Analysis of the Knowledge and Skills of Science Teachers in the Northern Region of Solok Regency in Planning Implementing and Evaluating 21st Century Learning

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Abstract: This study aims to determine the Knowledge and Skills of Science Teachers MGMP IPA North Region Solok Regency in Planning, Implementing and Evaluating 21st Century Learning This research is a type of descriptive research. The population in this study came from the North Region Science MGMP of Solok Regency. The sample of this study came from SMPN 1 X Koto Diatas, SMPN 1 Singkarak and SMPN 1 Junjung. The sample technique is purposive sampling. Data collection techniques are tests, observations, questionnaires, interviews and documentation. Data analysis in the form of quantitative and qualitative descriptive analysis. The results of the study can be concluded that the knowledge and skills of MGMP IPA science teachers in the northern region of Solok district are very good in planning, implementing and evaluating students' 21st century learning. This can be seen from the 21st century learning analysis value of SMP 1 X Koto Diatas of 78.15 good category, SMPN 2 of 78.56 good category Kubung and SMPN 1 X Koto Singkarak of 89.46 excellent category. So, teachers are guided to be able to apply 21st century learning, so as to improve the quality of Indonesian education.

Keywords: Knowledge; Science learning; Teacher skills, 21st Century

Introduction

The 21st century has had a huge influence on the progress of the world of education (Zorluoglu et al., 2021;Aköz et al., 2022; Ichsan et al., 2022; Suhaimi et al., 2022; Güven & Alpaslan, 2022). Education has used technology as an aid to the learning process (Maghfiroh et al., 2023). In this 21st century learning, teachers must have hard skills and soft skills in developing students' potential (Semilarski et al., 2021). Furthermore, students are also trained to develop 21st century skills which consist of critical thinking, creative, collaborative and communication skills (Supriyadi et al., 2023; Taar & Palojoki, 2022; Turhan & Demirci, 2021). These skills are needed by students in solving various phenomena that occur in life (Satria, 2018; Apra et al., 2021).

Teachers are educational staff who have a major role in training and developing students' knowledge in learning (Rizaldi et al., 2020). In the 2013 curriculum a teacher has applied 21st century learning. 21st century learning students must have the ability to think scientifically (Yusuf et al., 2020; Azmi, 2023). The ability to think scientifically functions to solve problems that occur in the learning process (Hernández-Fernández, 2022; Suharyat et al., 2023; Sondergeld & Johnson, 2019; Groves et al., 2021). Science learning is one of the subjects that is still difficult for most students to understand in Indonesia (Matsun et al., 2021). In addition, students' problem-solving skills in science learning are low Beier et al., 2019 ; Elfira & Santosa, 2023).

Science learning is a compulsory subject in schools that guides a student for scientific work (Kopparla et al., 2019; Ahmed, 2022; Dorn et al., 2022). Furthermore, in learning science students must be able to apply the knowledge gained in everyday life (Hujatulatif et al., 2022; Noris et al., 2023). However, learning science is a

subject that is still difficult for most students (Alatas & Fauziah, 2020). Furthermore, Research by Adiwiguna et al. (2019) states that 78% of students in Indonesia are only able to work on low category questions. Not only that, the results of the Indonesian PISA (Program for International Student Assessment) study show that the level of learning science for Indonesian students is still relatively low with a score below 500 (Suhaimi et al, 2022; Karim et al., 2022; Razak et al., 2021). So, it is necessary to have a teacher's efforts to improve the quality of learning by improving the learning model (Santosa et al., 2021).

Science learning today requires teacher competence to develop teaching skills, be full of innovation and creativity and be able to use innovative learning models to achieve good student competency targets (Hadisaputra et al., 2018; Santosa el at., 2021). Science subjects in junior high school are a combination of the fields of biology, physics and chemistry and are taught by teachers with a scientific background in biology, physics and chemistry. This means that even though a teacher has a biology background he must be able to teach material about physics and chemistry as well. However, due to different backgrounds, there are often still mistakes and difficulties in teaching (Fradila et al., 2021; Zulkifli et al., 2022).

Basically, 21st century competencies have been adapted in the Indonesian education system through the 2013 Curriculum (Razak et al., 2021). However, the implementation of the 2013 curriculum in the field is still not optimal. Some studies show that classroom learning is still characterized by conventional learning. Based on preliminary research conducted by the author at SMPN 3 X Koto Diatas, Solok Regency, that there are still teachers who have not implemented learning in accordance with the 2013 curriculum, even far from 21st century learning. Observation of learning tools developed by 10 teachers, 70% of teachers do not have lesson plans that describe 2013 curriculum learning and integration of 21st century learning. In addition, based on interviews with the junior high school supervisor. it was found that of the 7 public junior high schools under the supervision of the unit supervisor, 60% of teachers during the implementation of the teaching and learning process were not in accordance with the lesson plans they developed. The important role of teachers in facing the 21st century is their role as role models for trust, openness, perseverance and commitment for their students in facing uncertainty in the 21st century (Suhaimi et al., 2022; Suharyat et al., 2023; Ferdyan et al., 2021).

Previous research by Molzahn et al. (2002) explains that 21st century learning needs to be instilled in students so that they are able to develop knowledge in their lives. Research by Sondergeld et al. (2019) states

that every teacher is guided to be able to develop students' 21st century skills. 21st century learning is learning that aims to develop critical thinking, creative, collaborative and communication skills (Woods-Groves et al., 2021) stated that students who have 21st century skills are better at understanding and solving problems in learning. Research by Woods-Groves et al. (2017) A teacher must be able to develop students' 21st century skills in the teaching and learning process. Based on this problem, this research aims to increase the knowledge and skills of Science Teachers MGMP IPA Northern Region of Solok Regency in planning, implementing and evaluating 21st century learning.

Method

This research is a type of descriptive research. This research was conducted in Semester 1 of the 2022/2023 academic year on the material of the human motion system. This research was conducted in Class VIII of public junior high schools in Solok Regency which are members of the North Region Science MGMP of Solok Regency. MGMP IPA Northern Region is a combination of 4 districts located in the north of Solok Regency, namely X Koto Diatas, X Koto Singkarak, Junjung Sirih and Kubung. The population in this study came from MGMP IPA North Region of Solok Regency. The sample of this study came from SMPN 1 X Koto Diatas, SMPN 1 Singkarak and SMPN 1 Junjung. The sample technique is purposive sampling. The instruments used in this research are observation sheets and questionnaires. Data collection techniques are tests, observations, questionnaires, interviews and documentation.
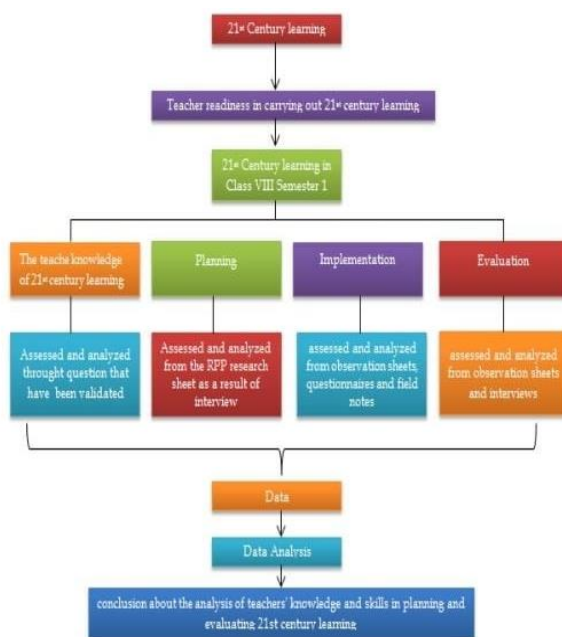

Figure 1. Research implementation chart

The interviews used in this study were structured interviews. Furthermore, the test used in the study was a multiple choice test totaling 20. Before testing the questions, validation was carried out first. Data analysis in the form of quantitative and qualitative descriptive analysis with the SPSS 16 application. The implementation chart of this research can be seen in figure 1.

Result and Discussion

Result

Results should Based on the results of the analysis of knowledge of the knowledge and skills of science teachers MGMP IPA Northern Region of Solok Regency in planning, implementing and evaluating 21st century learning. In 21st century learning, learning activities must be integrated in the 21st century components in full Boldcan be seen in table 1.

Table.1 Value of 21st Century Integrated Learning

Component	Average score	Category
Learning activities in integrating the 21st century	70.19	Good
Learning activities in improving student literacy	80.00	Very good
HOTS-based learning activities	83.00	Very Good

Based on table 1 explains the value of learning integrated with 21st century learning. The average score of learning activities integrated with 21st century learning is 850 in the insufficient category, the learning score in improving student literacy is 67 in the sufficient category and HOTS-based learning activities is 83 in the excellent category. The knowledge and skills of MGMP IPA science teachers have a very important role in encouraging students' 21st century learning. 21st century learning is the main basis in improving the quality of science learning. Science learning is learning that leads students to think scientifically and critically. Furthermore, the results of the evaluation of 21st century learning in science teachers and students have a positive impact on the teaching and learning process of students. This can be seen from the results of research from several schools in Solok District on the knowledge and skills of MGMP IPA science teachers in evaluating students' 21st century learning can be seen in table 2

Table. 2 Mean scores of Knowledge and Skills < 21st Century Learning

School	Average score	Category
SMPN 1 X Koto Diatas	78.15	Good
SMPN 2 Kubung	78.56	Good
SMPN 2 X Koto Singkarak	83.46	Very Good

Based on table 2 the average value of knowledge and skills about 21st century learning of SMPN 1 X Koto Diatas is 78.15 good category, SMPN 2 Kubung is 78.56 good category and SMPN 2 X Koto Singkarak is 83.46 very good category. Furthermore, the knowledge and skills of science teachers in promoting 21st century learning is very important. Science teachers must be professional in evaluating 21st century learning.

Discussion

21st century learning is a learning that leads students to think more scientifically (Ichsan et al., 2018). Knowledge and skills of science teachers have a very important role in planning implementing and evaluating 21st century learning. From the results of this study, the knowledge and skills of MGMP science teachers from several schools in Solok Regency consisted of SMPN 1 X Koto of 78.15 good category, SMPN 2 Kubung of 78.56 good category and SMPN 2 X Koto Singkarak of 83.56 very good category. This is in line with research (Adi et al., 2021) teachers must be able to develop the potential of the 21st century, so that they are easier to understand science lessons. Science learning students must be able to apply science in their lives. In addition, research by Ashton et al. (2019) teachers must be guided to develop 21st century learning so that students have a high level of knowledge in solving problems.

Evaluation of 21st century learning should be carried out by subject teachers (Santosa et al., 2021; Mirra & Garcia, 2021;Sudarsono et al., 2022). In carrying out the learning process, teachers must have high professionalism in order to be able to develop students' potential (Oktarina et al., 2021). Furthermore, knowledge and skills are central to developing 21st century learning (Masakowski, 2017;Hämäläinen et al., 2017;Maulding et al., 2012). Knowledge is all the information that a person gets from various sources (Ferry et al., 2020). Furthermore, the skills of science teachers must be improved in order to achieve learning objectives (Ichsan et al., 2023).

In planning, implementing and evaluating 21st century learning, science teachers who are members of MGMP IPA must have been trained in developing learning tools based on 21st century learning. In 21st century learning, students must be able to think critically, creatively, collaboratively and communication which is better known as 4C (Kowang et al., 2020;Turhan & Açık Demirci, 2021). These skills are needed by students in science subjects. Therefore, science teachers must evaluate this 21st century learning in order to provide positive things for the progress of education in Indonesia (Suharyat et al., 2023).

Conclusion

The knowledge and skills of MGMP IPA science teachers in the northern region of Solok district are very good in planning, implementing and evaluating students' 21st century learning. This can be seen from the 21st century learning analysis value of SMP 1 X Koto Diatas of 78.15 good category, SMPN 2 of 78.56 good category Kubung and SMPN 1 X Koto Singkarak of 89.46 very good category. So, teachers are guided to be able to apply 21st century learning, so as to improve the quality of Indonesian education. Furthermore, science teachers must have high knowledge and skills in order to encourage 21st century learning. In 21st century learning, students must be able to apply science learning in their lives. So, a teacher who has joined MGMP IPA is a solution in improving the quality of science learning in Indonesia in increasing 21st century learning in students.

Acknowledgments

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