variable	Link	Total Link Strength	Occurrences
1	development	10	19	11
2	School improvement	7	14	10
3	School Capacity	6	7	10
4	Capacity Building	5	11	12
5	Leadership Capacity	4	10	8
6	Building Capacity	3	4	6

The facts above show the limited capacity development of SMK schools. This can also be seen in the description of previous research which is still limited and partial, both in terms of approach and perspective of looking at SMK. With the variables of the principal's leadership, teacher professionalism, work culture, and the ability to use information technology, the problems of SMKs which are weak in organizational capacity and not following 21st century skills can be unraveled in it. Therefore, research on the capacity of SMK with the predictor variables of principal leadership, teacher professionalism, work culture, and the use of information technology is still very relevant for the development of the world of education, especially vocational education.
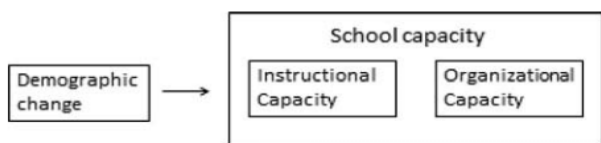

Figure 3 Model of School Capacity for Demographic Change [2]

Information technology as a tool in learning has four capabilities, namely: communicating ideas and information, handling information (handling information), modeling (modeling), and measuring and controlling[17].
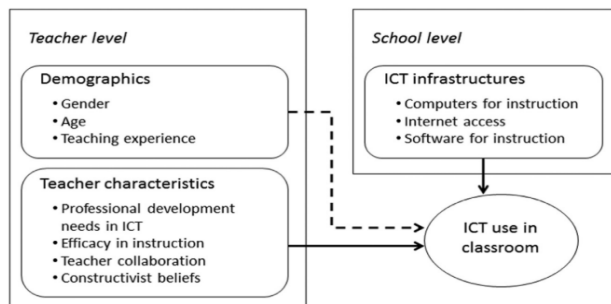

Figure 4 Factors Affecting ICT Utilization (Vanderlinde et al., 2014: 3)

FINDING AND DISCUSSION

The fact is that there are still many SMK graduates who are not directly absorbed by the labor market. Based on data from the Central Statistics Agency (BPS) in 2019 it is known that the number of open unemployment in August 2019 amounted to 7.05 million people, an increase from August 2018 which was only 7 million people [18]. he open unemployment rate (TPT) was dominated by SMK graduates at 10.42 percent in August 2019. Besides SMK, SMA was ranked second with a percentage of 7.92 percent, followed by diploma I/II/III at 5.99 percent, university at 5.67 percent, junior high school at 4.75 percent, and elementary school at 2.41 percent. The high unemployment of vocational school graduates is caused by over-supply in vocational schools in certain areas of expertise.

Principals have a central role in developing school capacity. Based on data from the DKI Jakarta Education Office (2021), it is known that of the 73 principals of public vocational schools in DKI Jakarta, there are still 20.5% or 15 public school principals who have not attended the school principal strengthening training. [19] found that the transformational leadership role of the principals of Vocational Schools in North Jakarta turned out to encourage teacher performance motivation. This role is seen in setting a good example in terms of leadership, and collaborating with teachers in improving the quality of teachers. As far as researchers are concerned, research on principal leadership related to school capacity in SMKs throughout Jakarta seems to be rare.

Table 3 Absorption of Vocational School Graduates for the 2019/2020 Academic Year in DKI Jakarta

No	Information	Total	Percentage
1.	Graduates who are already working	7.347	35.93%
2.	Graduates who go on to college	4,537	22.19%
3.	Entrepreneurial graduate	1.324	6.48%
4.	Graduates who have not worked	7.239	35.40%
		20,447	

Source: Data from the DKI Jakarta Provincial Education Office (2021)Table 4 Distribution of the Number of Vocational High Schools in DKI Jakarta

No	County/City	Number of SMK
1.	Central Jakarta	58
2.	North Jakarta	76
3.	West Jakarta	119
4.	South Jakarta	129
5.	DKI Jakarta	200
6.	Thousand Islands	1
Amount		**583**

Source: [20]

The gap between graduates and the need for labor in each area of expertise. In general, each area of expertise has fewer graduates compared to the needs of the world of work. However, this condition also causes unemployment because many graduates do not meet the competencies needed by the world of work

Table 5 National Vocational Exam Data in DKI Jakarta 2017-2019

NO	CITY/DIGENCY NAME	NUMBER OF EDUCATION UNITS			NUMBER OF PARTICIPANTS			AVERAGE VALUE		
		2017	2018	2019	2017	2018	2019	2017	2018	2019
1	Central Jakarta Administrative City	14	14	14	2825	2806	2823	62.70	59.89	66.41
2	North Jakarta Administrative City	9	9	9	2084	2122	2174	60.92	61.13	65.56
3	West Jakarta Administrative City	9	9	9	2047	2023	2074	66.91	64.94	68.31
4	South Jakarta Administrative City	18	18	18	3875	3649	3666	67.01	64.19	69.98
5	City Administration DKI Jakarta	13	14	13	3365	3602	3175	64.34	63.83	71.37
6	District Administration Kep. Kep. One thousand	0	-	-	-	-	0	-	-	-
	DKI JAKARTA	63	64	63	14196	14202	13912	64.61	62.90	68.63

The quality of vocational education is still few that reach the overall national standard. Of the 583 SMKs, only 509 have completed the SNP quality report cards. Of the 509 SMKs, only 210 have met the post-SNP standards for SMKs in DKI Jakarta. It means that the SMK in DKI Jakarta that meets the education quality standard is still below 50%.

Table 6 Industry Skills Portfolio

Rating	Skills	Example
1	Social skills (social skills)	Negotiation, emotional intelligence, collaboration
2	Cognitive skills (cognitive skills)	Data analysis, think abstract

3	Personal /mental abilities (personal/mental abilities)	Decision making under pressure, persistent
4	Process skills	Critical thinking and deductive reasoning
5	System skills (system skills)	Integrative decision making, entrepreneurial skills
6	Technical skills (technical skills)	Programming and adaptability to new technologies
7	Content skills _	ICT understanding, active learner.
8	Intercultural skills (intercultural skills)	Work across cultures and geographies.
9	Resource management skills	Manage my time and resources efficiently.

Source: Krachtt (2018: 24)

As an institution that plays a role in preparing qualified, skilled, and competent personnel, Vocational High Schools are required to respond to internal and adaptive conditions as well as to respond absorptively to the dynamics of the labor market. Industrial developments that have entered the industrial revolution 4.0 have implications for changes in the characteristics of the workforce needed by the industrial world. In this 4.0 industrial revolution, computerized technology has shifted to the digital world so that everything in the joints of life begins to be connected. The industrial revolution 4.0 is marked by increased digitization of the manufacturing industry driven by four main technological disruptions, namely: (1) increased connectivity, volume, and fast computing power in manufacturing technology; (2) developments in data analysis and business intelligence; (3) the novelty and emergence of technology that integrates humans with machines; (4) improvement of digital content transitions and orders for physical manufacturing spaces.[22]

The features of information technology in the learning process are (1) speed in processing; (2) the method of determining information procedures (use of symbols concerning specific rules in their operation); (3) its capability in transformation (eg in changing from text feature to voice feature); and (4) how IT tools help novice users build and refine their mental models so that they look more like experts [23] To obtain quality learning, information technology tools need to be used to support students in carrying out the cognitive tasks needed [23]

Based on the table above, identified related keywords, namely school improvement, development, and student. While the leadership capacity variable is a variable that is not directly related to school capacity. Research on school capacity is mostly carried out in primary or elementary education units.

This integration cannot be transformed individually, but organizationally. It cannot be imposed on the individual capacity of teachers or school principals alone but is also carried out in the entire organizational system and school capacity to create a generation of skilled 21st-century graduates or vocational students with the face of revolution 4.0.

The realization of graduates with vocational competencies according to 21st-century skills and the needs of industry with a 4.0 face formed in the school culture. The required work culture is socialized and implemented in schools. In the journal Educational and Learning Studies, it was found that the cultural experience of the SMKN 9 Padang school was connected with the work culture of its students. It turns out that the application of school culture with the philosophy of the real entrepreneur school and bringing the values of cooperation and closeness encourages the work culture of each student [24]. The research is still limited to the context of SMK from the tourism department, and has not been found from several engineering majors and others.
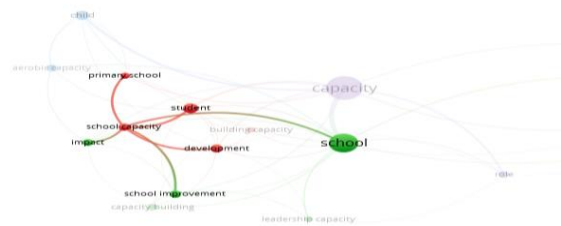

Figure 5 Variables Related to School Capacity

Based on the review of the results of bibliographic research using the VosViewer application, it is known that the variables of teacher professionalism, work culture, and the use of information technology are new variables that are not related to the variables related to school capacity that have been studied. As for the leadership of the principal that has been identified, it is still a variable to be studied because of the central role of the principal's leadership on school capacity. Several previous studies that are relevant to the research, linking the variables to be studied, the Relationship between Principal Leadership and Work Culture.

Table of Research Results on the Relationship of Principal Leadership with Work Culture

No	Researcher	Title	Results
1	Maleen Z. Gong Nava Subramaniam (2018)	Principal leadership style and school performance: mediating roles (RM) of risk management culture and management control systems (MCS) use in Australian schools	Based on survey responses from 106 Victorian secondary school principals, this study finds that RM culture is performance-oriented and allows the use of MCS games to play an important mediating role in leadership style and link school performance. Our results extended the organizational management and accounting literature linking leadership style, organizational control and organizational performance in

No	Researcher	Title	Results
			the school context.
2	Natallia Yakavets (2016)	Societal culture and the changing role of school principals in the post-Soviet era: the case of Kazakhstan	There is a relationship between national culture and changing the role of leaders in the school context. The results of the study provide empirical evidence on the ways in which community culture and cultural norms shape the role of principals
3	Keshni Bipath & Eles Moyo (2016)	Principals Shaping School Culture for School Effectiveness in South Africa	The principal who adapts to his gloomy environment and creates hope and a positive form of culture in their school is truly inspiring. Principals who use their leadership skills well and who have the ability to handle complexity and adapt to constant change

Table of Research Results About the Relationship of Principal Leadership with Teacher Professionalism

No	Researcher	Title	Results
1	enol Sezer & Tevfik Uzun (2020)	The relationship between school principals' social-emotional education leadership and teachers' organizational trust and job performance	The study found that there was a high and positive relationship between principals' socio-emotional educational leadership and teacher leadership, and organizational trust. Socio-emotional educational leadership behavior positively affects organizational and work beliefs as well as teacher performance.
2	Lijuan Li Philip Hallinger James Ko (2016)	Principal leadership and school capacity effects on teacher learning in Hong Kong	The results show that several dimensions of principal leadership make significant contribution to school capacity and teacher professional learning. The existence of cooperation, trust, communication, support for students, and harmony, coherence, and structure in schools also affect the professional

No	Researcher	Title	Results
			learning of teachers.
3	Resven Feres, Nurhijrah Gistituati, Hanif Alkadri (2021)	The Contribution Of School Leadership And Teacher Professional Competency To Teacher Work Commitments In Junior High School State, River Full City	The results of the research data show that: 1) the principal's leadership contributes to the work commitment of teachers by 26.5%，2) the professional competence of teachers contributes to the commitment of teacher performance by 40%，3) the leadership of the principal and the professional competence of teachers together contribute to the work commitment of teachers by 52 ,3%.

Table of Research Results on the Relationship between Work Culture and School Capacity

No	Researcher	Title	Results
1	Karen Seashore Louis & Moosung Lee (2016)	Teachers' capacity for organizational learning: the effects of school culture and context	Research finds that components of school culture such as the academic press, student support, and trust and respect among teachers enhances teachers'

			capacity for organizational learning. The study also found that the role of teachers' professional culture in shaping organizational learning capacity is critical.
2	Laura Van den Broeck, Jannick Demanet, Mieke Van Houtte (2020)	The forgotten role of teachers in students' educational aspirations. School composition effects and the buffering capacity of teachers' expectations culture	Research on student aspirations, an important predictor of educational attainment, has largely focused on individual-level determinants, reflecting the classical status attainment model. Studies have suggested the effect of school composition, but ignored school processes. Inspired by new insights into school effects research looking at teacher expectations at the school level, we investigated the mediating and moderating role of teachable culture in the relationship between SES composition and aspirations. An analysis of stratified data (2013-2014) from 2,354 students and 502 teachers in 30 Flemish secondary schools suggests that shared expectations of teachers may offset the detrimental effect of low SES composition on aspirations.
3	Roos Van Gasse, Jan Vanhoof & Peter Van Petegem (2016)	The impact of school culture on schools' pupil well-being policy-making capacities	The results show that teachers assess the policy-making capacity of their schools, with with regard to student well-being, is in large part positive and policy-making capacity is mainly influenced by the flexible perspective of effectiveness in school culture

Table of Research Results on the Relationship between ICT Use and School Capacity

No	Researcher	Title	Results
1	Douglas Darko Agyei (2020)	Integrating ICT into schools in Sub-Saharan Africa: from teachers' capacity building to classroom implementation	The findings of the study revealed that teachers expressed general satisfaction with the content and process of the training program; however, the essential conditions for supporting the transfer of training ideas to school level do not appear to be adequate during the implementation period. The implications for effective professional development of integrating ICT into school organization and curriculum practices that have a lasting impact on teaching and learning particularly in the Sub-Saharan region and similar contexts are discussed.
2	ON Povalyaeva, et al	Actualization of self-realization need of junior	The results show that the self-realization needs that

	(2020)	school children with limited health capacities when using informational-communicative technologies	determine the process of self-development as a result of personal education are not sufficiently actualized when talking about junior high school children with limited health capacity. In this case, the need for self-realization, the actualization process as a result of the use of information-communication technology can be considered as a component of junior high school children with limited personal health capacity resulting from the problem of creating education.
3	Biplab Biswas, et al (2020)	Report of the 21-Day, 'Level-2' Capacity Building Program '4th Winter School Program 2020' on "Application of Geospatial Technologies for Disaster	The training is able to make participants have knowledge of remote sensing, geographic information systems, global navigation satellite systems, contemporary

		Management" Sponsored by NRDMS, DST, Govt. of India	survey instruments, etc., to build a knowledge base and adapt disaster management capacity

Learning capacity (instructional capacity) is the most important part of school capacity. This is following the following statement by [25]: "Perhaps the most central and crucial aspect of school capacity is instructional capacity". Based on this opinion, it is known that the most central and crucial aspect of school capacity is instructional capacity.

Research conducted by [26] found that principals' leadership is influenced by organizational culture factors, principals' relationships with teachers, participation in decision-making, teacher enthusiasm and professionalism, teacher job satisfaction and commitment, and student attitudes towards school. Based on research conducted by [27] Found that principals' leadership is influenced by managerial skills (such as self-management, time management, influence, decision-making, and commitment), emotional intelligence, human skills, attention, and consideration for the needs of their followers (such as comfort, communication skills, and empathy). , etc).

Based on the picture above, it is known that there are four layers of factors that influence the use of ICT in learning. The first layer variable refers to the teacher's condition related to ICT. In the e-capacity framework, two endogenous conditions are put forward; relevance of ICT knowledge and skills and how to acquire them [28] The second layer of conditions contains the general conditions of the teacher. These are conditions described in the school improvement literature as conditions that encourage implementation. The last two measurement scales refer to teacher education beliefs about the nature of good education. Research shows that educational beliefs have an impact on the application of educational innovations in general [29]. The third layer of variables refers to ICT-related school factors: These include various organizational features or local conditions that affect ICT integration. The fourth layer variable refers to the conditions described in the school improvement

literature as a contribution to the implementation and realization of educational change [30].

CONCLUSION AND RECOMMENDATION

Vocational school principals are required to know the use of information technology in carrying out tasks in vocational schools to further improve teacher professionalism in working with an information technology-based work culture.

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