

Readiness of High School Biology Teachers in West Sumatera in The Face of Learning in the Era of 4.0 Industrial Revolution in Aspects of Collaborative Skills

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Abstract – This research aims to describe the readiness of high school biology teachers in West Sumatera in the study of learning in the era of the industrial revolution 4.0 on aspects of collaborative skills. The research method uses *i* method by combining quantitative and qualitative research methods. Quantitative data is obtained with questionnaires and qualitative data is obtained through the interview process. Data analysis is performed using descriptive analysis techniques. The results showed that the biology teachers of SMA Negeri in West Sumatera belong to the category very well prepared with an average value of 4.24 on the overall aspect of collaboration. Communication aspects have the highest contribution with the value of 4.54 and the ICT use aspect for collaboration has the lowest contribution to the value of readiness of high school biology teacher in West Sumatera.

Keywords – Industrial Revolution 4.0, Collaboration, Readiness, Biology Teachers.

I. INTRODUCTION

The Industrial Revolution 4.0 is a concept of change that refers to the rapid development of technology. According to Muhali (2018:1), the Industrial Revolution of 4.0 is a concept of educational, gender, work, and mental development through the use of technology. Many of the benefits that will be gained from the Industrial Revolution 4.0 as stated by Prasetyo (2018:2), that the potential benefits of the industry is the improvement of speed-flexibility of production, improvement of services to customers, and increased benefits and positive impact on the economy of a country. However, there are five challenges that will be faced by aspects of knowledge, technology, economics, social, and politics (Zhou, 2015:4).

The challenge must be faced with a variety of preparatory efforts. The preparation that can be done is to improve the quality of human resources in utilizing ICT, optimizing the ability of learners, develop the values (characters) of students, as well as preparing the means of digital-based learning Infrastructure (Syamsuar, 2019:1). The results of the research of Yuara (2019:7) state that teacher readiness faced the challenge of the 4.0 industrial revolution is heavily influenced by critical thinking skills, communication, collaboration, creativity and innovation.

Collaborative skills are a key element needed in the 21st century (OECD,). Collaborations help one to understand how to solve the problem, decide on the best action and teach that everyone always has a different opinion (Erdogan, 2019:10).

Collaborating can also improve competence (e.g., conflict resolution skills and the use of helpful behaviors) and concepts (Ginsburg, 2006:5). When executed properly, collaborations allow groups to make better decisions than one individual, as it allows for consideration of some perspectives.

Collaboration has the meaning of working together effectively and showing respect to the diverse team members, training the smoothness, and willingness to make the necessary decisions to achieve a common goal (Greenstein, 2012:105). Roekel (2010:19) stated that fifty years ago, a lot of work was done by individuals working alone, but today much of all the significant work is accomplished in the team. The opinion is in line with Redhana (2019:2), that superior products cannot be produced by one person, but rather produced through the collaboration of many Parties.

The results of the research of Wijaya (2016:14) said collaboration is needed in the face of the 21st century by 78.79%. The high percentage value indicates that collaboration needs to be optimally applied in the learning process. The results showed that the implementation of collaboration in the learning process could improve learning outcomes, the enjoyment of subject matter, self-esteem, and diversity inclusivity (CCR, 2015:9-10). This shows that collaboration needs to be carried out optimally in the learning process by teachers.

Teachers are figures who play a role in guiding, educating, and directing learners in the learning process. Teachers strongly determine the outcomes and outputs that the school produces, because teachers are tasked with planning learning, running plans, and assessing the learning that has been done (Baker, 2005:2). The teacher's role, when done well, can improve students' collaborative skills in order to face challenges in the era of the 4.0 Industrial Revolution.

The explanation above shows that collaboration and teachers play an important role in improving learning outcomes. However, the fact that the students' learning outcomes in West Sumatera province is still relatively low on biological subjects. This is proven by the achievement of the average value of the student biology of students, 52.58 from 19 districts/cities. The highest value earned is only 69.37 and the lowest of the 52.58.

The study of Foration conducted on several biological teachers in West Sumatera showed that the implementation of collaboration in schools is still not maximal. Teachers have

not performed collaborations with other teachers in school because of time constraints. In addition, during the learning process, student collaborations are also not optimal because in groups only a few people are actively releasing their ideas. Others do not contribute through their ideas. Based on this, research conducted the readiness of high school biology teachers in West Sumatera in the face of learning in Sera Industry Revolution 4.0 on aspects of collaboration skills.

II. METHODOLOGY

This research is a descriptive study using *mixed* methods combination. Sugiyono, (2013:19) said that combination research methods combine between quantitative and qualitative research methods to be used jointly in a research activity.

The population in this study is all of the biology teachers of SMA Negeri in West Sumatera. Sampling was carried out using the *Stratified Cluster Random Sampling* Technique by determining the number of samples using the Slovin formula so that a sample of 80 biological teachers was obtained.

Primary Data is obtained through kesioner and interviews. The Development of the questionnaire began by formulating indicators and selling them in the form of statements. The scale used in this questionnaire is the Likert scale. The Kesioner used are valid and reliable.

The teacher's readiness will be classified into five modified categories of purwanto (2010:103) as follows.

Table 1. Teacher Readiness Category

Range of values	Category
4.20-5.00	Very prepared
3.40-4.19	Ready
2.60-3.39	Simply ready
1.80-2.59	Less ready
1.00-1.79	Very unprepared

III. RESULTS AND DISCUSSION

1. Result

The study used a questionnaire that consisted of 30 statements. Here is the distribution diagram of the value of each statement on eight aspects of collaboration.

Out of the 30 statements, it obtained the value of readiness of high school biology teachers in West Sumatera in the face of learning in the era of the 4.0 industrial Revolution on each aspect of collaborative skills, as follows.

Diagram 1. Distribution value of each statement

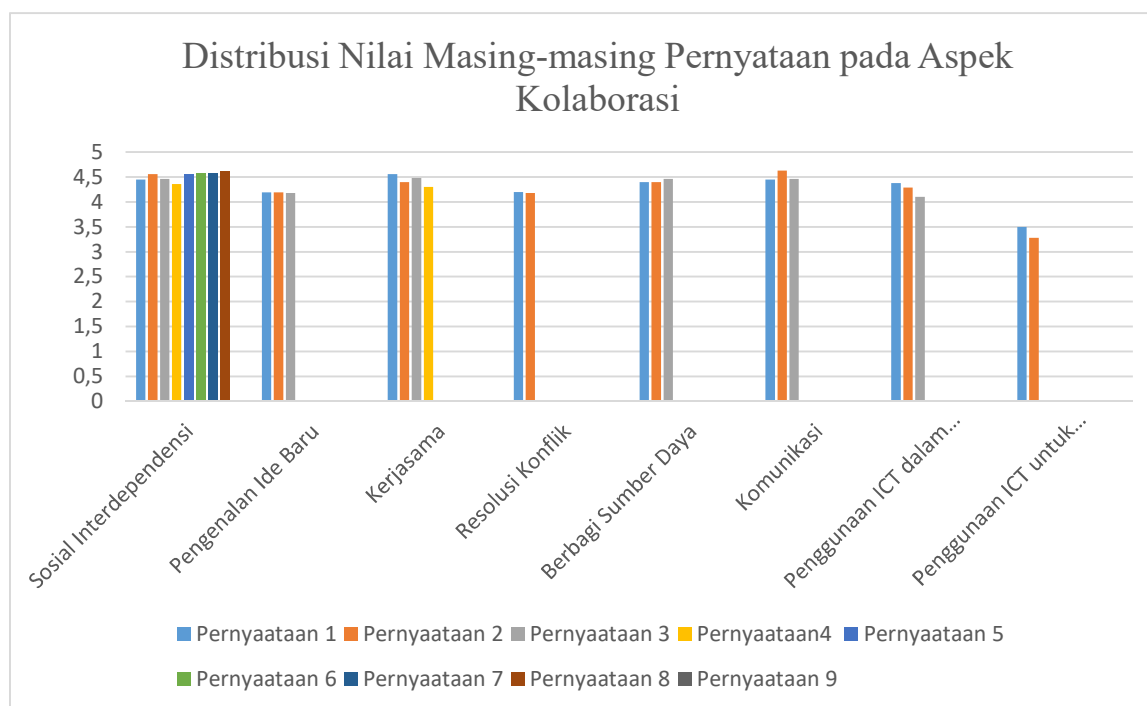


Table 1. The readiness of the West Sumatran high school biology teachers to each aspect of collaboration

No	Aspects of collaboration	Value	Readiness Category
1.	Social interdependencies	4.51	Very ready
2.	Introduction to new ideas	4.18	Ready
3.	Cooperation/Assignment Division	4.43	Very ready
4.	Conflict resolution	4.19	Ready
5.	Resource sharing	4.42	Very ready
6.	Communication	4.54	Very ready
7.	ICT Use in learning	4.25	Very ready
8.	Use of ICT for collaboration	3.39	Simply ready
Amount		33.91	Very ready
Average		4.24	

2. Discussion

Based on the data above, the readiness of high school biology teachers in West Sumatera in the face of learning in the era of Industrial Revolution 4.0 on the aspect of collaboration, is very prepared with the value of 4.24. Aspects of communication become aspects that have the greatest contribution to the readiness of biological teachers with a value of 4.54. This is because communication acts to bring implicit thinking into explicit explanation in conducting collaborations (Child, 2016:2). The High value of

communication gained positive effect on the success of collaboration (Raflis, 2015:1). So that communication became the key to the success of collaboration in education.

The aspect that has the least contribution to the readiness of biological teachers from the collaboration side is the use of ICT for collaboration with the value of 3.39. The value belongs to the category quite ready. This is because teachers have not yet utilized technology to collaborate with others. Rather, teachers only utilize technology to communicate.

The following will be discussed on the readiness of high school biology teachers in West Sumatera in the face of the 4.0 industrial Revolution in the collaboration skills by describing each aspect of collaboration.

a. Communication

Communication is an aspect that has the greatest contribution to collaboration with the value of 4.54. The high value provides a positive effect on the success of collaboration (Rafli, 2015:1). There are three statements related to the communication aspects of collaborating. The teacher's statement communicates well with the learners to have the highest score with a value of 4.63. This is because the teacher is communicating while delivering the lesson material and motivation to the learners (Pontoh, 2013:7). Teachers also often conduct interpersonal communication to improve learners' knowledge because they are considered more precise and effective (Pontoh, 2013:9).

The second value of 4.54 is derived from the teacher's statement of good communication with the teacher. This indicates that the interpersonal communication of teachers with other teachers is good. According to the research results Puti (2015:4-6) that the interpersonal communication conducted by the teacher is good. The smallest value of 4.46 is derived from the teacher's statement having the ability to convey opinion well. The ability of teachers to convey their opinions well still needs to be improved using language understandable to students when conveying material (Malik, 2014:4).

b. Social Interdependencies

Social interdependencies referred to in collaboration are positive interdependence. Child (2016:2) expresses positive interdependence occurs when a person's goal can be achieved if another person in the team reaches their destination as well. A positive interdependence connects team members together and they convince that drowning or swimming together (Laal, 2013:2).

The social aspect of interdependence is an aspect that has the second largest contribution to collaboration with a value of 4, 45. This happens because social interdependencies are the heart of collaborative activities that have been the business of the cooperation and turn the Working Group into teamwork (Collazos, 2003:1). Social interdependencies are also an important factor that affects the effectiveness of collaboration (Johnson, 2009:11).

A relationship of positive interdependence between teachers and teachers can occur in the form of mutually

encouraging and constructive feedback (Miller, 2007:8). This relationship can also occur when the teacher can understand what others are experiencing and can feel the difficulties faced by other teachers. (Daughter, 2015:5).

There are nine statements on this aspect. A grade that has the highest value gained from a positive interdependence statement with a value of 4.58. Statements that have the smallest value derived from the teacher's statement motivate each other with the value 4.36. This suggests that motivating each other should be improved among fellow biological teachers.

c. Cooperation

Cooperation is an important part of collaboration. Astuti (2019:7) States to cultivate a collaborative character, must be familiarize with cooperation. The aspect of cooperation becomes the third largest contribution to the readiness of biological teachers in the face of learning in the era of the 4.0 industrial Revolution with a value of 4.43.

The statement that resulted in the highest value of 4.56 is derived from the teacher's statement of cooperation with the students. The lowest value of the 4.30 is derived from the teacher's statement in cooperation with the students' parents. This indicates that the cooperation of teachers with students' parents still needs to be improved again.

The cooperation of teachers and parents is very important. BISRI (2016:147) expressing cooperation between teachers and parents can increase student confidence, reduce discipline violations, and improve student motivation. Teachers and parent's cooperation can also increase student learning activities (Yanti, 2013:73).

Guru has also done good cooperation with other teachers in the school, fellow biology teachers. While carrying out a teacher activity has also been working well through the division of the *jobdesk* work respectively.

d. Sharing Resources

Sharing resources contributes the fourth largest to collaboration. The impact of gathering resources from team members is the implementation of effective collaboration (Child, 2016:2). The resources referred to in research include sharing of knowledge, experience, and skills. The results showed that teachers were very prepared in this aspect with a value of 4.42.

Teachers share resources by sharing knowledge, sharing experiences, and sharing skills with other teachers. Sharing

skills get the highest score of 4.46 and sharing experience and knowledge get the lowest value of 4.40.

The benefits that teachers can get after sharing their skills with other teachers are improving their performance and learning outcomes (Santia, 2016:2), improving human Resources (Nuraina, 2019:2), and improving the professionalism of teachers together (Yuniendel, 2018:11). Sharing knowledge and experience still needs to be improved because by increasing the teacher will be more professional (Saragih, 2017:8).

e. Use of ICT in Learning

The use of ICT in learning has become prevalent in the era of the 4.0 Industrial Revolution. The results showed that the use of ICT obtained the value of 4.25 which belongs to the category is very ready. The use of ICT in learning is an aspect that has the fifth largest contribution to the readiness of biological teachers in the face of learning in the era of the 4.0 Industrial Revolution. This indicates that the biology teachers of SMA Negeri in West Sumatera have often used ICT such as laptops (4.38), LCD (4.29), and Internet (4.10) in the learning process. The results are in line with the research results of Puspita (2019:4) that as many as 84.4% of teachers have implemented ICT in the learning process. The use of ICT is done to create learning Plan, media, model of Defajan, learning evaluation until the filling of the report.

The Use OF ICT in learning has many benefits. First, it can increase the interest and attention of learners, enrich learning resources, and can help learners in solving complex problems (Puteh, 2011). Secondly, ICT-backed learning will offer better flexibility, creativity, and teaching process (Domalewska, 2014:7). Third, can help teachers to enrich his teaching skills (Budiman, 2017:8). Fourth, can improve the *knowledge transfer* process by reducing the cost due to distance and time (Ningsih, 2014:16). Fifth, support the learning process is more effective and productive, and relieve the learning process (Nugroho, 2014:12).

f. Conflict Resolution

This relates to the determination of the decision through discussion. The results showed that the value gained by this aspect is 4.19 with the category ready. The highest value of the 4.20 is a statement of decision-making through discussions with other teachers. The lowest value of 4.18 is derived from the decision-making statement through the principal's discussion. This indicates that teachers more often set decisions through discussions with other teachers than in discussions with the headmaster.

The results showed that there was a decision after a discussion with various school parties. It is already in line with Sahlberg's statement (2010) That success in education is the result of the collaboration of elements in the education system that support each other. However, decision-making with the principal should be further improved by the teacher.

g. Introduction of New Ideas

This is related to conflict resolution, team members should be effective at offering solutions to the task at hand, which can then be negotiated (Child, 2016:2). The results showed that the aspect of the introduction of new ideas was a small contributing aspect to collaboration. The value gained is 4.18 with the category ready and is in seventh order from eight aspects of collaboration. This indicates that the process of introducing new ideas in collaboration is still not optimal and needs to be improved by the biology teacher of SMAN Negeri in West Sumatera.

Improvement in this aspect is necessary in order to resolve the problem by the teacher. The results of the study of Putri (2015:4-5) stated that G-Uru teachers who have problems that he thinks are difficult to solve, will discuss and share experiences with other teachers through kkg. The teachers involved in the KKG activities will find the solution together.

h. Use of ICT for Collaboration

The aspect of ICT use for collaboration is the least contributing aspect to collaboration. The value earned 3.39 belongs to the category quite ready. This value is the smallest value compared to seven other collaboration aspects.

The results showed that teachers more often use email applications (3.50) than *videoconferencing* applications (3.28) to collaborate. There are several applications that teachers can use for collaboration. Resta (2007:12) states that online collaboration can be supported by e-mail, file attachments, electronic bulletin boards, chats, blogs, wikis, digital audio and video conferencing systems, asynchronous/ Synchronous communications System-based instructional management tools (Management system courses, CMS; Learning Management System, LMS), and virtual learning environment (Blackboard/WEBCT, Moodle, Sakai, Claroline, FirstClass).

The Use OF ICT to collaborate has several benefits. First, simplify the distribution of information. Second, simplify the activity of control over cooperation activities. Third, can facilitate the process of monitoring the change and renewal of information related to cooperation. Fourth, facilitate communication between the parties. Fifth, managing

cooperation information as part of the publication to the public (Sidik, 2014:9). Sixth, it can increase the development of the learners needed to achieve success in the modern World (Domalewska, 2014: 8).

Other discoveries were gained through the interview process. The results showed that teachers were committed to facing challenges in the era of the 4.0 Industrial Revolution. In a variety of ways. The way that teachers go is by increasing the level of education, adding information through the Internet, improving competence, improving the effectiveness of the 4C implementation in schools, and some waiting for socialization to come.

Related to the improvement of competence, the teachers have not yet had the training on learning in the era of the 4.0 Industrial Revolution. Both the education office and the school, have never brought a speaker who discussed this topic. Teachers only often hear the term Industrial Revolution 4.0 without ever obtaining his training. In relation to the 4C skills, teachers have long learned about this skill when socialization of the 2013 curriculum. But in the optimization of the 4C implementation in class, it is still difficult.

Various technologies that teachers most often use during the learning process are laptops and LCD. Mobile is only used by some teachers in schools. This is because there is a school rule that prohibits participants from carrying a mobile phone. This prohibition is related to the many negative effects that can be inflicted if students use mobile phones in the classroom. Internet access in school is also limited around the teacher room only. Many learners who have not been able to get internet at school. So if you need the Internet, learners rely on the quarantine to browse the information.

IV. CONCLUSION

Based on research that has been done, high school biology teachers in West Sumatera are very prepared to face the study in the era of the 4.0 Industrial Revolution on collaborative skills with a value of 4.24. Communication aspects contributed to the greatest contribution to the readiness of biological teachers with the value 4.54. The use of ICT for collaboration contributes the smallest contribution to the biology teacher's readiness with a value of 3.39. The use of ICT for collaboration still needs to be improved again by biological teachers.

Teachers are very prepared to indicate that the implementation of collaboration is well underway. Teachers 'collaborations occur with fellow teachers, principals, student parents, and learners in the learning process. The research

results also demonstrate the readiness of teachers to influence the quality of education. This is evidenced by the long Padang district that has the highest readiness value, it also has the highest value of the UN in West Sumatera district.

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