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MAP OF MIDDLE SCHOOL TEACHERS' ABILITY TO RESPOND TO CHANGES IN COMMUNITY CULTURE, LOCAL WISDOM AND LITERACY IN SCIENCE LEARNING IN THE DIGITAL ERA

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Abstract. Disruption of information technology has caused changes in community culture and local wisdom in the school life environment. Schools as institutions that prepare graduates with environmentally friendly Pancasila values cannot be separated from community life as a source of learning. The purpose of this study was to map the ability of middle school science teachers to respond to socio-cultural changes in society, the potential of local wisdom, and the demand for student literacy enhancement in learning according to the philosophy of 21st Century Education. The research method used ex-post facto with a descriptive approach. Sample of this study was 15 students of Biology Education Study Program who are compiling theses and undergraduate and master's degree programs with the theme of linking science learning in schools with 21st century education, cultural change, local wisdom and literacy. To complete the data, a survey was conducted of 500 middle school teachers in West Java through a google form with 33 statements and interview guide. The instruments used questionnaires and interview guide. The results of this study indicated that most teachers have not fully carried out learning according to the philosophy of 21st Century Education. Most teachers were able to carry out the online learning process, design learning through searching content on the internet, videos, YouTube, e-books, and use various applications related to learning according to their expertise. 21st Century Education-oriented learning has not been carried out massively among teachers. There was an increase in student literacy, thinking skills, engineering skills and scientific attitudes. Existing community culture and local wisdom in the school environment were rarely used as a source of learning for the basic values of religion and spirituality, nationalism, and values of human character. The teachers' ability to respond to changes and increase literacy in building a digital culture remained low due to limited skills in dealing with environmental changes that were difficult for schools to follow.

Keywords**:** Science Learning; Digital Era; Community Culture; Local Wisdom; Literacy and Digital Culture

I. INTRODUCTION

A fundamental change in people's mindsets has occurred for over three decades due to the continuous disruption of information technology in various fields, including education. Social interactions involving individual behavior habits, mindsets, ideologies, and individual insights lead to massive changes in the community culture. The trend of cultural change has been very noticeable, begetting mode of thought, behaving, and the way people respond to circumstances. People quickly respond to phenomena that occurred. The trend of people's mindset has shifted to efficiency, not just meeting the required standards. In the educational area, the current trend of education indicated that the output is more important than merely the learning process in the classroom. Luxury buildings are no longer a priority for parents to send their children to study at a university.

However, the profile of graduates from the Study Program, Institutional Accreditation, graduate tracer study and university's network are more important. The university's output has also led to entrepreneurial behavior which is more important than the success of academic achievement. Therefore, the policy of implementing the school curriculum in the Merdeka Belajar (Freedom to Learn) program is left entirely to the teachers to choose the essential materials, while the government only covers the basics. From elementary school to University, curriculum content is left to teachers and lecturers, meaning that curriculum management between elementary school and university is the same. Moreover, the assessment system is completely different from the assessment system carried out by teachers, such as during the covid-19 pandemic, and the assessment system is in

accordance with the Merdeka Belajar (Freedom to Learn) curriculum. Lastly, the development of Merdeka Belajar (Freedom to Learn) curriculum in schools requires teachers to carry out various innovations. Therefore, teachers of any subject, particularly science teachers, need to have insight and abilities that are more than just content abilities. This study was conducted to map the potential of teachers' abilities to respond to socio-cultural changes, potential of local wisdom, and demands of 21st Century Education, student literacy enhancement and the ability to collaborate with the surrounding community,

The process of social change in today's society cannot be ignored by schools, especially teachers. Schools and parents must synergize in responding to the flow of cultural changes that affect the mindset of students and parents massively. With social media and information disclosure, things that occur in society are recorded by students, on the other hand, school culture is recorded by parents. Social interaction continues to occur throughout the episodes of life, forming the potential of local wisdom which eventually forms the scientific literacy of students. Students and teachers as part of the community understand that scientific literacy, community literacy and social culture cannot be separated. How can a learning process that does not cause a dichotomy between natural science and social science as well as religious science including metaphysics can be utilized in people's lives? The current reality is that the barriers to the use of knowledge in life gradually disappear, and the use of science becomes widespread and wide open.

Several studies revealed that social change in society can be used as a source of student learning for all subjects. Community culture has a lot of potential for local wisdom to help students improve their literacy. Social literacy, scientific literacy, and environmental literacy support the mindset of students. It is said that "learning designs involving the environment and local potential provide opportunities for students to learn more deeply through exploration activities of river ecosystems in the environment around the school. The learning assists students to apply their knowledge and eventually bridge between theory and facts that occur in the surrounding environment (Karyadi et al., 2016).

In relation to culture, information technology accelerating the occurrence of cultural resonance between students and the community causes social changes in the midst of people's lives, as seen from their interaction patterns, and lifestyles to mindsets. The results of this study also draw broad conclusions, namely; "the role of ICT in various fields of science education include; as a source of the latest lecture materials, reference data and learning media, and serve a large number of students who have not had the opportunity to learn, and improve efficiency, effectiveness in learning and academic services. There are several obstacles to utilizing ICT in the field of science education, both regarding facilities and infrastructure, human resources, and high awareness of the community (Miftah et al., 2014). The results of the studies reveal that science learning and socio-cultural changes in society are suitable for use in science learning for the development of students' creative thinking skills. The natural environment related to socio-cultural indicated the highest correlation, namely the natural and socio-cultural environment (4.4=x), textbooks (2.4=x), audio-visual (0.4=x), and the internet (8.3 = x (Suastra, 2010). The results of a study on science learning based on local wisdom revealed that "Science learning based on local wisdom can foster a love for indigenous knowledge of the community as part of the nation's culture which has implications for the surrounding natural resource conservation and environmental balance" (Tresnawati, 2018). The utilization of local potential in science education can be carried out by adapting the framework of sociocultural studies in education (Pieter, 2012). In general, the science education curriculum must pay attention to nature and the environment in an integrated manner.

In this regard, it is said that the curriculum may not succeed without learning. Curriculum and learning can develop scientific literacy between curriculum and learning and integrate Nature Of Science (NOS) and scientific inquiry explicitly (Anjarsari, 2014).

In short, science education does not only offer concepts related to objects, inanimate objects and living things but also existing social values as a result of the interaction process between humans resulting in social change, metaphysical values arising from the potential of local wisdom, as well as the relationship between the two which produces student literacy integrated with community life. Science education needs to be part of the supplementary science learning in schools. This is in line with the results of the study that "Education must be able to become an agent of change to provide positive changes to social change. Education must be able to develop creativity and people's minds to find something new and useful for the improvement of society. The more people displaying their creative abilities, the more people that make changes" (Idris, 2011). The trend of social change in society is "a symptom of changing social structures and cultural patterns in the life of society, which is a common symptom that occurs throughout time in all communities (Lubis, 2018), such as "the pattern and intensity of community interaction with designs become more intimate" covering from broad scope of community activities to the level of personal activities (Kurniawan, 2009).

Currently, science and technology have advanced, especially in information and communication technology. Learning system in schools, lecture system, and management system in educational institutions have been referring to the quality control system using a software application system for the performance of teachers, employees and students as well as coordination with parents of students. Information system have been used in learning, measuring student performance in learning, teaching materials, student practicums, attendance and a very large assessment system. In short, information system technology has been included in all dimensions of education management, from the registration of new students to graduating from school. The advantages or disadvantages due to the information system and technology have an impact on people's mindset involved (both in the school community and outside the school). Seeing this reality, teachers playing

Journal of Education, Teaching, and Learning
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the main learning scenario to determine the success of students must take primary control of the learning process. Therefore, teachers must be responsive and able to do problem-solving so that advances in information and technology have a positive impact on the role of schools as producers of graduates who are useful for the country's development.

Based on the above background, the problem in this study was how are the ability of middle school science teachers to respond to changes in the socio-cultural community, the potential of local wisdom, and the demands of student literacy enhancement in science learning? For more details, the description of the formulation of the research problem is 1) How is the map of the ability of middle school science teachers to respond to trends in socio-cultural changes in the community in learning science in schools?; 2) How is the map of the ability of middle school science teachers to utilize the potential of local wisdom and the natural environment for the benefit of learning resources?; and 3) How is the map of the ability of middle school science teachers to improve student literacy according to the demands of the current changing trends in the community? This study has three objectives, namely; 1) To map the ability of middle school science teachers to respond to trends in social and cultural changes in the community in science learning in schools; 2) To map the ability of middle school science teachers to utilize the potential of local wisdom and the natural environment for the benefit of learning resources; and 3) To map the ability of middle school science teachers to improve student literacy according to the demands of the current changing trend of community.

II. Methods

The research method used ex-post facto with a mix method approach. The sample of this study was 45 students of Biology Education Study Program (Bachelor and Masters Program) who had passed the thesis trial and were declared to have passed their bachelor's and master's thesis. The sample selection was based on the theme of bachelor's and master's thesis in accordance with this study, namely examining science learning in schools involving assessment aspect and the subjects were middle school science teachers and students or one of them. First, if the thesis or research data is in the form of student assessments, then based on that data, the role of the teacher is analyzed. Second, selecting bachelor's and master's theses that have data related to science learning and discusses the demands for community literacy enhancement in the digital era, so that the data indicators in bachelor's and master's theses are in accordance with 21st century education indicators. To complete the data, a survey was carried out to 500 teachers to map the ability of middle school teachers in West Java with variations in gender, age, and working period randomly, using google form.

The instrument used was in accordance with the methodology used by students according to their respective research methods. For students using quantitative methods, the instrument was at least questionnaires and tests. Meanwhile, for students using qualitative methods, the research instrument used interview guide. As supporting data, students working on their thesis using an observation guide were selected.

The data used in this study were the data of research results of bachelor's and master's thesis of guidance students under the direct supervision and guidance of the researchers. After the trial examination, both bachelor's and master's thesis, the researchers asked permission from the students who had passed. With the permission of the students and the selection of an appropriate research theme, data selection with sufficient validity, data of graduates of the guidance students were used in this study. Data analysis was carried out by recapitulating all student data and processing the average and statistical tests to be described. In general, for data in the form of interviews and observations, a general descriptive analysis was carried out on the information of the research results. For description of data of the students' findings, qualitative and quantitative data were extrapolated to determine the tendency of teachers in schools, teachers as master program students, and prospective natural science education teachers who had graduated from FKIP both bachelor's and master's.

III. Results And Discussion

Map of the ability of middle school science teachers to respond to trends in socio-cultural changes in society, local potential, and student literacy enhancement

Most of the teachers in schools were interested in Merdeka Belajar (Freedom to Learn) with the demands of 21st century education. This was because teachers were aware that instilling students' mindsets with 21st century educational philosophy must be carried out from an early age considering that critical, creative, and innovative thinking are an essential part. Teachers have made various efforts, including carrying out learning according to the needs of students while disseminating renewable technology products such as using various applications available on students' mobiles or laptops. The learning was adapted to the changing trend of community culture and the potential of existing local wisdom. The following is an acknowledgment of the learning process performed by middle school teachers in West Java;

Fig. 1 Teachers' Responses Toward Utilizing Trends in Cultural Change and Local Wisdom Digitally

Figure 1 shows that in general, teachers in schools understand that learning must be oriented to the demands of 21st-century education, literacy enhancement and potential of local wisdom. 26.2% of the teachers have implemented learning in accordance with the demands of 21st-century

Journal of Education, Teaching, and Learning
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education. However, a small number of teachers in West Java had a mindset that training critical, creative and innovative thinking as the main characteristic of the demands of 21st-century education are not necessary. Teachers' insight of the trend of social change and the potential of local wisdom was significant because the teachers had the mindset to disagree with learning adapted to the trend of social change and the potential of local wisdom, 2.2% of 441 random teachers in several regencies/municipalities thought that concept or insight of the demands of 21st-century education was not necessary for middle school students.

Figure 2 below shows that in general, middle school teachers in West Java believe that learning must collaborate with current cultural developments of the community and existing local wisdom. They carried out the efforts in various ways, such as using the STEM integrated Project Based Learning model to increase student literacy, local wisdom integrated practicum learning model to improve students' critical thinking skills, and practical work learning models integrated with the culture of the surrounding community to improve students' creative thinking skills. The problem-based learning model is to develop problem-solving skills. The percentage of teacher response in the context of belief, collaboration, and use of appropriate strategies for 21st-century education is as follows;

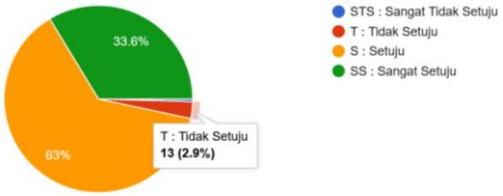

Fig. 2 Teacher's responses toward the necessity of collaboration in digital learning

Fig. 2 above shows that a small number of teachers are not sure and pay less attention to learning strategies that require collaborative thinking (2.9%). They admitted that they were comfortable carrying out learning with lectures because they can have direct dialogue with students and considered that the students were comfortable with the method.

Fig. 3 below shows the difference in the responses of male and female teachers in responding to the use of mobile phones. The teachers have different views about the use of mobile phones by students when learning in class. The percentage of teachers allowing the students to use mobile phones and those who forbid are almost the same (47.1% of teachers agree that students can use mobile phones during learning), but 40.4% of teachers disagree and 6.1% of teachers are strongly disagree. This means that in general, the teacher forbids students from using mobile phones during learning in the classroom. The teachers allowing the students to use mobile phones during learning in the classroom are aware that the students use mobile phones during learning in the classroom to search for other references on the internet. Meanwhile, those prohibiting and making school rules to prohibit the use of mobile phones during learning in the classroom are concerned that the students may play games and use WhatsApp to chat with other students, so that they could not focus on the subject taught.

The following are the survey results on teacher perception of the use of students' mobile phones during learning in the classroom.

Fig. 3 Teachers' responses toward the use of mobile phones during learning in the classroom.

Fig. 3 above illustrates an interesting point, why do teachers have different views on the use of mobile phones in the classroom? The reason for each teacher seems logical, both have different logic. No less important, the percentage of those who strongly agree and those who strongly disagree are almost the same, 6.1%. This means that the current trend of cultural change in society was not well disseminated, especially in the context of the importance of the demands of 21st century education. The contextualization of information technology products into the learning process has not been fully utilized as tools and learning resources for teachers in schools. Moreover, students have not been motivated to utilization of technology for the benefit of increasing their literacy related to the subject matter. Here, the teacher's role has not been able to connect between the changing culture of the community and the teaching materials delivered in the classroom. It eventually becomes a separate problem, this is the current problem happening in the digital era. On one hand, the use of mobile phones is necessary to search for references assigned by the teachers to students, on the other hand, the teacher forbids using mobile phones during learning for the reason that they are worried that the students may not concentrate on the subject and so on.

Figure 4 below shows that middle school teachers in West Java are more likely to use internet-based learning applications to facilitate students in understanding the concepts. On occasion, teachers asked students to find information on the internet to check the correctness of the information. The teachers thought that learning resources were varied, and information in society, especially about the nature of science is used as a learning resource for students. More than 86% of teachers are able to use the internet in learning. Moreover, the teachers are fully aware to search for various alternatives in learning that lead to the goal of science as a product by using websites through the google search engine.

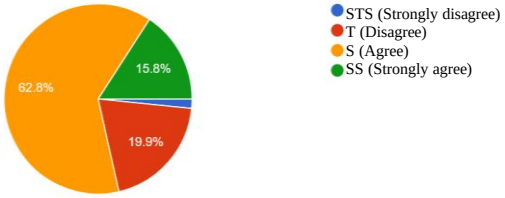

Fig. 4 Teachers' Response Toward Utilizing Various Learning Applications

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 261-273
p-ISSN: 2477-5924 e-ISSN: 2477-8478

Figure 4 above shows that 19.9% out of 441 teachers refuse to use the application, meaning that the teachers' mindset is not evenly distributed about the use of social media, materials in accordance with the changing trends of community and the diverse literacy needs of students in the future. The teachers' mindset is also not evenly distributed massively about learning resources, they think that books are the primary learning resources, other sources are considered additional. In fact, there are many variations of learning resources, including changes in the socio-cultural community and the potential of local wisdom.

Fig. 5 below shows that 98% of teachers are learning and are likely to carry out learning to support the demands of the 21st century, but they have difficulties to assoiate community culture, local wisdom potential and student literacy integrated into learning models. Eventually, some teachers have no motivation to carry out the learning process using new learning models such as STEM-Integrated Project Based Learning because they can use the potential of local wisdom as a learning resource, the following data are related to teacher motivation to use learning models;

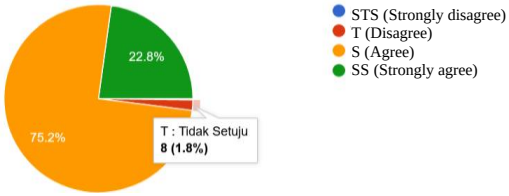

Fig. 5 Teachers' Responses Toward Utilizing Various Learning Models

In general, teachers think that STEM-integrated Project Based Learning model can enhance students' critical thinking, particularly in relation to the development of community culture and the potential of local wisdom. Some teachers ensure that the learning model which largely determines the teachers' success in integrating cultural change, the potential of local wisdom, and increasing literacy can be implemented in science learning.

Fig. 6 below shows that the teachers get creative to call their fellow teachers to always respond to the development of information technology because it has become the community culture around the school and has been included in the learning at school. However, the teachers find it difficult to respond to community culture to be used as a source of student learning. The teachers find it difficult to associate community culture directly into classroom learning. The following is data related to the difficulty of associating cultural change material and the potential of local wisdom to be a source of student learning. In general, the teachers carry out the learning process according to their field of expertise, namely the target of mastering essential concepts. The teachers have gained a lot of insight due to the COVID-19 pandemic as they had to understand and be able to carry out digital learning.

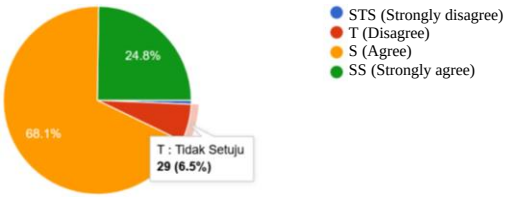

Fig. 6 Teachers' Responses Toward Utilizing Local Wisdom in Learning

Fig. 7 below shows the teachers' response toward the needs of high-level thinking students (critical thinking, creative and innovative thinking), increasing literacy and scientific attitudes according to the philosophy of 21st century education, which has not been carried out massively. The teachers are aware that in general, the learning process has not met the target of the 21st century education demands, namely to train students to think at a higher level. The teachers are also aware that in general, the learning process has not reached the target of training students to think innovatively. The teachers rarely carry out the learning process using the potential of local wisdom, in general, the learning process is less oriented towards increasing literacy due to limited access to information. In general, the difficulty of teachers is indicated by the answer that they disagree if learning is oriented to the demands of 21st century education and associates to the trend of cultural change, the potential of local wisdom and increasing student literacy.

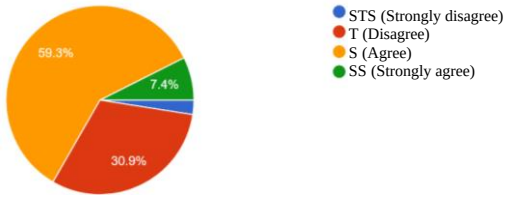

Fig. 7 Teachers' Responses Toward Students' Higher-Level Thinking Needs in Learning

On the one hand, when the teachers were asked about online learning, 97.8% of teachers stated that they are able and accustomed to carrying out online learning. However, 2.2% of teachers stated that they are unable and not interested to carry out online learning. Therefore, some teachers have not been able to adapt to the learning process more freely and widely through online methods by using various learning resources on the internet such as videos, youtube, e-books, blogs, and using various learning applications, especially natural science according to the material to be taught in the classroom.

Fig. 8 below shows that in general, the teachers have the right mindset that scientific literacy, thinking skills, engineering skills and scientific attitudes are the demands of 21st century education. Therefore, teachers prefer existing community cultural trends and local wisdom within the school environment to be used as a learning source. They stated that community culture and the potential of local wisdom are learning sources and media for improving student literacy as the basic values of students' lives in the future. Most teachers have the mindset that community culture and the potential of

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 261-273
p-ISSN: 2477-5924 e-ISSN: 2477-8478

local wisdom are a learning source and media for increasing spirituality, motivation, nationalism, and human character values, despite non-optimal teachers' ability in utilizing the trend of social change, the potential for local wisdom and literacy enhancement. The following Fig. 1.8 shows the survey results related to this matter;

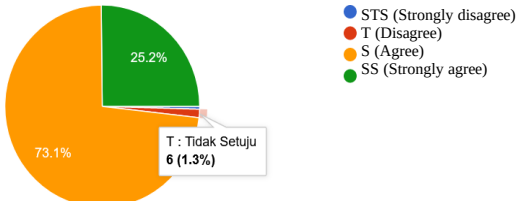

Fig. 8 Teachers' Responses Toward the Utilization of Applications in Learning

Teachers' Responses in Linking Learning to the Demand of 21st Century Education By Working Period

In general, based on age and working period, it shows that the teachers have almost the same philosophical perspective in responding to the demands of 21st century education. Differences arise from technical aspects related to digital literacy. Senior teachers have lower digital literacy skills than teachers with a working period of less than 5 years. Thus, the technical problem becomes an obstacle for senior teachers, namely the ability to use digital technology. Digital literacy and technological transformation literacy need to adapt to the features on the monitor screen and mobile phones. Due to this obstacle, senior teachers with a working period of more than 20 years answered that they disagree with online learning by utilizing cultural trends, local potential, higher-order thinking skills, literacy enhancement and enhancement of students' digital engineering skills. The speed of response is indeed an existing problem for senior teachers in schools. Senior teachers have the advantage of having a high awareness of the Merdeka Belajar (Freedom to Learn) paradigm because it can support the mental growth of students about independence and various intelligences that have not been growing well at school. Fig. 9 shows the effect of teachers' working period on the demands of 21st century education as follows;

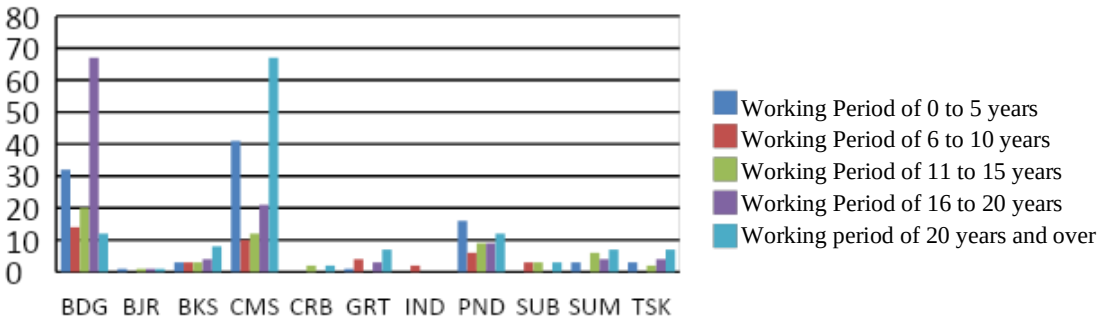

Fig 9. The effect of teachers' working period on the demands of 21st century education

Based on fig. 9 above, it shows that age and working period do not characterize striking differences in the level of responsiveness to the demands of 21st century education, meaning that senior teachers are likely to be less responsive to cultural changes. This is due to digitizing information, not the mindset of senior teachers on cultural change, local potential and low student literacy. The data can be interpreted that all teachers have the potential to respond to conditions, namely cultural changes, local potential and the demands of enhancement of students' digital literacy.

Teachers' Responses in Linking Learning with the Demand of 21st Century Education By Gender.

In general, teachers in West Java by gender have different responses to the demands of 21st century education. Fig. 10 below shows the data recapitulation on teacher responses;

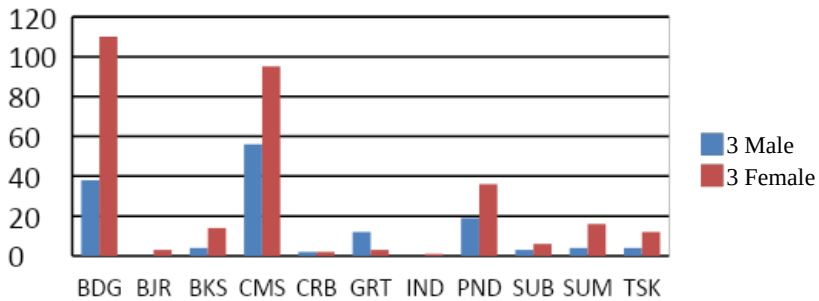

Fig 10. Recapitulation of Teacher Response by Gender in Each Regency/Municipality in West Java

Journal of Education, Teaching, and Learning
Volume 8 Number 2 September 2023. Page 261-273
p-ISSN: 2477-5924 e-ISSN: 2477-8478

Based on fig. 10 above, it shows that gender affects the level of responsiveness to the demands of 21st century education, meaning that female teachers are more likely to respect the developing community socio-cultural conditions which demand teachers and students to change their mindset to further improve literacy according to the demands of community cultural change.

Differences in Activities in Using Social Media By Gender

In general, based on gender, teachers have different behaviors in using social media (digitally). Female teachers more often use social media than male teachers in learning, such as using the internet via (WhatsApp, Instagram, Blog, Telegram, and email), including using various digital learning applications. Information on media and learning resources through YouTube (various learning videos), virtual practicum, and conducting activities on social media in the learning process. Communication with students and parents about the condition of students, discussions through WhatsApp groups, case studies and tutoring through social media networks and so on. The following is the data recapitulation on teacher responses to social media activities;

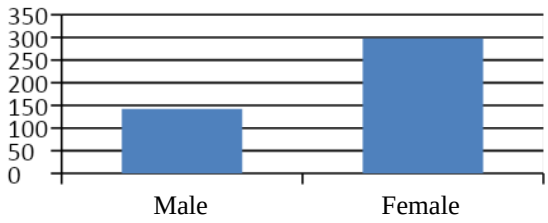

Fig. 11 The Effect of Teacher's Gender on Social Media Activities in Each Regency/Municipality in West Java

Based on fig. 11 above, it shows that male and female teachers have different activities in using social media. Female teachers use social media more frequently and use more applications, they use various social media platforms in learning to find references, to search for examples, to search for assignments for students, including providing special guidance through WhatsApp and Instagram. On occasion, teachers use e-mail to give assignments that require longer descriptions and answers from the students' activities. It was possible that the data was the result of online learning during the recent COVID-19 pandemic. Female and male teachers have the same function and regulations. However, the data at least shows the current situation why do female teachers have more frequent online activities than that of male teachers?

Analysis of Student Needs

Fig. 12 below is of considerable interest because in the current Merdeka Belajar (Freedom to Learn) school ecosystem, community literacy has significantly developed compared to ten (10) years ago. Today's community is able to analyze the needs of their children in education. The survey results show that in general, parents and students have a courage to express the need for the current dimension of education. They conduct an analysis of the school condition. The emergence of public response to the educational process is caused by the increasing information literacy of the community in the field of education on social media. Information about education, including the Merdeka Belajar (Freedom to Learn) program, is easily accessible on social media. This is indicated by the development of community culture and literacy enhancement of the community and students. Therefore, schools and teachers are required to improve the various dimensions needed by the community. The following are the analysis results of the needs of students and parents in the fields that are considered to be the dimensions of success for students in the learning process at school;

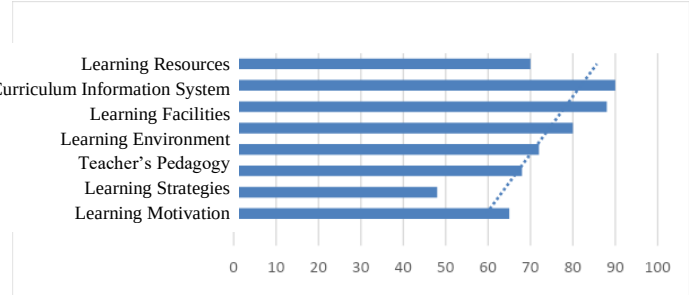

Fig. 12 Student Needs Rating

Based on fig. 12 above, it shows that parents, teachers, and students state at least seven keywords on their needs, although some keywords are "similar" in scope and field (Ali Nurdin, 2022). Parents and students state the terms learning resources, learning environment, learning media, another keyword is curriculum information system. Parents expect that teachers understand about learning facilities and their functions, teacher pedagogy, learning strategies, and learning motivation. Of the seven key dimensions of the needs of parents and students, the most dominant keywords are curriculum information system, learning facilities, learning environment, learning resources and teacher pedagogy. Then, the least dominant keyword is learning media, parents may not worry about learning media because in the digital cultured school ecosystem, learning media has spread easily on social media through YouTube and other platforms.

Discussion

Map of Middle School Teachers' Ability to Respond to Changes in Community Culture Trends, Potential Local Wisdom, and Enhancement of Students' Literacy

Teachers as the spearhead of the development of the education ecosystem in schools, such as science culture, learning culture, work culture, achievement culture, academic culture, including digital culture and other cultures that can be established and developed in schools, have their own appeal. The appeal exists when the current teachers are encouraged to function as teacher mover, as in Merdeka Belajar (Freedom to Learn) program. Merdeka Belajar (Freedom to Learn) program through the role of the teacher mover is a strategic

program to change the community mindset on a more dynamic, creative, collaborative, critical, polite and innovative education, in accordance with the character of Pancasila student profile. The study results reveal that in terms of ability, middle school teachers were aware to continue to provide "correct" cognitive intake to students. The teachers were aware that in order for the mindset and skills of students to be in accordance with the philosophy of 21st century education, they must be given early on, including critical, creative, and innovative thinking which is an important part of education.

The teachers' awareness can be seen from a high percentage, namely strongly agree (26.2%) and agree (71.3%) or a total of 97.5% of the teachers thought that they have to carry out the learning process in accordance with the demands of 21st century education. This means that in relation to the recognition (knowledge), already have insight, ability, skills and self-capacity middle school teachers already has insight of 21st century learners, although not yet massively (Bardach & Klassen, 2020), (Yusrizal & Fatmawati, 2020), (Riyan Rizaldi et al., 2021), (Lytzerinou & Iordanou, 2020), (Suwija et al., 2022), and (Kong, 2020). The teachers were aware of the disruption of culture and thinking due to the acceleration of cultural change in the community. Cultural changes resulted in the potential of local wisdom around the school to also change, as a result the literacy of students needed to increase. This phenomenon is a problembecause it may result in the change of educational ecosystem (Lubis, 2018). Therefore, the results of this study can be used as material to strengthen the key role of teacher mover in the Merdeka Belajar (Freedom to Learn) program.

The study finding reveals that most middle school teachers have carried out learning according to the needs of students. Through social medi, the teachers know and understand that there is a change in community culture and an increase in the students' literacy (Jumriani et al., 2021), (Sumartias et al., 2020), and (Umamah et al., 2021). Thus, the teachers may find it necessary to increase insight and teaching skills according to the 21st century education, as well as carry out traditional and digital learning. The process of teachers' literacy enhancement through training is needed so that the digital learning process can be carried out smoothly (Hayatin, 2019). The students were aware that they need motivation, appropriate media, strategies in learning, teacher teaching skills (pedagogics), a conducive environment and learning facilities that meet standards. This means that currently, from the students' point of view, the demands are in accordance with national education standards (Wahidin, 2019). Due to the availability of information on social media, there is an internalization of concepts and values that exist in society and including government regulations/policies that can be read at any time by both the community and students (Nurpratiwiningsih et al., 2023), (Rohmadi, 2021), and (Jumriani et al., 2021).

In addition, the learning process carried out by teachers is in the form of integrated learning by disseminating renewable technology products through various online applications or those that have been prepared and available on Android or laptops with materials according to their basic competencies (KD). Teachers continue to accelerate in learning, this is also encouraged by the role of teacher mover in the Merdeka Belajar (Freedom to Learn) program. Currently, the needs of teachers are to increase information literacy, scientific literacy, cultural literacy, potential literacy of local wisdom, literacy of thinking skills, psychological literacy of students, literacy of educational ecosystems and Indonesian character. This includes insight into the trend of social change and the potential of local wisdom which is significant because teachers have thoughts that are in accordance with the trend of social change and the potential of local wisdom (Amri et al., 2021). Social change in the community with the spread of information technology and equipment (tools)/hardware continues to innovate, cultural change accelerates and is difficult to control, it greatly affects the mindset of students and society in general.

The study finding indicated that middle school students already know their needs to carry out the learning process. The study finding indicated that the least important need was learning media. This means that students were able to find their own learning media that suits their needs to understand the concepts taught by the teacher. Learning media can be obtained from the internet and can be searched through the google search engine. However, students feel the need for appropriate learning facilities, the facilities here do not mean merely physical, it can be facilities in the form of mentoring services provided by the teacher to students. Various forms of services provided by teachers to students to facilitate students to learn are forms of necessary facilities. Another service is coaching and mentoring, because students have not been able to make decisions in many ways, especially the truth of concepts, problem solving, and decision-making. In this context, teachers need to provide facilities in the form of mentoring and coaching services that may be carried out outside of learning hours.

Seeing from the aspect of the student's needs in learning, the teacher's ability to meet the current needs of students has become part of the obligation, because it is clear that teachers do not only teach in the classroom to transform knowledge, but students demand many aspects. Thus, the concept of collaborative learning cannot be disregarded. Learning concept is collaborated with the development of community culture and existing local wisdom, such as using a problem-based learning model to develop problem-solving skills. Thus, currently, learning with the lecture methods in the classroom is no longer relevant, and the discussion is carried out to provide directions, road maps, joint discussions, problem-solving, and evaluation of programs that have been designed jointly between teachers and students.

The study finding indicated that on the map of the ability of middle school teachers in West Java, a small number of teachers (2.9%) did not pay attention to learning strategies with an orientation to the demands of 21st century education, such as demanding collaborative thinking, higher-order thinking and so on. The percentage is relatively small, but considering that the cultural conditions of society have changed, 21st century education-oriented learning is a necessity. Currently, no one should have thought that training

students to have higher-order thinking is a must, it is no longer a debate because the educational and cultural ecosystem of the community has long changed, so that the great values should not all become extinct. In fact, if the individual is not able to have such competence, then the individual will be left behind and clearly cannot be adaptive, let alone be competitive. Some middle school teachers in West Java admitted that they are still comfortable with learning with the lecture method because they can engage in a direct dialogue with students and consider that students are comfortable with such a method. The teacher's thinking may not have received a resonance from the transformational teacher, or information literacy and activities using social media have not been effective. Most middle school teachers in West Java have the mindset of 21st century education, but its implementation remains unclear. Therefore, the touch of information technology in the form of learning, social engineering such as building an educational ecosystem, building a school mover community, and the existence of social organization activities to create productive and efficient schools with community collaboration constitute social engineering that can form the teachers' habits and eventually form a cultural pattern that clearly characterizes the character of the digital age society.

In relation to the use of mobile phones, in general, middle school teachers in West Java forbid students from using mobile phones during learning in the classroom. The teachers allowing students to use mobile phones during learning in the classroom believe that the students can use mobile phones to search for other references on the internet. Meanwhile, those prohibiting and making school rules to prohibit the use of mobile phones during learning in the classroom are worried that the students may play games and use WhatsApp to chat with fellow students so that they can not concentrate on the learning.

The transformation of the formation of community cultural patterns starts from habits built from personal behavior resulting from attitudes formed due to personal thoughts, perceptions and beliefs. The three variables, namely belief, perception and thought, form attitude, behavior and habit that are simultaneously affected by information systems technology and social engineering connstructed in the community. Three variables, namely belief, perception and thought as well as behavior and habits are the temporary domain of change. Furthermore, scientifically, all these changes may be permanent in nature, if they have formed a cultural pattern of thought, perception and belief (Wahidin, 2022). The description is in line with the results of this study indicating that the ability of middle school teachers in responding to trends in social-cultural changes, the potential of local wisdom, and student literacy enhancement is determined by thought, perception and belief.

The results indicated that the contextualization of information technology products into the learning process has not been fully utilized as tools and learning resources for teachers in schools. The results indicated that teachers thought that learning resources were varied, rapidly expanding information in the community, especially about the nature of science was used as a learning resource for students. This is in accordance with the view that this fact is closely related to the teacher's frame of mind to building the mindset of students from an early age through the learning process at school (Wahidin, 2022). The learning process at school does not depend on the kinds of subject, such as science, social, language, history and others, it can use social interaction models in the classroom. Social interactions can be designed and set into social engineering. Social interactions between teachers and students vary, including when a teacher asks students to find information from the internet for the purpose of checking the truth of the information. It is not a "disgrace" that the teacher seems to not have the ability, but such a learning process includes the teacher's ability to carry out social engineering which has positive values because it can be regarded as learning together. The teacher trains students to search for references through websites and the results may be discussed together. This activity is very different from the teacher asking students to take a note in the classroom or giving assignments without control and no shared learning process.

The results of the study indicated that middle school teachers in West Java have massively unequal distribution of mindset about learning resources, they thought that books were the only learning resource. In fact, there were many variations of learning resources, including changes in the socio-cultural community and the potential of local wisdom. Learning resources in the current era of the educational ecosystem can be formed by teachers through media that may include; e-books, e-journals, YouTube, learning videos, virtual lab programs, WhatsApp group, Instagram, telegram, various learning applications, learning websites, and so on. The view that the information system and technology are 'the commander in chief' in various matters, including in learning at school, needs to be taken positively to improve student literacy. The media to use are all local potentials available around the school (Pesurnay, 2018). If this is not available, local wisdom is taken virtually through the internet. Students search for a theme or topic in the google search engine related to local wisdom that is not physically available around the school. The materials found on the internet were discussed by teachers and students.

The results indicated that middle school teachers in West Java had resonated with the trend of cultural change as a result of the transformation of information and technology. The *guru penggerak* (teacher mover) program in Merdeka Belajar (Freedom to Learn) has been implemented in accordance with the survey data indicating that "they have creative responses to call fellow teachers to always respond to the development of information technology because it has become the community culture around the school and has been included into learning at school". However, on the other hand, teachers had difficulty responding to community culture to be used as a source of student learning. This means that the teachers are willing to adapt to the community need (student needs) according to the demands of 21st century education, but the teachers' skills need to be improved. The results of this study also indicated that teachers with longer working periods do not show more creativity in adapting to community cultural

trends to improve student literacy. Thus, social engineering for internal middle school teachers in West Java is needed to improve learning skills oriented to community culture and local potential to improve student literacy (Cayarini et al., 2022).

Based on the explanation above, the student literacy needs are not only scientific literacy, social literacy, information literacy, and so on, but more importantly, students have literacy about themselves as humans (individuals) and as citizens of society (Rosmalah, 2021). Collaborative learning involves concepts according to subject areas, information technology, community values (social values), existing local cultural values, spiritual values, and other values to strengthen itself and adapt (Wahidin, 2015). The learning process is oriented towards thinking skills enhancement, especially higher-order thinking skills.

The results of this study indicated that to overcome the teachers' difficulty to integrate the concept of subjects with community culture and the potential of local wisdom as a learning source, it is necessary to improve literacy patterns for teachers and students in increasing literacy according to the demands of 21st Century Education. The materials can be used as a reference for improving the literacy of teachers and students regarding human beings as individuals. According to (Wahidin, 2015), physically, humans have body shape, facial expression, skin color, hair color, beautiful or handsome, tall, slender, fat, thin, slim, and various personal predicates, while non-physical characters concern patterns of education, thinking, acting, behaving, socializing, being religious, responding, communicating/associating, appearance, knowledge, humanity, and feeling (Cline & Necochea, 1996). This solution is needed considering that the map of middle school teachers' ability in West Java is the ability to respond to the needs of higher-order thinking students (critical thinking, creative and innovative), as well as literacy enhancement and scientific attitudes according to the philosophy of 21st century education, which has not been carried out massively. The teachers were also aware that in general, the learning process has not yet reached the target of training students to think innovatively. The teachers rarely carried out the learning process using the potential of local wisdom. The teachers were also aware that in general, the learning process has not met the target of literacy enhancement due to limited access to information.

In addition to the literacy solutions above, some teachers have not been able to adapt to the learning process using videos, youtube, e-books, and various science learning-related applications according to the materials taught in the classroom. In general, the teachers have the correct mindset that scientific literacy, thinking skills, engineering skills and scientific attitudes are the demands of 21st century education (Dini Nurbayani, 2022). Most teachers have the mindset that community culture and the potential of local wisdom are part of their use as a source and media for increasing spirituality, motivation, nationalism, and human character values. Despite non-optimal teachers' ability to the trend of social change, the potential of local wisdom and literacy enhancement, their motivation and willingness to respond to change are quite responsive.

Teacher Responses to the Demands of 21st Century Education By Working Period

An interesting finding in the study of teacher responses to the demands of 21st century education was the tendency of teachers who have long been less responsive to social change, considering that the speed of mastering digital literacy was slow compared to the millennial community. However, it does not mean that academic ability, social interaction ability, and readiness to carry out the learning process are directly correlated with the slowness of response to digital literacy (Hartelt et al., 2022), (Frondozo et al., 2022), (Monson et al., 2020), (Jeschke et al., 2021), (Widana et al., 2023), and (Beardsley et al., 2021). This gap may take a considerable time, if it is not resolved by "social engineering" specifically for teachers who have been working for a long time. The synergy of young teachers classified as millennials with non-Millenial teachers is needed. This form of synergy is a program to accelerate the mastery of introduction to technical/practical digital literacy.

As a teacher, the age factor is natural. It is normal to forget the concept and have difficulty incorporating the concept. Thus, the program to accelerate the introduction of information features digitally needs to be simplified. This gap has to be carried out considering that teacher resources to shift quickly to millennials cannot yet be carried out because millennials do not have sufficient insight into the content and are not mentally prepared to prepare future resources. This is an interesting problem experienced in schools, especially at middle school level in West Java. The 'hiatus' condition is due to the rapid generational shift from conventional to digital, so that schools have not been able to prepare reliable human resources from millennials. This must be answered because changing the mindset of students to become more literate according to the demands of changing community culture is more important for the future of the nation at a macro level. The views of middle school teachers in West Java about community social change associated with local potential or in virtual world networks (on the internet) to improve student literacy are lacking for those who are older, there is nothing wrong because that is the reality.

Teachers' Responses to 21st Century Education Orientation and Activities Using Social Media By Gender

Male and female middle school teachers in West Java have different tendencies in terms of activity using applications and social media for learning purposes such as WhatsApp, Instagram, Telegram, and Blogs. It can be said that female teachers are easier to carry out social engineering in learning using social media and collaboration with students and parents in learning. The success and suitability of achieving 21st century education targets will be easier to program than male teachers. Female teachers have more respect and preference for the socio-cultural conditions of a developing community which requires teachers and students to change their mindset to further improve literacy according to the demands of

changing community culture. Female teachers are more creative and are willing to try applications as well as easier to communicate with students than male teachers. Female teachers are more often and use more types of media. Social media platform variations in learning are used to search for references, examples, and assignments for students, including to carry out special guidance through the use of WhatsApp and Instagram.

Map of Teachers' Ability to Respond to Student Needs

Currently, the transformation of information is developing among the community. The results of the study of master program students indicated that the community (parents of students) understands the needs of schools and students. Schools must provide at least 7 keywords to support success according to the demands of 21st century education (Ali, 2022). A new culture has grown in the community, namely digital culture, because they gained the benefits of being able to access what is needed, including the needs of students to learn. This fact adds new demands for teachers. Currently, teachers must be able to analyze the needs of students. Students need facilities for easy access to information, procedures for accessing information, and choosing how to access information as expected by students. The new culture, called digital culture, which has just been developed in schools, is part of the map of the teaches' ability to respond to social and cultural changes in the community. Currently, the development of community culture and digital literacy enhancement in the community are far more advanced. Teachers must improve various dimensions needed by the community, especially students. The results of the study indicated that parents and students stated at least seven (7) main keywords that they refer to as learning needs, despite "similar" scope and fields in the keywords. Parents and students stated the terms; learning resources, learning environment, learning media. Another keyword was curriculum information system. Parents require that teachers must understand learning facilities, teacher pedagogy, learning strategies, and learning motivation and strategies, and procedures to perform tests to measure student success.

Of the seven keyword dimensions of the needs of parents and students, the most dominant dimensions are curriculum information systems, learning facilities, learning environment, learning resources and teacher pedagogy. Then, the least dominant dimension was learning media. This indicated that the community and students were no longer worried about learning media. Students and parents believed that there are many learning media spreading in social media, including WhatsApp, Instagram, Email, Telegram, Blog, YouTube, learning videos, virtual labs, e-books, e-journals and many more commonly used by millennial students. However, the serious problem is how to measure student success in the digital era so that the learning process really has meaning (Gibson, 2001). Thus, the teachers have actually been accustomed to using social media platforms.

IV. Conclusion

The level of teacher ability to respond to changes in community culture, local potential and community literacy enhancement might produce a digital culture of students. The ability of middle school teachers in West Java to respond to trends in socio-cultural changes in the community differred by gender, but there was no difference in terms of age and working period. Female teachers were more active and creative in using various social media applications than male teachers. In general, teachers were less creative in using social media, trends in community culture change and the potential for local wisdom to enhance student literacy. For teachers whose working period is over 20 years, they found difficulty in using social media as digital learning tools. All teachers were aware that the demands of 21st century education must be implemented, but the skills and supporting tools for acceleration in the form of social media and digital learning have not been possessed massively. There was a dilemmatic gap between the demands of 21st century education and the low fulfillment of the dimensions of the student needs. This situation can hinder the growth and development of digital culture of students in schools. There needs to be a policy strategy from the school's external parties (the Government) and internal schools to support the handling of educational ecosystem gap issue as a result of changes in community culture, potential of local wisdom and demands for literacy enhancement. The second strategy was to reduce the gap in teacher skills between generations and the school ecosystem from the manual era to the digital era, a "connection" program for the transformation of school information technology is needed. In the learning process implementation, it is recommended that teachers make social change and local potential as a source of learning.

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