

# An Analysis Dimensions And Indicators Of The 21 St Century Collaboration Skills: Student, Teacher and Principal Perspectives

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**Abstract:** 21st-century collaboration skills must be owned by students as a result of the transformation of their teachers, and the principal supervises teacher learning activities, to obtain data of the progress in which they are implemented. The realities that occur and the demands of future needs become the basis for determining the dimensions and indicators of collaboration skills. The purpose of this study was to obtain the results of the construction of dimensions and indicators of 21st-century collaboration skills, based on the perceptions of students, teachers, and principals. The research uses a mixed-method approach with a Sequential Explanatory model. The results of the research that all indicators are valid and are indicators that make up the dimensions of the collaborative model, and the construct of the collaborative model has sufficient validity. The dimensions are divided into 2 parts, namely (1) in the Very Good category (3,21-4,0) for the dimensions of work mechanism, the meaning of social relations, emotional attitude skills, social networking, having diversity competence (diversity); (2) Being in the Very Good category (2.41-3.20), for the dimensions: building knowledge, cognitive process skills, perspective-taking skills (point of view). Qualitative data from teachers shows that teachers are varied in applying various methods so that students can carry out collaborative activities. However, teachers are less successful in building students' ideas, directing students to processes and products in solving problems. The principal emphasize more on supervised work activities but lack in building diversity of information, cognitive process skills, perspective taking skills.

**Key words:** 21st Century, Collaboration Skills, Dimensions and Indicators.

## INTRODUCTION

### Context

In the current era, there have been major changes in life patterns. Information and communication technology changes the nature of how work is done and the meaning of social relationships. The keys to companies today are decentralized decision making, information sharing, teamwork and innovation. Success lies in the ability to communicate, share, and use information to solve complex problems. The ability to adapt, innovate in response to new demands and the ability to compile and expand the power of technology are used to create new knowledge. They have the impact on expanding human capacity and productivity (Griffin,

McGaw, & Care, 2012). The survey results found that professionalism, good work ethics, oral and written communication, teamwork, collaboration, critical thinking and problem solving skills are the most important skills.

There are five unique 21st century elements: (1) digital literacy; (2) inventive thinking; (3) effective communication; (4) high productivity; and (5) spiritual values (Saleh, 2019). Kong, et al, 2013). [3] recommend stakeholders to consider curriculum goal-setting policies that address 21st century skills development and to bridge the gap between schools and communities, the availability of digital technology for schools, and the e-learning process. (Finegold, & Notabartolo, 2016) argues that 21st century learning skills encourage a broader range of skills, attitudes, knowledge and students to succeed in school, in the workplace, and in life more generally. To face success in today's world students must have the skills such as critical thinking, problem solving, communication and collaboration (Skills, P. for 21st C, 2011).

The skills above allow a person to get more value to develop in a collaborative work environment (Redecker, 2017). The combination of critical thinking, problem solving, decision making and collaboration can be combined into a complex set of tasks or skills called "Collaborative Problem Solving". Meanwhile, information literacy, information and communication technology literacy as well as personal and social responsibility are the ways students learn through social networks and media (Griffin, 2015). In an increasingly complex world, the best approaches to solving diverse problems involve collaboration between people and institutions with different skills and backgrounds (Duchek, Raetze, & Scheuch, 2020).

Collaboration enables groups to make better decisions than those made by each individual alone, because it allows to consider multiple perspectives (Surowiecki, 2005). Interdisciplinary work is often an integral part of important advances in knowledge and technology (Leahey, & Reikowsky, (2008). (Unwin, 2010) argues that collaboration and initiative-taking are highly contextual abilities. In particular, the demand for the following skills is increasing, such as teamwork, creativity, strong work habits, and social skills (Malik, 2018; Achieve, 2012). Collaborative activities make the abilities to be flexible, compromise, and respect others (Wilson, Scalise, & Gochyyev, 2015). Collaboration encourages the growth of internal assets, such as self-esteem, decision-making skills, and responsibilities. The external aspects such as support between others, safe environment, and patterns of positive interactions with others have increased (Gifford, & Nilsson, 2014). The activities of maintaining ideas, exchanging diverse beliefs, building conceptual frameworks and active involvement characterize collaboration skills (Laal,& Laal, 2012)..

Collaborative problem solving requires cognitive processing skills, social sensitivity, emotional resilience, reflecting skills, and understanding diversity. Cognitive processing skills will direct knowledge-centered activities so that students can demonstrate deep knowledge and understanding as keys to developing skills (Griffin, McGaw, & Care, 2012). Hesse, Care, Buder, Sassenberg, & Griffin, (2015) describe how collaborative problem solving consists of the cognitive and social domains, and the cognitive domain consists of the skills in managing tasks and building knowledge. The social domain can be explored through one's participation, perspective taking and social regulation. Perspective taking skills include response and audience awareness skills. Responding skills become evident when problem solving successfully integrates collaborators' contributions into their own thinking and actions (Griffin, McGaw, & Care, 2012). Working with others effectively includes a person's ability to interact effectively with others including knowing when to contribute, listen, and respect different values (P21, 2009).

It provides learner-centered learning direction with students who are actively involved, community-centered resulting in collaborative knowledge building, and assessment-centered to be able to monitor the progress. Collaboration assessment can be done by observing or measuring participation, involvement in assignments by class working together, and discussing problems. The classroom environment plays an important role in assessment methods for 21st century cooperation. Schools have been recognized as knowledge-building organizations, particularly in the development of learning assessments via digital networks. Students are given the opportunity to undertake their own skill development and knowledge building (Hesse, Care, Buder, Sassenberg, & Griffin, (2015).

Collaborative learning is a learning approach that involves groups of students working together to solve problems, complete tasks, or create products. In collaborative learning (CL), it articulates and defends their ideas and creates their own unique conceptual, and the framework does not depend on expert frameworks or texts. There are five basic elements that characterize CL, i.e.: positive interdependence, adequate interaction, individual accountability and personal responsibility for achieving group goals, relevant interpersonal use, small group skills and group processing to increase the future effectiveness of the group. Four CL groups include: social, psychological, academic and assessment (Laal, & Kermanshahi, 2012).

Collaboration will produce collective intelligence, build community due to the presence of awareness, and integrate various perspectives at the community, social and global levels. Networking involves the understanding on how tools, media and social networks operate and the use of appropriate techniques to operate these resources to build collective intelligence and integrate new insights into personal understanding (Achieve, 2012). (Brodbeck, & Greitemeyer, 2000) suggest that, through progress in collaborative problem-solving tasks, individuals can learn the content domain or strategies and skills; and they can also learn how to deal with incapacitated people or how to coordinate, collaborate and negotiate with others.

Collaboration is the joining of various types of individuals in a form of activity towards a common goal. The above activities occur because there has been the determination of group agreements, responsibilities related to tasks, division of labor, and synergy of efforts to achieve optimal solutions. Collaboration shows negotiation skills, flexibility, articulation of points of agreement, the maintenance of the ability to think clearly and the finding of various pedagogical methods (Mujis, et al, 2014).

## **Literature Review**

Collaboration and teamwork can be developed through experiences inside school, between schools, and out of school (P21, 2009). Students can work collaboratively together on authentic project-based assignments and develop their skills through peer tutoring in groups. In the world of work in the future, collaborative skills must also be applied when dealing with colleagues who are located far away from each other. Effective communication and collaboration skills coupled with skills using technology and social media will enable collaboration with international groups.

Several studies related to collaborative learning have been shown to improve learning outcomes, material enjoyment, self-esteem, and diversity inclusiveness, and students have positive ratings of each other, teachers or subjects (Loes, Culver & Teniell 2018). Through collaboration, increased critical thinking and creativity are formed (CCR, 2015). This thing is in line with the research results of Saka (2021), that students who are taught by teachers who are

involved in collaboration get higher average achievements than those taught by isolated teachers. Teacher collaboration is an effective way to improve teacher quality which has an impact on increasing student achievement. Through collaboration, teachers discuss the challenges of learning, teaching them and about students. Collaboration provides an avenue for teachers to increase their knowledge, skills, resources, and success in their learning.

Collaborative work provides a direction where individuals can work effectively with others. In a team with diverse members, it makes minds open to different ideas and values and uses social and cultural differences to generate ideas, innovation, and better quality work (National Research Council, 2012). The forms of collaborative activities have had an impact on building collective knowledge. Kin, T.M & Kareem, O.A, (2021), conveyed in his research that Professional Learning Community (PLCs) as a collaborative and collective teacher learning community have increased the professional capacity of teachers in strengthening instructional improvement on an ongoing basis. Through PLCs a culture is built where teachers act as their own agents, proactively taking the initiative to build knowledge collectively. Study Kula, S.A & Guler, M.P.D. (2021) strengthen the above findings, that university-school collaboration related to teaching practice, has produced effective and productive data in the pre-service education process. This collaboration can improve the professional development and level of student learning. Pre-service teacher collaboration with students and parents, in lesson planning, supports their professional development. This collaboration guides them in the context of effective participation, builds effective communication channels, and develops shared plans and attitudes, through the exchange of views between them. This matter gives direction to the need for lecturers to meet more with practical schools, exchange ideas, plan and evaluate together.

Participation metaphors are indispensable to cognition (Greeno, 1998) and socio-culture (Vygotsky, 1978) and regard learning as an outcome activity. The metaphor of participation is the building of knowledge (Scardamalia, 2002). According to this view, learning is a discursive process in which collaborators generate a network of ideas that builds on one another. (Griffi, & Care, 2015) presents a hierarchical problem that leads to knowledge building. This article strengthens and extends the results of previous research. Winaryati, et al (2020) states that the habit of collaborative problem solving in the classroom has resulted in the emergence of several skills such as better interaction, sharing, contributing, complementary, encouraging thinking, commitment, mutual support, shared perceptions, having the same opportunities, the involvement of all parties. Collaboration skills at the classroom level also impact on emotional management and empathy. Collaboration providing an opportunity to develop emotional resilience and empathy must be explicitly designed (Leadbeater, 2010). Activities at the class level have an impact on global skills, increase the skills to involve respect, and appreciate the problems of other people and cultures that are different from their culture so that they will acquire social and cross-cultural (Barrett, 2014).

### **State Of The Art**

This article discusses the analysis of dimensions and indicators of the implementation of 21st-century collaboration skills in the field, based on the perceptions of students, teachers, and school principals. The article on previous collaborations discusses collaboration between teachers, teacher-students, and school-campus collaboration related to pre-service education and other forms of collaboration. The discussion of this article is carried out in detail and in-depth, starting with constructing the instrument, testing its validity and reliability based on field data

with various research approaches, both quantitatively and qualitatively. The hope generated field findings, to produce recommendation dimensions and indicators that can be used as a basis to conduct further research. The purpose of this study was to obtain the results of dimensional construction and indicators of 21st-century collaboration skills.

## **METHODOLOGY**

This study used a mixed method approach with a Sequential Explanatory model to answer the research objectives. This research model was characterized by data collection and quantitative data analysis in the first stage, followed by qualitative data collection and analysis in the second stage with the aim of strengthening the research results.

### **Data collection techniques:**

The author conducted theoretical studies related to collaboration skills in learning from various literatures to generate several factors, dimensions and indicators. The results were then distributed to 112 students. This stage was intended to obtain preliminary information on instrument clarity in 21st century learning collaboration skills. The results of the questionnaire were reduced in item function through explanatory factor analysis (EFA). The results of the analysis were tested by the model of Confirmatory Factor Analysis (CFA) physical order to identify the quality of the instruments of the 21st Century Learning Collaboration Skills.

The qualitative data were obtained through in-depth interviews, documentation and field notes. This study involved 6 junior high school teachers in Semarang and Metro Lampung, 5 junior high school principals who are members of private school associations throughout Central Java, and 3 junior high school principals in Metro Lampung.

### **Data processing techniques**

- a. The quantitative data was the basis to follow-up qualitative data collection.
- b. The qualitative data were processed. The data processing technique was carried out in the stages as follows: (1) all data were in transcript form, except the photos and videos where the narrative was written as explanatory; (2) the data were coded for later analysis by numbering 1, 2, 3, and so on; (3) The facts were compacted by reconstructing the sentences to make them more well-ordered to make it easier to understand the meaning; (4) verification (conclusion).
- c. The data were analyzed using mixed method. The ways were that the quantitative data findings were analyzed first to generate a research recommendation. The field findings were crosschecked with the qualitative data. The qualitative data were obtained from teachers to gain understanding, teacher teaching experiences, and future visions related to the 21st century collaboration skills. The qualitative data were also obtained from the findings related to how school principals supervise learning on teachers in terms of these collaboration skills.

## RESULTS.

### Descriptive statistics of the item constituent

The data processing used descriptive statistics including:

1. Calculating the frequency, percentage and mean. This calculation was conducted by calculating the categories of the respondents' answers to the questions on each questionnaire item. The result can show how many respondents who answered 4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree. The calculation was continued with the percentage of respondents' answers and the average answer.
2. Calculating the cross tabulation between the characteristics of collaboration skills in learning.

The variables of collaboration skills consists of 47 questionnaire items which have 4 answer categories. This variables consist of 8 dimensions, and each dimension consists of several questions, including: (1) Mechanism of action, (2) The meaning of social relations, (3) Taking perspective skills, (4) Building knowledge, (5) emotional attitude skills , (6) Social networking, (7) Having diversity competencies, and (8) Cognitive processing skills. The analysis results of the descriptions per item on the questionnaire are summarized in Graph 1. The highest value range is on the 3rd scale or agrees. These results indicate that the dimension of diversity competence is the most approved by the respondents with an agree value of 44%. This means that diversity competence is dominant in the influence of collaboration.

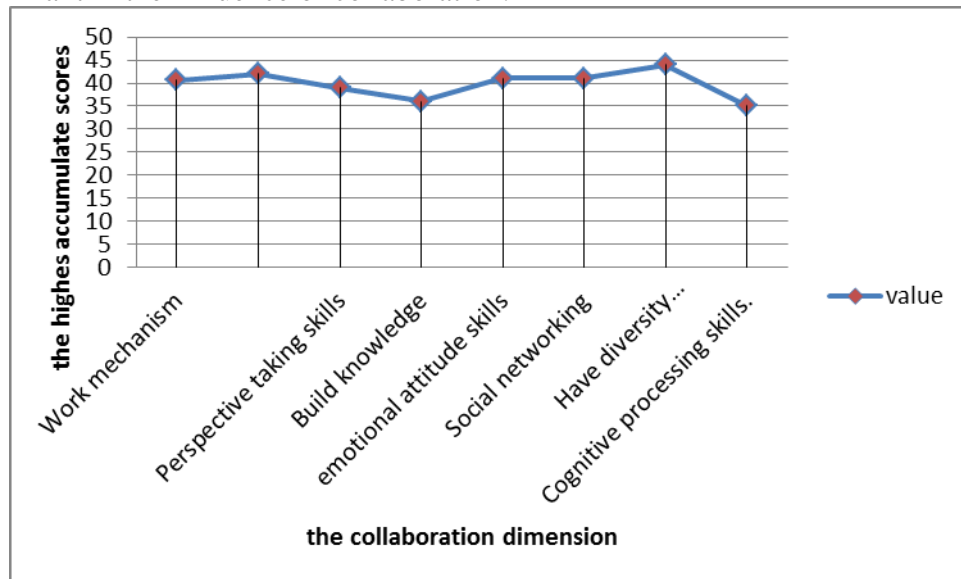


Figure 1. Results of Qualitative Descriptions of Responses to Collaborative Questionnaires

From the descriptive statistical analysis using the intermediate SPSS for the characteristics of the validity and reliability of the items that make up the dimensions, it can be concluded that the average respondent states that the dimensions that have been derived from the theoretical basis are important for the formulation of collaborative skill model. The results of the item reliability are shown in Table 1. The results of the calculation show that the reliability of the items that make up the dimensions based on the reliability of the alpha is 0.9509 in the reliable category, and the Cronbach Alpha is 0.9477.

Table 1. Validity and Reliability of Response

<b>Reliability &amp; item analysis</b>	
Scale Mean	: 120,1961
Variance	: 181,2914
Scale Std	: 13,4644
Alpha	: 0,9509
Max	: 140,0000
Min	: 52,0000
Cron. Alpha	: 0,9477

### **Outlier Evaluation and Item Normality**

Outlier test was conducted by comparing the data on the Malahobis distance with the critical value table of Chi-square ( $X^2$ ). The cut off outlier was determined by taking into account the number of indicators used (47) with a degree of freedom of 0.001 so that the cut off was carried out at a value of 65.25. the evaluation of normality was carried out using the critical ratio skewness value criterion of 2.58, positive or negative at the significance level of 0.01. The data can be concluded to have a normal distribution when the critical ratio skewness value is lower than the absolute value at 2.58 (Ghozali, 2014). To overcome the presence of the data that is not normal in a multivariate way is to use a bootstrap procedure. After bootstrapping the probability result becomes 0.002 which states that the model cannot be rejected, and this result is consistent with the chi-squares results of the original model which also cannot reject the null hypothesis. The results of this test became the basis for the model testing using EFA and CFA with the use of SPSS and lisrel applications.

### **Model and Hypotheses Testing EFA Results assisted by the SPSS 17 Program**

The CFA test with the SPSS 17 program aims to test whether a construct has unidimensionality or whether the indicators used can confirm a construct or a collaborative model variable. When each indicator is a construct measuring indicator, it will have a high loading factor value. This indicates that the indicator is valid. The assumption underlying whether the factor analysis can be used to test the construct validity using SPSS or not is that the matrix data must have sufficient correlation. The Bartlett of Sphericity test is a statistical test to determine whether there is a correlation between variables or not. The larger the sample size, the more sensitive the Bartlett test is to detect any correlation between variables.

The other test instrument used to measure the level of inter-correlation between variables is the Kaiser-meyes-Olkin Measure of sampling Adequacy (KMO MSA). The KMO value varies from 0 to 1. The desired value must be 0.50 for factor analysis to be carried out (Ghozali, 2014). The following is a factor analysis on the collaboration skills instrument indicator, using SPSS 17.

Table 2. EFA Test Results

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.840
Bartlett's Test of Approx. Chi-Square	6.162E3
Sphericity Df	325
Sig.	.000

The test results on the output table of SPSS 17 KMO (Kaiser-Meyer-Olkin) show the result of 0.840 (higher than 0.50) indicating that the mean correlation on the anti image correlation is higher than 0.30, meaning that the data could be analysed for factor analysis. Based on the Total Variance Explained table of the 47 indicators analysed, it indicates that the results of SPSS extraction become 1 factor (eigen value > 1, at 5.918) and are able to explain 53.798% of the variation contained in the collaborative model variables.

Table 3. *Component Matrix*

No	Dimensi	Nilai Component
1	Work mechanism	<b>.717</b>
2	The Meaning of Social Relations	<b>.734</b>
3	Taking Perspective Skills (Perspective)	<b>.859</b>
4	Building Knowledge	<b>.727</b>
5	Emotional Attitude Skills	<b>.717</b>
6	Social networking	<b>.723</b>
7	Having Diversity Competence	<b>.734</b>
8	Cognitive Process Skills	<b>.714</b>

Source: Processed factor analysis results

Based on the component matrix table, it can be explained that all dimensions can measure collaboratively in which the highest loading factor is 0.859, and the lowest is 0.714. This indicates that all indicators in the dimensions lead to a collaborative model variable. It can be concluded that the 47 indicators are truly valid and indeed the indicators of composing variables from the competency dimensions of the collaborative model. The next stage was to test the empirical validity for all instruments in the collaborative model using CFA with the lisrel program

**Test Results Assisted by Smart PLS**

At this stage, the draft model in the form of an instrument and its indicators tested at the main stage was revised based on the input from the main trial respondents. As in the initial trial phase, at this stage, revisions were made to the collaborative model instrument tested previously. Inputs, suggestions, and criticisms from the respondents were used as the materials for the improvement of the collaborative model. Overall, at this stage, the instruments were refined by the researchers together with the research team and FGD.



Lisrel output in the form of measurement equation results in an estimate of the relationship between indicators and latent variables as well as testing the validity of indicators in reflecting on latent (unobserved) variables. An indicator is categorized as significant when it has a value of  $R^2$  value greater than 0.10. From the Lisrel output, it is found that 8 dimensions with 47 indicators have the  $R^2$  value higher than 0.10, so it can be concluded that the indicators derived from these are quite good at representing latent and valid variables.

The measurement model produces t value to determine the significance of the relationship between parameters. The insignificant relationship has the red t-value, while the black one is for a significant relationship. When all indicator relationships with latent variables and measurement error are significant, all relationships are significant.

Table 4. Comparison of *Goodness of fit criteria* and Analysis Results

No	Criteria	<i>Goodness of fit</i> (Byrne:1998)	Analysis Results
1	Chi square	< 2 db	130,78
2	Significance (p)	$\geq 0,08$	0,000
3	RMSEA	< 0,05	0,097
4	Goodnees of Fit Index (GFI)	$\geq 0,90$	0,90
5	Adjusted Goodnees of Fit Index (AGFI)	$\geq 0,90$	0,85
6	Normed Fit Index (NFI)	$\geq 0,90$	0,95
7	Comparatif Fit Index (CFI)	$\geq 0,95$	0,97
8	Incremental Fit Index (IFI)	$\geq 0,95$	0,97

Source: Factor Analysis Results

Based on the results of the test, it is obtained and presented in table 4. Based on the results of the calculation of RMSEA at 0.097, these results indicate that the model has sufficient fit/ mediocre (Byrne, 1998). The Goodness of Fit Index (GFI) is a measure of model accuracy in producing observed covariance matrix. The analysis results of GFI (0.90) and AGFI (0.85) on the collaborative model instruments show that the model has a fairly good fit. NFI is one of the alternatives to determine the fit model, while CFI is a revision of NFI [38]. A model is considered fit when it has NFI and CFI values  $\geq 0.90$ . Incremental Fit Index (IFI) is used to solve sample size problem. A model is considered fit when it has an IFI value  $\geq 0.90$ . The analysis results of the NFI (0.95), CFI (0.97), and IFI (0.97) on the collaborative model show that the model has a fairly good fit.

Four out of the eight goodness of fit parameters are met (GFI, NFI, CFI, and IFI), while RMSEA is included in the mediocre category. It can be concluded that the model has a fairly good fit and the collaborative model construct on the research results can be said to have sufficient validity.

## **DISCUSSION**

### **The Description of Dimension Builder Items**

The items that make up the dimensions were obtained by the average assessment data. The results of the assessment were categorized as follows (5 categories): Poor = 1-0.8; Fair = 0.81-1.6; Good = 1.61-2.4; Very Good = 2.41-3.2; Excellent = 3.21-4.0.

The work mechanism dimensions of the majority of respondents' answers are 4 (strongly agree) by 37% and 3 (agree) by 40.7% with the highest percentage of 3 (agree). The average respondent's answer is 3.30, which is in the excellent category. The conclusion is that the respondents agree that working mechanisms are needed in collaborative decentralized decisions, teamwork, innovation in response to new demands, reflecting skills, task management skills, hierarchical problem solving, and information sharing. These dimensions are in the questionnaire items no: 3, 10, 15, 30, 57, 72, and 85.

In the dimensions of the meaning of social relations, the majority of the respondents' answers are 4 (strongly agree) by 41% and 3 (agree) by 42% with the highest percentage of 3 (agree). The average respondent's answer is 3.35, which is in the excellent category. This means that the respondents agree that the dimensions that must be available in the preparation of the assessment are adaptability, social sensitivity (how to listen and respect), public-centred, encouraging commitment, mutual support and strengthening, and good work ethics. These dimensions are in the questionnaire items no.: 5, 8, 11, 13, 16, and 18.

In the dimensions of perspective taking skills (point of view), the majority of the respondents' answers are 4 (strongly agree) of 37% and 3 (agree) of 39% with the highest percentage of 3 (agree). The average respondent's answer is 2.9, which is in the Very Good category (2.41-3.2). This means that the respondents agree with responding skills, audience awareness skills, integrating contributions, decision making skills, common perception, and consideration of various perspectives in collaborative assessment. These dimensions are in the questionnaire items no: 9, 25, 33, 41, 44, and 47.

In the dimensions of building knowledge, the majority of the respondents' answers are 4 (strongly agree) of 37% and 3 (agree) of 36% with the highest percentage of 3 (agree). The average respondent's answer is 2.8, which is in the Very Good category (2.41-3.2). This means that the skills required are synergizing various information, building conceptual frameworks, diversity of understanding, deep understanding, integrating new insights into personal understanding, and network of ideas in carrying out assessments. These dimensions are in the questionnaire items no: 14, 28, 32, 35, 71, and 74.

In the dimension of emotional attitude skills, the majority of respondents' answers were 4 (strongly agree) of 36% and 3 (agree) of 41% with the highest percentage of 3 (agree). The average respondent's answer is 3.25 which is in the excellent category. This means that the respondents agree with the growth of self-esteem, flexible abilities, emotional management (emotional resilience), the ability to empathize, better positive assessment, mutual understanding, and the ability to manage conflict to take advantage of opportunities well. These dimensions are in the questionnaire items no: 2, 4, 17, 66, 76, 83, and 87.

In the dimension of social networks, the majority of respondents' answers are 4 (strongly agree) of 35% and 3 (agree) of 41% with the highest percentage of 3 (agree). The average respondent's answer is 3.22 which is in the excellent category. This means that the respondent agrees with interdisciplinary work, a safe environment, building and maintaining connections (making work more effective), division of work, personal and social responsibility, and the

ability to adapt easily. These dimensions are in the questionnaire items no: 8, 13,15, 21, 23, and 75.

In the dimension of having diversity competence, the majority of the respondents' answers are 4 (strongly agree) by 44% and 3 (agree) at 38% with the highest percentage of 7. The average respondent's answer is 3.27, which is in the excellent category. This means that the respondent agrees with the ability to collaborate with anyone, exchanging ideas, defending ideas, opening to many ideas needed in having diversity competence in marketing products. These dimensions are in the questionnaire items no: 6, 24, 27, and 77.

In the dimension of cognitive processing skills, the majority of the respondents' answers are 4 (strongly agree) by 46% and 3 (agree) by 35% with the highest percentage of 3 (strongly agree). The average respondent's answer is 2.92, in the Very Good category. This means that the respondent agrees with initiative skills, encouraging thinking, internationalization of information, solving various problems, and involvement in task completion needed in cognitive processing skills. These dimensions are in the questionnaire items no: 29, 31, 36, 63, 64, and 73.

The results of the quantitative research data, which were obtained from students, show a grouping of dimensions divided into 2 parts: (1) in the excellent category (3.21-4.0) for the dimensions of work mechanism, the meaning of social relations, emotional attitude skill, social networks, and diversity competence; (2) in the Very Good category (2,41-3,20) for the dimensions of building knowledge, cognitive processing skills, and perspective taking skills (point of view).

### **The Qualitative Data Analysis**

The results of the quantitative data are corroborated by the results of the qualitative data. The qualitative data were obtained through in-depth interviews, documentation, and field notes on 6 junior high school teachers, principals of both junior high schools in Semarang and Metro Lampung. The qualitative data were obtained in the form of a transcript. The data were coded and then analysed by numbering. Next, they were reconstructed in the form of a sentence to make it more organized, and finally concluded.

The dimensions of building knowledge, cognitive processing skills, and perspective taking skills (point of view) result in less optimal data. Based on the qualitative data, several conclusions are drawn, as follows: knowledge building skills is an activity that needs to be improved. The recording of the documentation to the principal say: “teachers are less skilled to lead and direct their students in finding problems”. From the interviews, it was found that the students' ability to solve problems and find solutions was less skilled. The results of the observations reinforce that many teachers copy and paste the lesson plans. The results of the observations obtained the data that the principal when conducting supervision leads to teacher administration. As a result, the teacher is less careful in directing students to have the skills in building knowledge, and the mastery of teacher content is not maximal. As a consequence, there is a jam in collaborative activities (discussion) in learning as a result of the students' lack of conceptual mastery.

The results of the interview indicate that the teachers could not encourage the discussion activities smoothly so that the competence possessed needs to be improved. The results of recorded documents provide the reinforcement that the teachers feel more comfortable when they are in a comfort zone. This has an impact on the mastery of knowledge that is less in-depth and less diverse. Not more than 60% of the teachers were in a safe zone, and not more than 50% of

the teachers were happy with the change and desire to progress. The results of the discussion provide support so that teachers can update a lot with various developments that have occurred. The explanation above confirms that the collaboration between teacher-students, teachers-principals has not been going well.

The findings above are consistent with the results of research by (Mujis, et al, 2014) that collaborative learning has been shown to improve learning outcomes, enjoyment of subject matter, self-esteem, and diversity inclusiveness. There are many different pedagogical tools that make use of collaborative learning, and across the meta-analyses. They have been found to be more effective at generating academic achievement than individualistic or competitive learning.(CCR, 2018), provides the reinforcement that through collaboration there is an increase in critical thinking and the formation of creativity. Collaborative work provides the direction where individuals interact effectively with others. Each individual knows when to listen and talk and how to treat them with respect and in a professional manner. In a team with diverse members, it makes work effective because individuals respect cultural differences and collaborate with people from various social conditions and cultural backgrounds. They are open-minded to different ideas and values and use social and cultural differences to generate ideas, innovations and better quality of work (National Research Council, 2012).

Collaboration skills for the dimensions of concept fluency skills resulted in less than optimal data. The results of the field notes, interviews and document records show that a concept cannot be constructed properly. The students 'self-confidence was lacking (doubtful) due to the lack of students' mastery of concepts. As a consequence, teachers are required to map what material can be discussed by students, and what problems will be solved. Teachers really need to map the characteristics of each material to be delivered. There are many other skills that need to be developed so that they are understood by teachers and students. There are several notes that must be improved, i.e.: motivation needs to be cultivated both in teachers and students; it is expected that teacher commitment will increase. Teachers need to build trust in students so that students are confident in making concept decisions. Students need to be strengthened regarding their communication skills. Teachers feel safe in a comfortable zone, and not many teachers are updated with new innovations. Teacher-student collaboration must be built, so that students grow self-confidence, because they already have good mastery of concepts.

The results of the above research are relevant to the results of previous studies. Collaborative learning has been shown to improve learning outcomes, enjoyment of subject matter, self-esteem, and diversity inclusiveness, and students have positive assessments of both peers and teachers or subjects (Finegold, & Notabartolo, 2016; Gokhale, 1995). Participation metaphors are strongly influenced by cognition (Greeno, 1998) and socio-culture (Vygotsky, 1978) and perceive learning as an activity rather than an outcome. The metaphor of participation is knowledge building (Scardamalia, 2002). According to this view, learning is a discursive process in which collaborators generate a network of ideas that builds on one another. (Griffi, & Care, 2015) proposes a hierarchy of steps in problem solving that leads to knowledge building.

Collaboration has an impact on self-regulation abilities. Collaboration may have an impact on high levels of interaction and teamwork, as well as improve the personal qualities of students. Independent students are responsible for their own learning process and willing to improve their abilities throughout their career. (Coman, Tiru, Mesesan-Schmitz, Stanciu, & Bularca, 2020) argues that independent students get motivation from within themselves. Independent students understand that enthusiasm for learning is a basic skill that will make them

successful in the workplace. Collaboration encourages the ability to reflect on the strengths that exist in students and improve time management (P21, 2011a).

The results of the quantitative data from the dimension of perspective taking skills (point of view) obtained less than optimal data. The results of in-depth interviews, corroborated by in-depth notes and documentation obtained the data that the teachers were divided into groups randomly. This has an impact that there are discussion partners who cannot provide reinforcement (assistance). Teachers need to map from the start on the abilities of students at various levels so that friends can give consideration and input one other to narrow down a decision. It is necessary to make several agreements between the principals and teacher as well as the teacher and students to generate mutual commitment. There needs to be a shift in the mind-set of teachers and students related to future demands.

The research findings above support the results of previous research that activities at the class level have an impact on global skills because they increase skills to involve respect for the problems of other people and cultures that are different from their culture so that they will acquire social and cross-cultural skills (Barrett, 2014). It will also build awareness and knowledge of the differences that exist between individuals and society. Collaborative problem solving displays teamwork and the ability to foster interdisciplinary cooperation and global exchange of ideas to combat potential discrimination due to ethnicity, gender, or age.(P21, 2011b) develop motivation, character and skills to participate in society; and understanding the impact of societal problems locally and globally (P21, 2011b), and the opportunity to collaborate to join forces with others who will complement their strengths (Mansilla, & Jaskson, 2011 ). Collaboration provides the opportunities for the competences of cross-country, cross-cultural, religious and linguistic collaboration, and has good diversity competencies, knowledge, attitudes and actions so that they can collaborate with anyone in the world (Griffin, McGaw, & Care, 2012).

## CONCLUSION

All indicators in the dimensions lead to one collaborative model variable, so it can be concluded that the 47 indicators are valid and are indicators that make up the variables of the competency dimensions of the collaborative model. The model has a fairly good fit and the collaborative model construct has sufficient validity.

The results of the research data quantitatively, the data obtained are grouping dimensions which are divided into 2 parts, namely (1) are in the Very Good category (3.21-4.0) for the dimensions of work mechanism, the meaning of social relationships, emotional attitude skills, social networking, have the competence of diversity (diversity); (2) Being in the Very Good category (2.41-3.20), for the dimensions: building knowledge, cognitive process skills, perspective-taking skills (point of view).

Qualitative data from teachers shows that teachers are varied in applying various methods so that students can carry out collaborative activities. However, teachers are less successful in building students' ideas, directing students to processes and products in solving problems. The principals emphasize more on supervised work activities but lack in building diversity of information, cognitive process skills, perspective taking skills.

## CO-AUTHOR CONTRIBUTION

The author confirms that there is no conflict of interest in this article. Eny Winaryati discusses the introduction and analysis of qualitative data. Muhammad Munsarif writes research methodology and reference search. Mardiana field data collection, data entry, and interpretation of results. Suwahono performs quantitative data processing and statistical data analysis.

## ACKNOWLEDGEMENTS

The 6th International Conference on Progressive and Exciting Education (The 6th Profunedu) is an agenda organized by the Association of Muhammadiyah Higher Education Institutions (ALPTK-PTM). International Conference to be held on 26 June 2021. Not published in the proceedings

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