



Analysis of 4Cs-Oriented Learning Development Teacher Elementary School Post-Covid-19 Pandemic

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ARTICLE INFO	ABSTRACT
<p>Artikel History: Received : 05 November 2024 Revised : 29 December 2024 Published: 24 January 2025</p> <p>Keywords: Learning Development 4Cs Skills Orientation Post-Covid-19 Pandemic</p>	<p>An analysis of the development of 4Cs-oriented learning for elementary school teachers in the post-COVID-19 pandemic needs to be carried out to determine the level of success in implementing learning during the Covid-19 pandemic while maintaining the quality of learning outcomes oriented to 4Cs skills. These four skills form the basis of student readiness in dealing with the rapid development of science and technology that is occurring in the 21st century. The results of a preliminary study by researchers on nine SD Gugus Raden Intan Kec. Candipuro, South Lampung Regency, Indonesia, found three main problems (1) the learning objectives represented in the learning outcomes of students were not 4Cs oriented: (2) teachers in implementing online learning during the pandemic were not oriented towards achieving 4Cs skills. (3) teachers have not made professional development demands to develop interactive media, interesting methods, and several learning systems that accommodate 4Cs skills oriented learning effectiveness during a pandemic. The sample in this study involved 27 lower grade teachers who taught grades 1, 2, and 3 at SD Gugus Raden Intan Kec. Candipuro, South Lampung Regency, Indonesia. The focus of learning development analysis in this study aims to obtain an intervention that can help improve teacher competence in developing learning that is oriented towards the achievement of the 4Cs skills after the Covid-19 Pandemic.</p>



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INTRODUCTION

The rapid development of science and technology in the 21st century has had an impact on a person's readiness to master basic skills such as critical thinking and problem solving, communication, collaboration, creativity and innovation, better known as 4Cs skills (Bialik & Fadel, 2015; NEA, 2010; P21, 2015; Piirto, 2011; Pozdnyakova et al., 2019; Rohman, 2020; and Trilling & Fadel, 2009). This condition has an impact on various disciplines to actively adjust and develop interventions to achieve 4Cs skills (Alismail, & McGuire, 2015; Masami, 2021, Fajriatin & Gafur 2021. Firmansyah 2021; and Sunardi and Doringin, F. 2020).

The Indonesian government's efforts to achieve 4Cs skills in improving the quality of education are through the development and refinement of the education curriculum. The curriculum currently developed by the government is the 2013 Curriculum, which aims to prepare students to have life skills as individuals and citizens who are faithful, productive, creative, innovative, and able to contribute to society, nation, state, and world civilization (Permendikbud Number 70 of 2013). Various other supporting programs have also been carried out by the government in an effort to encourage the realization of professional educators in the 21st century, such as continuous professional development programs for teachers, including training, technical guidance, seminars, workshops, and workshops on learning development oriented towards achieving 4Cs skills.

Achieving the 4Cs skills requirements by providing quality learning has become a concern for parents and education experts during the COVID-19 pandemic, because in practice, learning during the COVID-19 pandemic is almost entirely carried out through e-learning platforms (Nuryani and Haryanto, 2021, Rahayu and Supardi, 2021. Yatini and Mulyatiningsih, 2021) The results of preliminary research found that the technical obstacles experienced by students during online learning included (1) learning media that was not interesting and interactive, (2) the character (communicative, collaborative, and ethical skills) of students was difficult to monitor, (3) the absorption of material was not optimal, and (4) sometimes there were geographical obstacles for students and teachers who were far from the internet network

The above conditions, if ignored, will have an impact on learning loss in the learning process (Firmansyah 2021. Rahayu and Supardi, 2021. Jena, 2020). To prevent this impact, teachers need to receive an intervention that can help improve their competence in planning and implementing learning that is oriented towards achieving 4Cs Skills in the four main components of education (Standards and Assessments, Curriculum and Instruction, Professional Development, and Learning Environments) in education oriented towards achieving 21st century skills (Barton, et al, 2014; Anderson, and Krathwohl, 2001). The formulation and development of appropriate interventions for teachers certainly require knowledge of the root causes of the problems. Problems can be seen from teachers' understanding of each component of the curriculum, their knowledge of designing lesson plans, and how teachers implement their plans in classroom learning activities. Based on the existing problems, the causal factors and teachers needs can then be analyzed to create plans and implement classroom learning oriented towards achieving 4Cs skills in accordance with the formulation of The Partnership for 21st Century Skills (P21).

METHOD

The method used in this study is mixed method research. The mixed method research used in this study is the exploratory design method The exploratory design method means that the quantitative approach tends to reinforce the qualitative approach (Creswell 2018). The Sequential Exploratory model is technically implemented by first collecting quantitative data, which is then supported by qualitative data findings on the research subjects (Creswell 2018). The exploratory design method can be explicitly seen in Figure 1.

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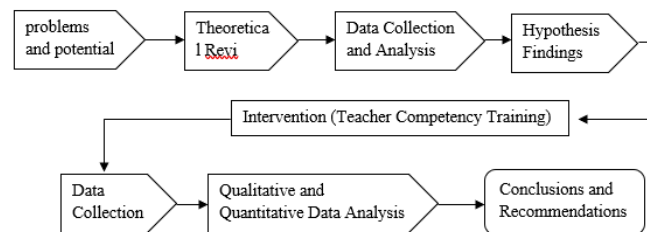


Figure 1. Sequential Exploratory Model

Figure 3 explains that the technical aspects of this study began with analyzing the phenomena of problems and potential in post-COVID-19 pandemic learning. The analysis of problem phenomena and potential aims to examine teacher competencies in four main components of education oriented towards 21st century skills, including teacher competencies in (1) standards and assessments, (2) curriculum and instruction, (3) professional development, and (4) learning environments. The second stage is to conduct a theoretical study used as a basis for data collection and analysis to identify the focus of the research problem. The focus of this study is the development of learning oriented towards 21st century skills. In the third stage, the researcher collected and analyzed data on teacher competencies in (1) standards and assessments, (2) curriculum and instruction, (3) professional development, and (4) learning environments oriented towards 4Cs skills. The results of the data collection and analysis in the fourth stage led the researchers to formulate hypotheses based on the phenomena found. The fifth stage was the provision of intervention by conducting teacher competency training on learning oriented towards 21st century skills achievement with involving 27 lower grade teachers teaching in grades 1, 2, and 3 at SD Gugus Raden Intan, Candipuro District, South Lampung Regency, Indonesia. The sample in this study is presented in Table 1.

Table 1. Number of Elementary Schools in Candipuro District, South Lampung Regency

No	School Name	Number of teacher samples
1.	Rantau minyak Elementary School	3 people
2.	SDN 2 Sidoasri	3 people
3.	SDN 1 Karyamulyasari	3 people
4.	SDN 2 Karyamulyasari	3 people
5.	Sinar Palembang Elementary School	3 people
6.	Batuliman Elementary School	3 people
7.	SDN 1 Sidoasri	3 people
8.	SDN 1 Way Gelam	3 people
9.	SDN 2 Way Gelam	3 people
amount		27 people

The implementation of the intervention training (Teacher Competency Training) in this study was carried out through four steps, namely exploration, implementation (exploration, *problem solving*, *project*, and collaboration), observation, and reflection. The entire steps of the intervention training (*Teacher Competency Training*) can be seen in Table 2.

Table 2. Steps in the Implementation of Intervention Training (*Teacher Competency Training*)

Intervention Steps	Activity Details
Scoping	In this stage, teachers collected portfolio assignments in the form of documents used in learning. The scoping was conducted to determine the teachers' initial competencies regarding learning oriented towards 21st-century skills.
Implementation	This stage aims to provide training to teachers with a focus on learning themes oriented towards achieving 21st century skills. Teachers are given training in designing and implementing learning oriented towards achieving 4Cs skills. The implementation stage is based on active learning, namely: exploration, <i>problem solving</i> , <i>projects</i> , and collaboration.
Observation	Researchers assessed and observed teachers' designs and abilities in implementing learning using assessment rubrics. This stage aimed to determine whether teachers were able to design and implement learning oriented towards achieving 4Cs skills. In addition, researchers also noted important things that occurred during the implementation of teachers' learning in the training.
Reflection	In this stage, researchers reviewed, analyzed, and considered the results or impacts of the interventions that had been carried out. Based on the results of this reflection, researchers and teachers revised or improved the learning design and implementation that had been prepared.

The next test is to use multiple linear regression analysis to see if there is a linear relationship between the implementation of intervention training (Y) partially (individually) on teacher competence in developing *standards and assessments* (X₁), teacher competence in developing *curriculum and instruction* (X₂), teacher competency in developing *professional development* (X₃), and teacher competency in developing *learning environments* (X₄).

Research Design & Procedures

Results of the Analysis of Teacher Competence in *Standards and Assessments* Oriented to 4Cs

The Partnership for 21st Century Skills (2015) states that there are four *standards and assessments* that must be achieved in the implementation of learning, namely (1) *critical thinking and problem solving*, (2) *communication*, (3) *collaboration*, and (4) *creativity and innovation*. The assessment results were carried out through an observation sheet, assessment instruments, and learning achievements as seen in the teaching materials. The results of the analysis of teacher competencies in relation to 4Cs *skills-oriented standards and assessments* in the implementation of learning can be seen in Figure 2.

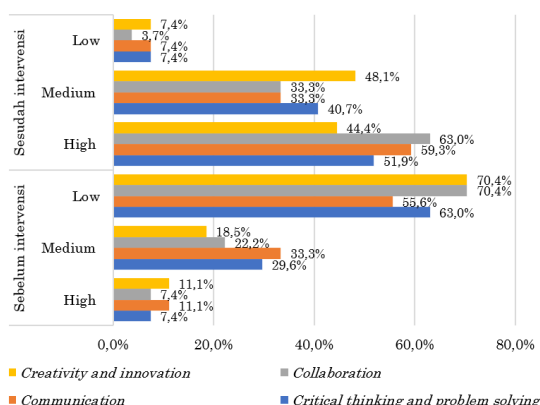


Figure 2. Results of the Analysis of Teacher Competence in *Standards and Assessments*

Figure 2 shows that before the intervention was carried out on the 27 teachers who were the research sample, only about 7.4%; 11.1%; 7.4%; and 11.1% were able to understand well the 4Cs-oriented *standards and assessments*. After the intervention, which involved exploration, problem solving, projects, and collaboration with teachers, the teachers' understanding of the development of high-quality *standards and assessments* increased to 51.9%, 59.3%, 63.0%, and 44.4%.

Results of Teacher Competency Analysis on 4Cs-Oriented *Curriculum and Instruction*

The analysis of teacher competence in *curriculum and instruction* in this study focused on (1) teachers' understanding of each component of the curriculum, (2) teachers' ability to select and implement learning models and instruction oriented towards 4Cs skills; and (3) teachers' ability to deliver teaching materials effectively to achieve 4Cs skills. The results of the analysis of teacher competence in *curriculum and instruction* in the implementation of learning can be seen in Figure 3.

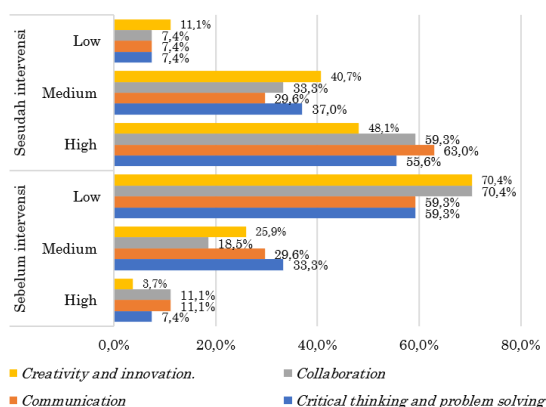


Figure 3. Results of the Analysis of Teacher Competence in *Curriculum and Instruction*

Figure 3 provides information that many teachers still do not understand *curriculum and instruction* development oriented towards 4Cs skills. Teachers' ability to design learning, select and implement learning models that are in line with the curriculum for achieving 4Cs skills is still low, as evidenced by the researchers' findings which describe that only 7.4%; 11.1% 11.1% 3.7% are able to understand well the 4Cs-oriented *curriculum and instruction*. After implementing interventions involving exploration, *problem solving*, *projects*, and collaboration with teachers, there was an increase in teachers' understanding of *curriculum*

and instruction development, as evidenced by the achievement percentages of 55.6%; 63.0%; 59.3%; 48.1% in 4Cs-oriented *curriculum and instruction* competencies.

Results of Teacher Competency Analysis on 4Cs-Oriented *Professional Development*

Professional development is a very important part of implementing 4Cs skills-oriented learning. The results assessed in the *professional development* component are (1) the ability of teachers to develop innovative learning strategies, methods, and models oriented towards achieving 4Cs skills and (2) the ability of teachers to create and develop interactive teaching materials. The results of the analysis of teacher competence in *professional development* in the implementation of learning can be seen in Figure 4.

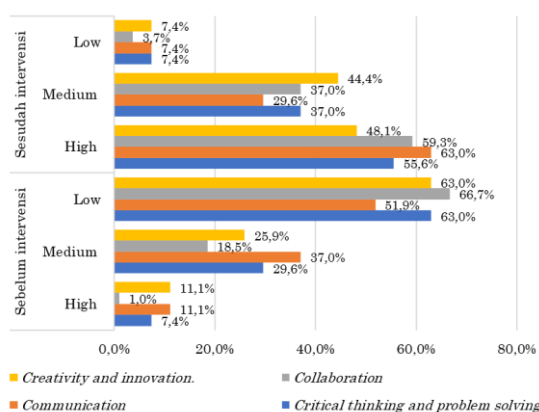


Figure 4. Results of the Analysis of Teacher Competence in *Professional Development*

Figure 4 explains that developing innovative learning strategies, methods, and models, as well as creating and developing teaching materials in line with the curriculum for achieving 4Cs skills, is still low. This is evidenced by the researchers' findings of 7.4%; 11.1%; 1.0% 11.1% who are able to understand well regarding 4Cs-oriented *professional development*. After implementing interventions involving exploration, *problem solving*, *projects*, and collaboration with teachers, there was an increase in teachers' understanding of *professional development*, as evidenced by the achievement percentages of 55.6%; 63.0%; 59.3%; 48.1% for *professional development* competencies oriented towards the 4Cs.

Results of Teacher Competency Analysis on *Learning Environments* Oriented to 4Cs

The Partnership for 21st Century Skills (2015) explains that one of the aspects assessed in this component is the ability of teachers to create learning environments such as social learning systems and the principles of teacher response in learning to achieve 4Cs skills in the learning process. The results of the analysis of teacher competence in *learning environments* in the implementation of learning can be seen in Figure 5.

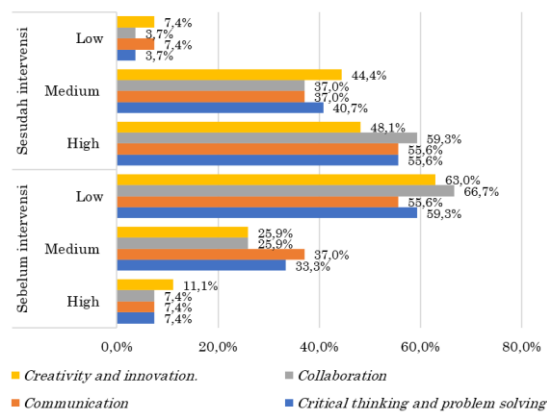


Figure 5. Results of the Analysis of Teacher Competency *in Learning Environments*

Figure 5 explains that before the intervention, many teachers did not understand the development of effective learning environments, such as forming a social learning system and the principles of reaction in learning, as evidenced by the researchers' findings of 7.4%; 7.4%; 7.4%; 11.1% who were able to understand well the 4Cs-oriented *learning environments*. After implementing the intervention by exploring, *problem solving*, *projects*, and collaboration with teachers, there was an increase in teachers' understanding of the development of *learning environments*, as evidenced by the achievement percentages of 55.6%; 55.6%; 59.3%; 48.1% in *learning environment* competencies oriented towards 4Cs.

Furthermore, the results of multiple regression analysis by analyzing the Coefficients table in the SPSS output can be used as a basis for seeing the partial (individual) effect of the *independent* variable (Y) on the *dependent* variable (X_1 , X_1 , X_1 , and $X_{(1)}$). The SPSS output analyzed in the multiple regression analysis is the Coefficients output as shown in Table 2.

Table 2. Coefficients Output of Multiple Regression Analysis of Independent and Dependent Variables.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			
(Constant)	-12.423	5.351		3.775	.005
Conference standards and assessments (X_1)	.147	.161	.122	.979	.025
1 Curriculum and Instruction Conference (X_2)	.351	.138	.457	4.578	.002
Professional development conference (X_3)	.247	.159	.277	3.472	.017
Learning environments (X_4)	.579	.127	.371	2.374	.028

a. Dependent Variable: Response to Intervention Implementation (Y)

Table 2 provides information that the Significance value of the Teacher Competency Training (Sig.) < The probability is 0.05, which means that the implementation of the intervention (Teacher Competency Training) partially affects competency standards and assessments (X_1), competency curriculum and instruction (X_2), competency professional development (X_3), and competency learning environments (X_4).

Discussion

This study aims to analyze the competence of elementary school teachers in developing 4Cs-oriented learning after the Covid-19 pandemic, conducted on elementary school teachers in the Raden Intan Cluster, Candipuro District, South Lampung Regency. The problems underlying this study were identified in the researcher's preliminary study of nine elementary schools in the Raden Intan Cluster, Candipuro District, South Lampung Regency, Indonesia, which found three main problems: (1) the learning objectives represented in the learning outcomes of students were not yet oriented towards 4Cs; (2) teachers in the implementation of online learning during the pandemic were not yet oriented towards achieving 4Cs *skills*; (3) teachers had not carried out *professional development* requirements to develop interactive media, interesting methods, and several learning systems that accommodate the effectiveness of learning during the pandemic oriented towards 4Cs skills.

The results of the analysis of the above issues represent that teachers' competencies are still low in facilitating learning oriented towards 21st *century* skills as defined by *the Framework for 21st Century Learning* by The Partnership for 21st Century Skills with a focus on four competencies, namely (1) *standards and assessments*, (2) *curriculum and instruction* (3) *professional development* and (4) *learning environments*. The finding of low teacher competency *in standards and assessments* will have an impact on teachers' ability to formulate learning indicators and objectives that are not relevant to 21st century skills. This is reinforced by Lusiyan's (2020) research, which states that the ability of students as prospective professional teachers to detail standards in learning assessment will help to design effective 21st century learning.

The findings of low teacher competency in *curriculum and instruction* in this study illustrate that teachers' understanding of implementing a curriculum oriented towards 4Cs skills using teaching materials has not been effectively implemented. Barton, et.al (2014) state that teachers' understanding of implementing a good curriculum will have an impact on learning and help students achieve learning objectives.

The findings on teacher competence in *professional development* in this study were also found to be low. *The Framework for 21st Century Learning* explains that this has an impact on teachers' ability to develop innovative learning strategies, methods, and models oriented towards achieving 4Cs skills. Relevant findings were also obtained in the research results of Pozdnyakova et al. (2019); Sunardi and Doringin (2020) stated that the development of good professional competence in teachers has an effect on teaching style and good classroom management in the learning process.

The findings of the analysis of the last problem phenomenon are that teachers' competence in *learning environments* is still low. According to Yatini and Mulyatiningsih (2021), teachers' ability to create a good learning environment can help students feel comfortable in the learning process. Furthermore, Sunardi and Doringin (2020) and Talat and Chaudhry (2014) state that teachers' ability to shape the learning environment through social systems and good reaction principles can help students achieve 4Cs skills in the learning process.

The results of the four findings above can be formulated into a research hypothesis stating that teacher competency in *standards and assessments*, *curriculum and instruction*, *professional development*, and *learning environments* is still low and needs to be addressed through intervention in the form of *Teacher Competency Training* with the following steps: (1) Scoping, (2) Implementation (exploration, *problem solving*, *projects*, and collaboration), (3) Observation, and (4) Reflection.

The researchers' findings after conducting *Teacher Competency Training* for 27 elementary school teachers in the Raden Intan Cluster, Candipuro District, South Lampung Regency, showed that the competency of 4Cs-oriented learning development increased significantly. as evidenced by the Sig values of 0.025, 0.002, 0.017, and 0.028 in Table 2, which are smaller than the probability of 0.05. Improving teacher competency through training activities that lead to *problem solving* and *project* exploration can have an impact on improving teachers' professional competency, performance, and experience, which will be implemented in learning (Astuti, et.al, 2019; Santosa et.al, 2022). Furthermore, structured project assignments in training can have an impact on improving teachers' competencies to be more professional in learning in line with 21st-century education (Chai, and Kong 2017 Georgieva, 2019). The results of research by Chiong, R. & Jovanovic, J. (2012) reinforce that the implementation of collaboration in learning has an impact on the effectiveness of achieving learning objectives.

CONCLUSION

Based on the results of this study and discussion, it can be concluded that the phenomenon of low teacher competency in 4Cs-oriented learning among elementary school teachers after the Covid-19 pandemic can be improved through the implementation of *Teacher Competency Training*. The partial implementation of *Teacher Competency Training* has a positive effect on competency *in standards and assessments* (X_1), competency *in curriculum and instruction* (X_2), *professional development* competency (X_3), and *learning environments* competency (X_4), as evidenced by the Sig values of 0.025, 0.002, 0.017, and 0.028 in Table 2, which are smaller than the probability of 0.05.

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