

The role of teacher self-efficacy on the instructional quality in 21st century: A study on vocational teachers, Indonesia

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ABSTRACT

The quality of learning for vocational teachers in Indonesia in the 21st century is still a very serious problem and has not yet received a practical solution. The prediction is that the self-efficacy of vocational teachers is weak and is motivated by very limited mastery of digital technology and low psychological well-being, which is strongly suspected as a contributing factor. This study examines the role of self-efficacy and mediation of digital technology intimacy and psychological well-being in improving the quality of vocational teacher learning. This research is an ex-post-facto study with 216 vocational teachers as respondents. Data was collected using a questionnaire technique consisting of digital technology intimacy (DTI), psychological well-being (PWB), self-efficacy (SE), and instructional quality (IQ) questionnaires using four Likert scales, namely strongly agree to strongly disagree. Data were analyzed using structural equation modeling (SEM) analysis techniques with path analysis and bootstrap methods. The results of the study revealed that SE had a significant and positive effect on DTI and PWB in influencing the quality of learning. On the other hand, DTI and PWB have a positive effect on self-efficacy and learning quality.

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1. INTRODUCTION

Teaching in the world of vocational education plays a vital role in achieving students' work competencies [1], [2]. The quality of vocational teaching has a significant shift compared to before [3], [4]. The integration of digital technology in the concept of teaching is becoming a trend in the world of education, including vocational education [5]–[8]. Previous research has revealed and tested the effectiveness of the conceptual model framework of technology, pedagogy, and content knowledge (TPACK). However, in the 21st century, teaching must no longer be interpreted at the level of pedagogy or transfer of knowledge but must be considered as learning at the andragogy level, which means that teachers have the essence of learning [7]–[9]. The teacher is no longer the center of learning which always provides various aspects needed by students. Students must be able to construct their knowledge through the facilities the teacher provides. Thus, it can be seen that good instructional quality is teaching that can teach students to build their knowledge independently [10], [11].

However, the swift current of digitization is a major problem for students in constructing knowledge broadly and thoroughly [12]. Thus, vocational teachers fully involve digital technology in all learning activities. The pedagogical approach is not sufficiently relevant to the context of vocational learning. The paradigm must be shifted to the level of andragogy and cybergogy as independent or adult learning involving the role of technology [13]–[16]. According to individual needs, this guide makes it easier for students to construct knowledge, skills, and attitudes [17]. The ability and reach to access information is the key to student success during learning [4].

Empirical research reveals the ideal concept of teaching with andragogy and cybergogy levels applied in vocational education. The four model domains are key in applying vocational knowledge: digital technology, andragogy, employment, and content knowledge [17]. This model synthesizes current thoughts, concepts, and theoretical frameworks regarding the extent and nature of the four domains in online learner engagement. Vocational teachers can use this model to strengthen student competence. Literature studies in previous studies reveal that 21st century teaching involving the concepts of andragogy and cybergogy is reflected in four important indicators [18]. The first important indicator is the teacher's behavior in teaching students or as a learning facilitator. The teacher's behavior will then determine the activity and full involvement of students in learning referred to as the second indicator. The learning system, which includes strategies, media, and learning resources, is integrated with comprehensive digital technology, referred to as the third indicator. Then the last indicator is an increase in learning motivation and students' understanding of independent learning to construct their knowledge [13], [19]–[21].

However, the quality of vocational teaching from implementing learning concepts at the andragogy and cybergogy levels has crucial constraints. Various previous studies reveal that the level of understanding of teachers in implementing 21st century teaching is still very limited [15], [22]–[24]. The involvement of teachers in transferring knowledge is still high, which means that student involvement is neglected [25]. In addition, the lack of interactive media used in teaching is also a crucial problem for vocational education teachers [26]–[28]. As revealed by previous research, applying this concept requires important support. The internal condition of the teacher is an important factor that must be considered. Self-efficacy (SE) is an internal condition crucial in influencing teachers' quality in teaching [29], [30]. Bandura stated that self-efficacy refers to an individual's belief in his ability to succeed in doing something [31]. A vocational education teacher's self-efficacy will provide confidence in his teaching ability [32]–[35]. Thus, in the context of 21st century teaching involving the concepts of andragogy and cybergogy, self-efficacy will determine the quality of teachers in teaching various work competencies in vocational education.

Besides self-efficacy, another important factor that influences the quality of vocational teacher learning is the intimacy of digital technology (DTI) support the learning process. Besides self-efficacy, another important factor that influences the quality of vocational teacher learning is the intimacy of digital technology to support the learning process [36], [37]. Good literacy skills and digital technology will strengthen their confidence in managing 21st century learning [10], [36], [38], [39]. Another factor is psychological well-being (PWB) [40], such as feeling optimistic about work, having job satisfaction, and no symptoms of depression have meaning in learning. With happiness and life satisfaction, the teacher's self-confidence and confidence in teaching will increase, and the quality of instructional will also increase by itself. Good literacy skills and digital technology will strengthen their confidence in managing 21st century learning [10], [41]–[43]. Another factor is PWB [37], such as feeling optimistic about work, having job satisfaction and no symptoms of depression have meaning in learning. With happiness and life satisfaction, the teacher's self-confidence and confidence in teaching will increase, and the quality of instructional will also increase by itself [44].

Based on the problems and concepts described, important things are interesting to be researched and studied further. This study focuses on measuring the significance of DTI, PWB, and self-efficacy on the quality of 21st century teaching for vocational education teachers and measuring the role of self-efficacy in mediating DTI and PWB influencing instructional quality (IQ). Thus, the hypothesis of the study: i) There is a significant positive effect of self-efficacy on the quality of instructional (H1); ii) There is a significant positive effect of DTI on the quality of instructional (H2); iii) There is a significant positive effect of PWB on the quality of instructional (H3); iv) There is a significant positive effect of DTI on self-efficacy (H4); v) There is a significant positive effect of PWB on self-efficacy (H5); vi) There is a significant positive effect of DTI on the quality of instructional mediated by self-efficacy (H6); and viii) There is a significant positive effect of PWB on the quality of instructional mediated by self-efficacy (H7).

2. RESEARCH METHOD

2.1. Research design

This research design is ex-post facto, which aims to measure events based on phenomena [45]. This study involved vocational teacher respondents in Yogyakarta, Indonesia. Only vocational teachers who apply the superior school curriculum are selected. Data collection is done online using Google Form.

2.2. Respondents

This study involved 216 vocational teachers from 10 vocational schools in Yogyakarta, Indonesia. Vocational teachers involved have teaching experience of more than three years with the aim that the teacher has passed the orientation phase and experienced a change in status to become a young teacher. This study also considers the status of teachers' status, civil servants, non-civil servants, and honorary teachers. To obtain mixed data, male and female gender were considered. Respondents were selected using the purposive sampling technique. Data that does not meet the criteria have been ignored. The distribution based on the characteristics of the respondents is presented in Table 1.

Table 1. Characteristic respondents

Dimensions	Category	Public school F (%)	Private school F (%)
Gender	Male	61 (28.24)	54 (25.00)
	Female	54 (25.00)	47 (21.76)
Employment status	Civil servant	74 (34.26)	12 (5.56)
	Certified teacher	28 (12.96)	57 (26.39)
Teaching experience	Honorary teacher	13 (6.02)	32 (14.81)
	≥3 years	13 (6.02)	24 (11.11)
	4-6 years	24 (11.11)	47 (21.76)
	7-9 years	21 (9.72)	14 (6.48)
	10-12 years	25 (11.57)	6 (2.78)
	<12 years	32 (14.81)	10 (4.63)

2.3. Collecting data and instruments

The data in the research on DTI, PWB, SE, and IQ variables were collected using an online-based questionnaire technique via google form. Data collection was carried out from early November to late December 2021. The instrument used a four Likert scale consisting of answer options strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). The preparation of the instrument was carried out concerning the study of literature and expert opinion. Table 2 presents a grid of instruments in this study.

Table 2. Instruments grids

Variable	Indicators	Sub-indicators	References
DTI	Context and orientation	Understanding the context and orientation of digital technology	[10], [41]–[43]
	Accessibility and exploration	Accessibility and exploration effectively and efficiently	
	Information evaluation	Selective information according to purpose	
	Digital creativity and criticism	Critical and creative in using digital technology	
PWB	Optimistic at work	Possession of a sense of optimism in all teacher activities	[40]
	The high meaning of work	Meaningful work goals for teachers	
	Honor of work	Sufficient honor for teachers in carrying out their duties	
SE	Job satisfaction	Satisfaction in carrying out work as a teacher	[31], [46]
	Level	Students' ability to motivate, assess, and solve their problems	
IQ	Generality	Confidence and ability to use life experiences to achieve success in various fields	[9], [10], [13], [19], [21]
	Strength	Students' optimism about goal	
	Teacher behavior and roles	The role of facilitator and constructive behavior to students	
	Student activities	Full involvement of students in learning	
	Integrated Learning System	Integrated learning with digital technology plays an important role in supporting learning	
	Enhancement of student motivation and understanding	There is an increase in output in the form of motivation and a comprehensive understanding of learning	

2.4. Data analysis

The data obtained were analyzed using structural equation modeling (SEM) analysis techniques to measure the effect of exogenous variables on endogenous variables, both without mediators and with mediators who have strong support from existing theories. Testing the validity and reliability of the instrument using confirmatory factor analysis (CFA). Path analysis was used to measure the direct effect of DTI, PWB, and SE on IQ. Meanwhile, the bootstrap method was used to measure the role of SE as a mediator of DTI and PWB in influencing IQ. The data analysis in this study used the help of Amos 18 software.

3. RESULTS AND DISCUSSION

3.1. Validities and reliabilities instruments

The initial stage is CFA to test the validity and reliability of the instrument and Cronbach's alpha and ensure the feasibility and consistency of all indicators in the variables studied. The validity test results show that all indicators on all research variables have a loading factor value above 0.50. None of the indicators of any variables were dropped. All indicators on all instruments have met the validity criteria and are ready to be used for research [47]. Likewise, the instrument's reliability shows that all indicators have high coefficients [48]. Table 3 presents the results of the validity and reliability tests.

Table 3. Validities and reliabilities instruments

Variable	Indicator	Validity		Reliability	
		LF	Decision	α	Category
DTI	DTI 1	.658	Valid	.894	Very high
	DTI 2	.590	Valid	.928	Very high
	DTI 3	.744	Valid	.931	Very high
	DTI 4	.623	Valid	.879	Very high
PWB	PWB 1	.511	Valid	.943	Very high
	PWB 2	.541	Valid	.952	Very high
	PWB 3	.564	Valid	.939	Very high
	PWB 4	.719	Valid	.901	Very high
SE	SE 1	.792	Valid	.916	Very high
	SE 2	.858	Valid	.966	Very high
	SE 3	.670	Valid	.897	Very high
IQ	IQ 1	.632	Valid	.907	Very high
	IQ 2	.671	Valid	.922	Very high
	IQ 3	.540	Valid	.920	Very high
	IQ 4	.788	Valid	.918	Very high

3.1.1. Goodness of fit

The goodness of fit aims to ensure that the analyzed model has a good fit to explain accurate results. The chi-square values, probability, GFI, AGFI, and RMSEA were adjusted according to the goodness of fit index. The results of the model suitability test obtained a chi-square number of 1.102 (small), probability of 0.424 (≥ 0.05), GFI of 0.941 (≥ 0.90), AGFI of 0.907 (≥ 0.90), and RMSEA of 0.046 (0.08). Based on these results, it can be concluded that the overall fit model is in the goodness of fit category. Furthermore, SEM analysis was carried out [49]. Figure 1 illustrates the results of the SEM analysis and its suitability index.

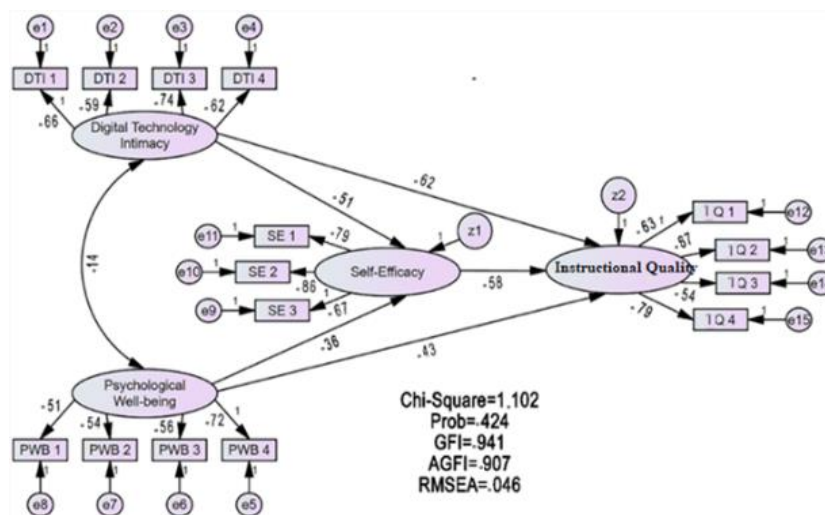


Figure 1. Results of the SEM analysis and its goodness of fit index

3.1.2. Direct effect test

The results of the direct influence test are seen based on the path analysis results to determine the estimated value of the effect and the significance value with a significance level of 5%. Direct influence testing was conducted to measure the effect of self-efficacy on the instructional quality of 21st century

vocational education and then to measure the influence of digital technology intimacy, psychological well-being of self-efficacy, and the quality of 21st century teacher teaching in vocational education. Table 4 presents the results of the direct influence test using path analysis.

Table 4. Path analysis test result

Path	Estimate	SE	CR	p
Self-efficacy-instructional quality	.582	.017	10.967	***
Digital technology intimacy-instructional quality	.617	.022	12.893	***
Psychological well-being-instructional quality	.434	.034	8.614	***
Digital technology intimacy-self-efficacy	.513	.027	10.008	***
Psychological well-being self-efficacy	.716	.078	14.476	***

Self-efficacy affects the instructional quality of 21st century vocational education teachers with an estimated value of 0.582 and a significance of 0.000***, so the first hypothesis is supported. Then the intimacy of digital technology affects the instructional quality of 21st century vocational education teachers with an estimated value of 0.617 and a significance of 0.000***, so H2 is supported. Psychological well-being affects the instructional quality of 21st century vocational education teachers with an estimated value of 0.434 and a significance of 0.000***, so H3 is supported. The intimacy of digital technology affects self-efficacy with an estimated value of 0.513 and a significance of 0.000***, so H4 is supported. The estimated value of 0.716 and a significance of 0.000*** on the effect of psychological well-being on self-efficacy makes H5 supported.

3.1.3. Mediation effect of self-efficacy

The mediation effect test was used to see the significance of the mediator's role of self-efficacy in mediating the intimacy of digital technology and psychological well-being on the quality of 21st century teaching for vocational education teachers. In this test, the bootstrap method is used. Because it is the most powerful and reliable method in explaining the mediating role of a mediator variable to obtain confidence limits for certain indirect effects in most conditions [50].

Table 5 shows that the non-intimacy effect of digital technology on instructional quality through the mediation of self-efficacy with a 95% confidence level of probability ranges from 0.326 to 0.712, and the estimated effect is 0.352**, which lies between these two values. Thus, it can be concluded that the intimacy of digital technology has a significant indirect effect on the quality of 21st century teaching for vocational education teachers through the mediation of self-efficacy, so H6 is supported. Likewise, Table 6 shows that the indirect effect of psychological well-being on the quality of 21st century teaching on vocational education teachers through the mediation of self-efficacy gain is likely to range from 0.218 to 0.534, and the estimated effect is 0.246*, which lies between these two values, so H7 is supported.

Table 5. The mediating effect of self-efficacy between digital literacy technology intimacy and teacher instructional quality

	IQ		SE		Estimate	SE	Bootstrapping BC 95% CI	
	Estimate	SE	Estimate	SE			Lower limit	Upper limit
DTI	0.873***	0.018	0.513***	0.023				
IQ			0.628***	0.056				
R ²	0.227		0.391					
Indirect effect					0.353**	0.087	0.326	0.712
Direct effect					0.513***	0.027	0.308	0.590
Total effect					0.866***	0.022	0.818	0.864

Table 6. Mediation effect of self-efficacy between psychological well-being and teacher teaching quality

	IQ		SE		Estimate	SE	Bootstrapping BC 95% CI	
	Estimate	SE	Estimate	SE			Lower limit	Upper limit
PWB	0.968***	0.055	0.716***	0.019				
IQ			0.842***	0.081				
R ²	0.294		0.502					
Indirect effect					0.246*	0.034	0.218	0.534
Direct effect					0.716***	0.078	0.691	0.848
Total effect					0.962***	0.046	0.836	0.971

3.2. Discussion

Learning in the 21st century is influenced by constructivist schools, namely, the learning process is student-centered [49], [51], [52]. However, the problem that occurs is just the opposite in online learning. The influence of vocational teachers is very strong [8]. In addition, learning motivation and 4Cs or critical thinking, communication, creative thinking, dan collaboration are on the threshold and have become a new problem nowadays [22]. In addition, teacher efficacy in teaching is also low and equips students with competence. The results of this study prove the importance of self-efficacy in influencing the quality of instructional in vocational education teachers. The estimated value of 0.582 with a significance value of 0.000*** is a significant number that shows the significance of self-efficacy in influencing the instructional quality of 21st century teachers in vocational education. In this case, a teacher's self-efficacy level is an important key in the teaching process in the 21st century. Self-efficacy can provide an overview of the teacher's abilities that can be adapted to learning conditions, so self-efficacy is very decisive in providing confidence in his abilities when facing various tasks and problems in learning. The results in this study are also supported by relevant previous studies [53], [54]. Relevant research reports that self-efficacy plays a major role in influencing the instructional quality of a teacher, especially in improving student learning outcomes [55]. Vocational education teachers who are required to have important competencies will be helped when they have strong self-efficacy in teaching [33], [34], [56].

However, self-efficacy is not the only important factor in influencing the quality of teachers in teaching in vocational education. Familiarity with digital technology is very important, namely intensively learning, caring about its development, self-literate, critical, and creative in using various media and digital learning resources to support teaching. Familiarity with digital technology will provide teachers with a comprehensive understanding of critically and creatively determining media and learning resources that can be useful for 21st century teaching [42], [43]. In this study, the intimacy of digital technology has a significant positive effect on the quality of 21st century teaching for vocational education teachers, either directly or through the mediation of self-efficacy. The direct effect obtained an estimated value of 0.617 with a significance value of 0.000 and through self-efficacy mediation, an estimated value of 0.353 was obtained with a significance value of 0.008. The intimacy which refers to the teacher's depth in mastering digital technology, will certainly strengthen the teacher's confidence and trust in his teaching ability. This is also evidenced by previous relevant research which revealed that the intimacy of digital technology plays a very important role in online learning that requires a comprehensive integration of digital technology [57]–[59].

In addition, the psychological well-being of a teacher is also an important factor in influencing the quality of a teacher's teaching. Psychological well-being in individuals is characterized by feeling optimistic about work, having job satisfaction and no symptoms of depression, having a high meaning in life, and developing personal talents and interests. With happiness and life satisfaction, the teacher's self-confidence and confidence in teaching will increase, so the quality of instructional can also increase by itself. The estimated direct effect value is 0.434 with a significance value of 0.000*** and the effect through the mediating role of self-efficacy is 0.246 with a significance value of 0.029*. Efficacy can mediate psychological well-being in influencing the quality of teacher teaching because important factors influence it. Teachers who have psychological well-being are reflected in having a sense of happiness, job satisfaction and, receive appropriate remuneration, have better morale and performance than those who do not have these aspects [44], [60], [61]. These feelings will eventually strengthen the self-confidence and self-confidence of a teacher, so that self-efficacy in teaching will be better [62], [63].

4. CONCLUSION

The problem of instructional quality for vocational teachers is significantly influenced by the self-efficacy factor and is mediated by familiarity with digital technology and psychological well-being. Familiarity with digital technology has proven to significantly affect the quality of 21st century teaching for vocational education teachers, both directly and through self-efficacy mediation. Similarly, teachers' psychological well-being was also shown to influence brand instructional quality significantly. The role of vocational education institutions in this regard is crucial, especially in supporting the transformation of teaching in the 21st century. Self-efficacy which is the main capital must always be strengthened, especially in the era of digitalization where the actual integration of digital technology in learning requires the main capital from within the individual, namely belief and good confidence. In addition, advances in digital technology must also be accompanied by the familiarity of teachers in using it, so that teachers can reach a critical and creative level in using the right digital technology to support the teaching process. The researcher reinforces that vocational teachers must also get job satisfaction, feel happy, and receive high salaries, so that their psychological well-being is well fulfilled. Furthermore, further research is needed on the stress level of vocational teachers in dealing with advances in digital technology on the quality of learning.




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