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21st Century of Collaboration Skills: The Practical Basis of Learning Supervision

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Abstract

In this 21st century era, the students, teachers and principals are required to have a 21st century knowledge and learning skills. There are 4 characters of 21st century learning skills consist of critical thinking and problem solving, creativity and innovation, collaboration and communication (4Cs). This article emphasizes determining of the determining the dimensions and indicators of collaboration skills in learning supervision. The approach of this research is the Mixed Method, by the use of the continuous application of two model designs. Exploratory Sequantial Design, followed by Explanatory Sequantial Design. The conclusions of this article are: (1) This article concludes the dimensions and indicators of collaboration skills in 21st century learning supervision, based on 3 stages of research, they are: (a) Validation of dimensions and indicators, based on analysis of various research findings from various sources of information. (b) validation resulting from tests through EFA and CFA. (c) validation of findings from phase 2 clarified through FGDs. (2) The results of the study obtained 4 dimensions and 25 indicators of collaboration skills in the supervision of 21st century learning, with details as follows: a) The "Work Mechanism" dimension has 6 (six) indicators; (b) The “meaning social relationship” dimension has 6 indicators; (c) The dimension of “building cognitive competence in diversity” resulted in 6 indicators; (d) The dimension of “attitudes and emotions in social networks” has 7 indicators. The recommendations are: the results of the dimensions and indicators of 21st century collaboration skills in the supervision of learning above can: (1) be followed up by research in the field; (2) Used as an indicator to assess 21st century learning and supervision of learning.

Keywords: *Collaboration, 21st Century, Learning Supervision.*

INTRODUCTION

The complex and dynamic demands of 21st-century life encourage the world of education to make a change. Ball, Joyce, and Anderson-Butcher, (2016), conducted a study on the 21st Century Life & Career Skills scale (21 C-LCS), to measure 21st-century life and career skills. The result of this research is to encourage and advocate for 21st-century life and the development of career skills among youth, as well as the need for attention to understanding the classroom environment, to be successful in further studies and careers. This reality demands that young people develop various cognitive and non-cognitive skills, (Zolkowski & Bullock, 2012; Unrau, Font & Rawls, 2012).

Related to the above text, the world of education has a responsibility to improve the skills of its students (CCSS Initiative, 2014; Frey et al, 2012; Kelly et al, 2010). Forms of non-cognitive skills that must be owned by young people consist of: self-esteem, decision-making skills, and responsibility, teamwork skills, creativity, strong work habits, and social skills, positive interaction patterns with others, skills that explore the multidimensional nature that diverse. The above skills will support greater academic success (Edwards, 2007; Nambiar, et al 2019). This matter indicates that the need for a change in the educational mindset in the 21st century, including the learning by teachers. Moreover, between 2030-2040, the number of productive age (aged 15-64 years) has increased which is called the demographic bonus, (Bappenas, 2019; Central Statistics Agency 2017). Complex problems are faced by the younger generation, encouraging the initiation of problem-based learning methods/models (Griffin, 2015). Social interaction in the form of collaboration is a strategy that makes it easy to solve problems. Scager, et al (2016), stated that collaborative learning will be effective if students are given the opportunity to be independent (autonomy), combined with challenging, open, and complex group assignments. This activity fosters a sense of responsibility and shared ownership of the collaborative process and the end product of group work. Implementation of multi-literacy and problem-based pedagogy, is the view and approach of teachers changing classroom practice. Students encourage their own learning through inquiry, as well as work collaboratively to research and create projects that reflect their knowledge, (Bell, 2010). Learners will be trained when to contribute, when to listen, how to respect different values and opinions (P21, 2009), as well as the ability to work in teams and time management (Barton, 2006). Students will ask more questions, and read various texts to gather more information (Kuhlthau, 2010, p. 2). The main focus of knowledge building is the community where ideas are shared

and expanded (Warhuus, et al, 2017)). 21st century education, encouraging concepts to work together to build a strong pedagogy (Comber, 2015; Luke, 2014; Cleovoulou & Pamela Beach, 2019).

The above explanation implies that 21st century collaboration skills must be owned by teachers and students. Teachers are expected to be able to transfer 21st century collaboration knowledge and skills to their students. Related to this, the learning activities done by the teacher need to be assessed for their achievement and effectiveness. Considering the work of teaching supervision is the most important link of the learning quality assurance system and teaching management system as the basis for improving the quality of teacher learning, as well as improving student learning outcomes (Chen & Tang, 2012). Supervisors should find out cooperation and concern, in order to have a positive and acceptable disposition among teachers and others (Kotirde & Jaelani, 2012).

LITERATURE REVIEW

For several decades, empirical research has shown a positive relationship between collaborative learning and student achievement, effort, persistence, and motivation (Johnson, 2009; Tran, 2019). Collaborative learning has the potential to promote deep learning, in which students engage in high-quality social interactions, such as discussing contradictory information (Bertucci et al., 2006). Understanding these concepts involves a process of conceptual change, a process particularly activated in collaborative learning, in which students interact by explaining and critically questioning one another (Van Boxtel, Van Der Linden & Kanselaar, 2000; Linton et al, 2014). Collaborative learning has been explored and emphasized its relevance in undergraduate biology programs, and compared it with student achievement (Wiegant et al, 2012, 2014).

Teacher collaboration as a means of reflecting and improving teaching practice, providing collegial support or peer feedback, and collectively designing learning methods (Kelchtermans, 2006; Vangrieken, Dochy, Raes & Kyndt, 2015). Teacher collaboration in education focuses more on conversation and exchange of ideas, there is a sense of collective responsibility in order to improve their teaching practice, is more effective, and especially able to change individual beliefs about their learning, (Hargreaves and O'Connor, 2017; De Jong, Meirink & Admiraal, 2019). Collaboration benefits better reflection skills, more evaluation of student learning practices and needs, more welcome to the innovation, collaboration and theory, and more evidence-based decisions in practice, and seeks to improve them, (Hagevik, Aydeniz & Rowell, 2012; Sachs, 2015; Watson & Michael, 2015). There is an increase in the competence of pre-service teachers through collaboration, reflection and investigation, and there is a balance and support provided for pre-service teachers (Chassels & Melville, 2009; Willegems et al, 2017, 2018).

Teachers are required to transfer these collaboration skills to students, and this learning activity needs to be supervised, with the aim of obtaining data on the achievement of its implementation. Strong supervision, resulting in complete feedback data, as well as having an impact on the quality of learning, (Zhou, 2018). The implementation of high learning supervision can improve teacher teaching attitudes and competencies, (Daud, et al, 2018). High-quality learning, can be generated when there is reflective practice where feedback occurs from all lines, providing sufficient space for improvement, based on various sources of information, as part of supervision activities (Hopkins, at.al, 2019). Regular and reflective clinical supervision will produce qualified professionals (Harvey, Spurr, & Fenwick, (2019). Winaryati, & Mufnaety, 2012; Yunus, Lestari, & Raharjo, 2016, conveyed their findings related to the implementation of supervision in the field, namely: the principal did not inform the entirety of the teaching strategy, was not quick to provide feedback/suggestions, the implementation of academic supervision was still ineffective, unscheduled and non-existent. follow-up. This encourages research related to the supervision of collaboration skills needed in 21st century learning.

This article has novelty compared to the previous articles. Research on collaboration skills that must be owned by students or teachers in the 21st century has been widely written; but there are no articles that discuss multiple targets at the same time, both students, teachers and school principals. The novelty of this article is that there are two activities for which data are to be obtained, namely learning and at the same time supervising learning. The purpose of this study is to obtain valid dimensions and indicators of 21st century collaboration skills that must be owned by students, teachers and school principals at the same time.

METHOD

The approach of this research is the Mixed Method, by the use of two model designs continuously, namely exploring qualitative data collection and then proceeding with quantitative data collection or known as the Exploratory Sequential Design model approach. From the quantitative data which have been produced, it is continued to analyze the qualitative data with the aim of explaining the findings of the existing data. This research design is called the Explanatory Sequential Design model. The research design is described as follows:

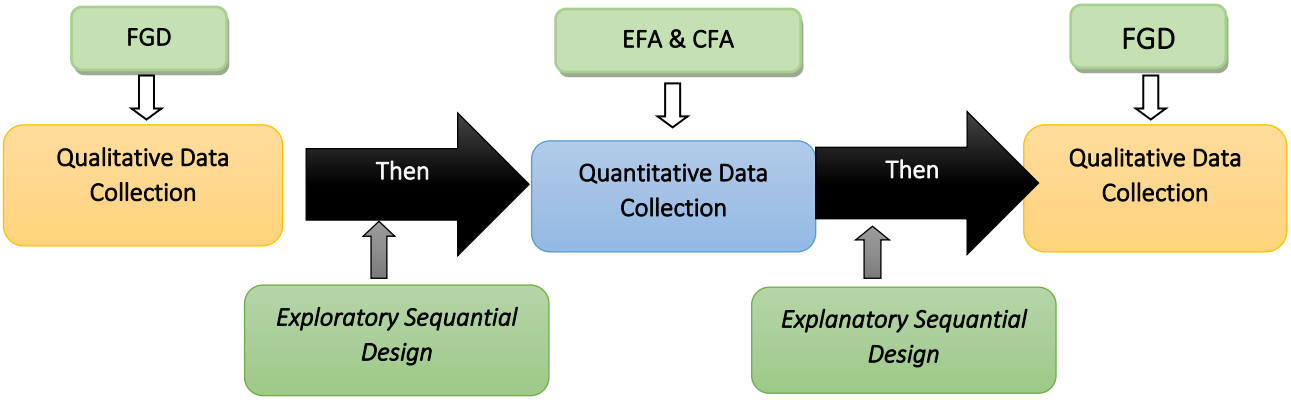

Figure 1. The flow of Research Design that Should Be Done

RESULT AND DISCUSSION

Instrument Validation by Experts

The indicators and dimensions have been formulated by the research team, and their suitability is analyzed through Focus Group Discussion (FGD) activities. FGD participants are practitioners, education experts, evaluation experts and measurement experts. The formulation of indicators and dimensions that have been agreed upon by practitioners and experts, becomes the basis for the preparation of the instrument. This instrument is tested for validity by experts in the field. There are 8 dimensions and 48 indicators that have been declared valid.

Model Constructs Through Exploratory Factor Analysis (EFA)

Quantitative data collection was obtained by the distribution of the instrument to students of public and private junior high schools in 2 (two) provinces, namely in the provinces of Lampung and Central Java. The questionnaire was distributed in an online format, via a google form. The total number of respondents was 329. The number of junior high school students who filled in was dominated by class VIII as many as 175 people (53.23%).

Descriptive Statistical Analysis

The results of the data after being rotated through EFA showed that there were 4 main dimensions that compose collaboration instruments in the supervision of 21st century learning. Collaboration skills are the main factors that become the main entity in the preparation of learning supervision based on theoretical analysis. The empirical results in the field were processed using the SPPS version 16.0 program which produced a statistical description of the research variables/dimensions. Based on the data that respondents' answers to all dimensions tend to be homogeneous. The results are presented in table 1.

Table 1. Descriptive Statistics of Research Results

Dimension/Variable	Quantity	Theoretical Range			Actual Range/Empiric		
	N	Min	Max	Mean	Min	Max	Mean
Work mechanism	329	7	35	21	10	35	28,89
Relationship Meaning	329	7	35	21	25	35	29,52
Cognitive Competence in Diversity	329	21	105	63	40	105	85,03
Attitudes and Emotions in Social Networks	329	13	65	39	20	65	53,58

Source: Processed Data on 2021

The results of the statistical description above illustrate that the collaborative construct as part of the 4C's (character Skills) in 21st century learning supervision is built through 4 dimensions. This dimension is based on actual data with junior high school students respondents.

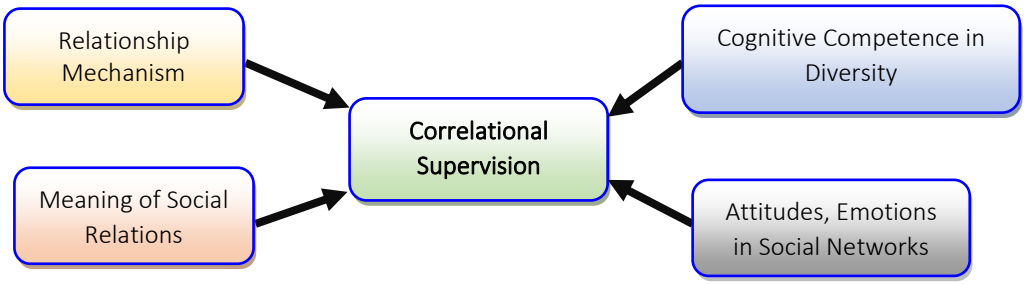

Figure 2. The main construction of correlational instruments for building collaboration skills in 21st century learning supervision

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) function is for test the validity of a theoretical construct. CFA is used to test whether these indicators are valid indicators as a measure of latent constructs. The following is a confirmatory analysis of the variables/dimensions: "Work Mechanisms, Meaning of Social Relations, Cognitive Competence in Diversity, and Attitudes and Emotions in Social Networks as follows:

1. Work mechanism

   Dimensional model of the Working Mechanism, data obtained that there is 1 indicator, namely MK 1 has a factor loading value of 0.683. Based on (Tabachnick & Fidell, 2007) a good loading factor must be above 0.7; then MK 1 must be removed from the indicator, so that it becomes 6 indicators. The results obtained increase other loading factors so that the indicators used are very good.

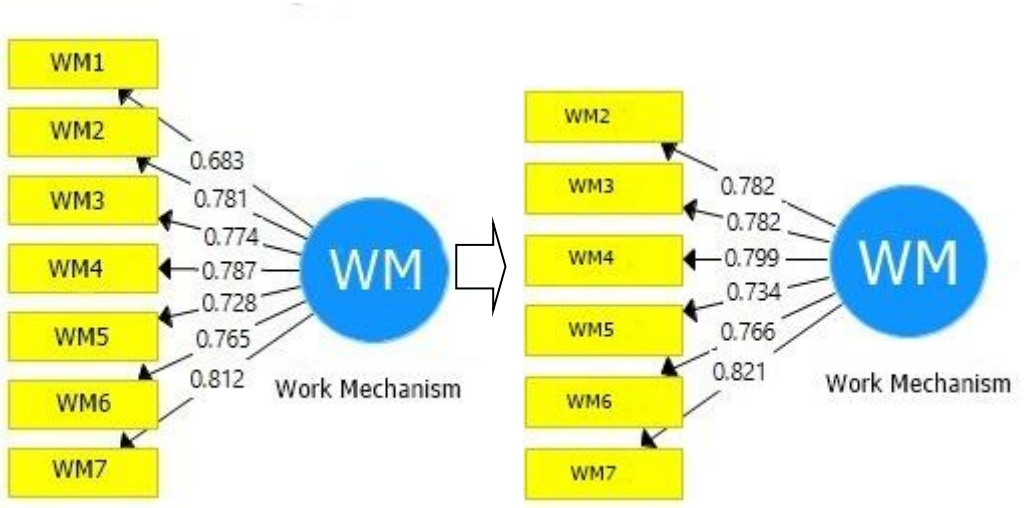

Figure 3 CFA Data Processing Mechanism of Work Revised (The Data is Processed using SmartPLS)

2. Meaning of Social Relations

   The results of the CFA dimension test "the meaning of social relations" assisted by Smart PLS, data obtained that there is 1 indicator, namely item number 7 (MH7), has a factor loading of 0.541. Based on Tabachnick & Fidell, (2007), a good loading factor must be above 0.7. The decision is that MH 7 must be removed, so that the loading factor value is above 0.7. The results obtained increase other loading factors so that the indicators used are very good, and have been revised as shown in the Figure 4 below:

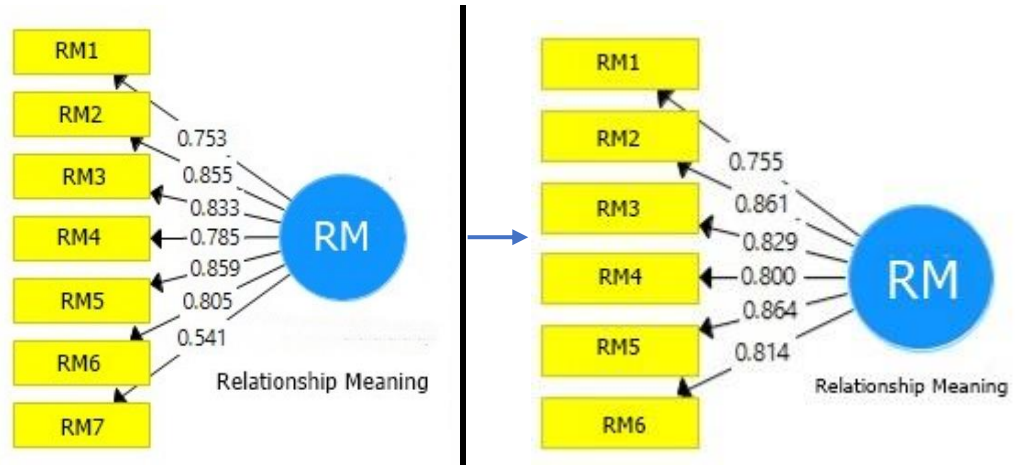

Figure 4 CFA Data Processing Results Meaning of Social Relations (the data is processed using smartPLS)

3. Cognitive Competence in Diversity
The results of the CFA dimension test for Cognitive Competence in Diversity using SmartPLS are presented in Figure 6. Overall, the indicators for developing Cognitive Competence in Diversity have a loading factor value above 0.7. This is shown in Figure 5:

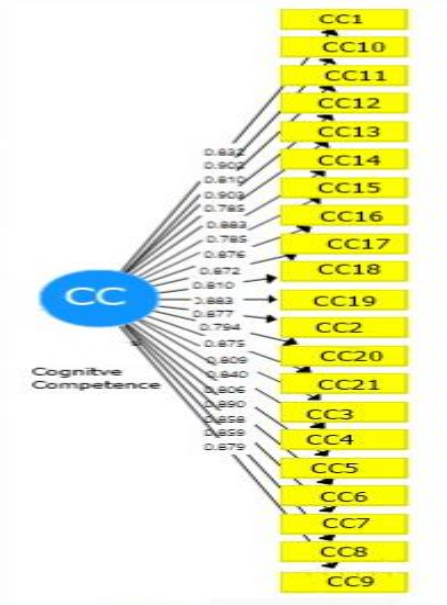

Figure 5 Results of CFA Data Processing Cognitive Competence in Diversity (The Data is Processed using SmartPLS)

4. Attitudes and Emotions in Social Networks
The results of the CFA test of Attitude and Emotion dimensions in Social Networks using Smart PLS are presented in Figure 6 below:

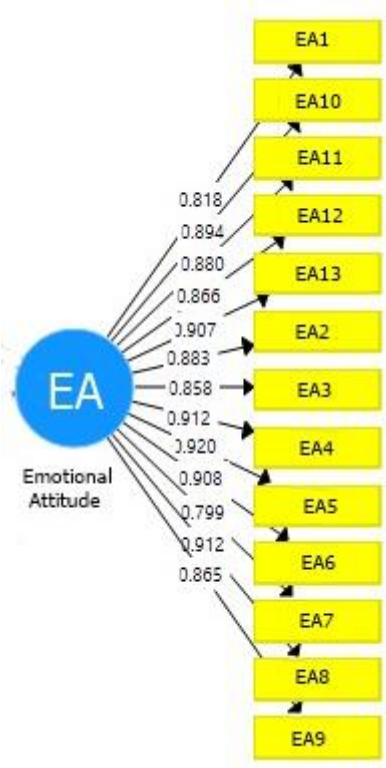

Figure 6 Results of CFA Data Processing Attitudes and Emotions in Social Networks (The Data is Processed using SmartPLS)

The analysis of the research results obtained in a composite score reliability coefficient achieved by the collaborative concept of entry supervision, which was 0.928, with the partial reliability coefficient of each dimension moving from a value of 0.763 to 0.924. The concept of collaborative skills is supported by 4 dimensions. Each variable is able to explain the variance of its variants. Working Mechanisms 28, 112%, Meaning of Social Relations 22,252%, Cognitive Competence in Diversity 20,234%, and Attitudes and Emotions in Social Networks of 28,151%. This shows the multidimensionality of collaborative concepts. These results indicate that the validity of the collaborative construct in this study was achieved well.

MODEL

The results of the study showed that models of each dimension of Work Mechanism, Relationship Meaning, Cognitive Competence in Diversity, and Attitudes and Emotions in Social Networks in building collaborative instruments are shown in Figure 7.

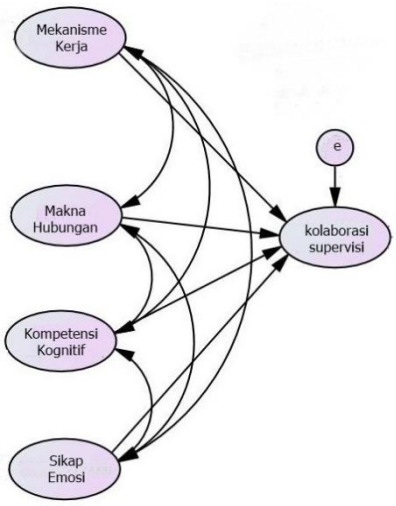

Figure 7 Test Results of the 4C's. Collaborative Skills Composition Model Components (The Data is Processed Using SmartPLS)

The model test used to test the model used in the study. Testing is done by knowing the value of Goodness of Fit. If the resulting Goodness of Fit is good, the model can be accepted (Ghozali, 2014). Based on the overall goodness of fit measurement, it indicates that the model proposed in this study has been accepted and is suitable for use. The complete data is listed in table 2.

Table 2. Goodness of Fit. Test Results

	Cut-off value	Results	Model
RMSEA	≤ 0.08	0,066	Good
GFI	≥ 0.90	0,937	fit
AGFI	≥ 0.90	0,834	Marginal
CMIN/DF	≤ 2.0	0,523	Good
TLI	≥ 0.90	0,921	Good
CFI	≥ 0.90	0,918	Good

Qualitative analysis

Dimensional and indicator data obtained through EFA and CFA are generated based on student responses. In order to obtain indicators that can accommodate the needs of students, teachers, school principals, the above data needs to be validated by practitioners and experts through FGD activities. The result is as follows.

1. Working Mechanism Dimension.
   The dimension of "work mechanism" from the results of the FGD obtained 7 (seven) indicators, including: (1) decentralized decisions; (2) team work; (3) Innovation in response to new demands; (4) Reflecting skills; (5) Task management skills; (6) Hierarchical problem solving; (7) Share information with each other. Factual data with student respondents obtained all indicators are valid. However, after a qualitative assessment by practitioners and experts, the following assessment was obtained:
   a. The indicator “innovation in response to new demands” is not included in the working mechanism. Understanding the dimensions of the work mechanism provides more direction on how a work is carried out in collaboration/teams. The indicators above provide a more detailed description of the response/response.
   b. The indicator “reflecting skills” was changed to make it easier to accept, then changed to “skills in giving guidance”.
   c. The need to replace the equivalent word of decentralization in the indicator “decentralized decisions” is replaced by “decision is left to all members”.
   d. The conclusion is the dimension of "Work Mechanism" becomes 6 (six) indicators.
2. Dimensions of The Meaning of Social Relations.
   The dimension of "the meaning of social relations" from the results of the literature review obtained 7 (seven) indicators. The results of the assessment through EFA and CFA with student respondents obtained that 6 (six) indicators are valid, and there is 1 (one) invalid indicator, namely: "actively participating". The results of the validation by experts and practitioners obtained a decision to eliminate 1 indicator of "active participation". The reason is the indicator above has been included in statement number 1, namely "adaptability". The conclusion of the “meaning social relationship” dimension has 6 indicators.
3. Dimensions of cognitive competence in diversity.
   The results of the assessment by junior high school students, obtained data, which is 4 (four) dimensions were combined into 1 (one) dimension. The four dimensions include: (1) Perspective taking skills (point of view; (2) Building knowledge; (3) Having diversity competencies (diversity); (4) Cognitive process skills. The 4 dimensions above become one dimension, namely: "Building Cognitive competence in diversity”, has 21 indicators. These 21 indicators were re-validated, and several decisions were made: (a) collecting all indicators; (b) translate each indicator; (c) grouping in one perception equation; (d) discuss the emerging indicators based on a common understanding; (e) reviewing the newly formed indicators. The validation results from 21 indicators to 6 indicators. The complete analysis is as follows:

Table 3. Changes in the indicators of FGD results on the dimensions of Building Cognitive Competence in Diversity

Dimensions: Building Cognitive Competence in Diversity		
No	Indicators before being validated by experts and practitioners	Indicators of the results of the FGD
1.	Opposition skills	1. Skilled in solving problems for the common good
2.	Defend the idea	
3.	Diverse problem solving	
4.	Task completion engagement	
5.	Perception equation	2. The skill of bringing together

6.	Taking into account the various opinions of members	opinions from diverse perceptions
7.	Skills to synergize various information	
8.	Opinion pooling skills	
9.	Open to many ideas	3. Collaborative exchange of ideas
10.	Can collaborate with anyone	
11.	Exchange of ideas	
12.	Diversity of understanding	4. various understandings to be united into new insights
13.	Integrating new insights into personal understanding	
14.	Ability to understand the context of the conversation	
15.	Decision making skills	
16.	Building a conceptual framework	5. Collaboratively building deep knowledge
17.	Network of ideas	
18.	Deep understanding	
19.	Initiative skills	6. Collaboration encourages thinking and initiating in understanding an information
20.	Encourage thinking	
21.	Information internalization	

4. Attitude and Emotion Dimensions in Social Networks

The results of the assessment with junior high school students obtained data combining 2 (two) dimensions into one dimension. The previous dimensions are: (1) emotional attitude skills (7 indicators) and (2) social networking dimensions (6 indicators). The two dimensions above combine into a new dimension, namely the "Attitudes and Emotions in Social Networking" dimensions. Quantitative data analysis resulted in all 13 indicators being valid.

The results of the reassessment by FGD participants, generated data as follows:

a. Agree with merging 2 dimensions into 1 dimension with the dimension name "attitudes and emotions in social networks"”
b. The results of the analysis resulted in 13 indicators, but after being validated by the FGD participants 7 indicators were produced. There are several indicators that are combined and some indicators are removed. The validation results are as follows:

Table 4. Changes in the Indicators of FGD Results on the Attitudes and Emotions in Social Networks Dimensions

Dimensions: Attitudes and Emotions in Social Networks		
No	**Indicators before being validated by experts and practitioners**	**The FGD results**
1.	Growing self esteem	1. Growing confidence
2	Flexible ability	2. Understanding each other
	Positive ratings are getting better	
	Mutual understanding	
3	Safe environment	Deleted. Less relevant to the dimension of “Attitudes and Emotions in Social Networks”
4	Emotional management (emotional resilience)	3. Ability to manage emotions
	Ability to manage conflict	
5.	Interdisciplinary work	4. Building diverse connections
	Build and maintain connections (Make the work effective)	
	Division of work	5. Division of work
	personal and social responsibility	deleted
	Adaptable	6. Adaptable
	Ability to empathize	7. Ability to empathize

CONCLUSIONS

This article concludes the dimensions and indicators of collaboration skills in 21st century learning supervision, based on 3 stages of research, namely: (1) Validation of dimensions and indicators, based on analysis of various research findings from various sources of information. (2) validation resulting from the test through EFA and CFA. (3) validation of findings from stage 2 clarified through FGD.

The results of the study obtained 4 dimensions and 25 indicators of collaboration skills in the supervision of 21st century learning, with the following details:

1. The dimension of "Work mechanism" has 6 (six) indicators including: (a) The decision is left to all members; (b) teamwork; (c) skills to provide mentoring; (d) Task management skills; (e) Hierarchical problem solving; (f) Sharing information.
2. The "meaning social relationship" dimension has 6 indicators including: (a) Adaptability (Interacting effectively); (b) Social sensitivity (way of listening, respect, etc.); (c) People centered; (d) Encourage commitment; (e) Support and strengthen each other; (f) Good work ethic.
3. The dimension of "building cognitive competence in diversity" resulted in 6 indicators as follows: (a) Skilled in solving problems for the common good; (b) Ability to unite opinions from diverse perceptions; (c) Collaborative exchange of ideas; (d) various understandings to be combined into new insights; (e) Collaboratively building deep knowledge; (f) Collaboration encourages thinking and initiating in understanding an information.
4. The dimension of "attitudes and emotions in social networks" has 7 indicators, namely: (a) The growth of self-confidence; (b) mutual understanding; (c) Ability to manage emotions; (d) Build diverse connections; (e) division of labor; (f) adaptability; (g) ability to empathize.

The results of the dimensions and indicators of 21st century collaboration skills of learning supervision above can: (1) be followed up by research in the field; (2) is used as an indicator to assess 21st century learning and supervise learning.

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