

Research Article

How is Reflective Practice in Learning? A Science Teachers Perspective

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Abstract.

Reflective is a thinking process that can be carried out by teachers, leading to improvements in effective classroom management and quality and improving student performance, so that reflective practices are indispensable in teaching and learning practices. This study aims to describe the reflective practice of science teachers in junior high schools. Primary data were collected based on the teacher's experience in teaching science learning, highlighting three aspects including reflective action, the form of reflective action, and follow-up to reflective activities. This qualitative study was conducted through the distribution of online questionnaires. The results indicate that reflective action in learning by science teachers is always carried out, but the form of reflective action has not yet involved many peers, principals, and supervisors. Most often done by teachers themselves, to accept other people's thoughts, learn, or share good practices have not fully occurred. The follow-up of reflective activities has not been followed by changes to the design of further learning in the lesson plan, but teachers are more focused on changing the teaching process that they do in class independently.

Keywords: reflective practice, science teachers, perspective

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Published: 26 April 2024

Publishing services provided by
Knowledge E

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Selection and Peer-review under the responsibility of the ICMScE Conference Committee.

1. INTRODUCTION

The era of the industrial revolution 4.0 and society 5.0 brought significant changes in all aspects, especially in the world of education. The progress of Revolution of Society 5.0 gives a signal that teachers must be ready and responsive to changes that have been occurring. Science teachers are expected to contribute positively in facilitating students to acquire skills and abilities needed in their future life through meaningful learning in Science classrooms. The change also brings challenges as well as opportunities for science teachers to constantly develop their capacity as educators to be ready and relevant to the demands of the development occurring through the times. This capacity

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is not merely having conceptual knowledge but also the ability of performing good skills as well as having a positive attitude or character in responding to changes. One of the abilities that science teachers must possess today apart from teaching skills is the ability to reflect on professional practice [1, 2]. Being a reflective teacher is very important because this ability is one of the demands of the professional competence of teachers in Indonesia [3]. Several studies that have been conducted have shown that teachers' reflective abilities can have a positive impact on professional development [4, 5]. Moreover, modern society's life is characterized by technological sophistication [6] because it is very effective in developing critical thinking and lifelong learning [7].

Reflection or practice of reflection is reflective thinking based on individual contemplative thinking, reasoning, which is reprocessed through analytical thinking from learning experiences [8]. Since it was introduced in 1980, research reveals that the practice of reflection in learning is related to social constructivist theory [9] so that in reflection, knowledge is built through social interaction with other people. Schon (1983) identified two types of reflection, namely reflection in-action and reflection-on-action. Reflection in action is a way of thinking and theorizing about teaching practices when teachers teach and is an automatic activity that is carried out unconsciously. Reflection-on-action is a conscious experience and thought process about the teaching practice that has been carried out and reveals the knowledge used in the situation [10]. Science teachers in carrying out their duties need to have the ability to be able to practice reflection, not only be able to think reflectively but also act reflectively and carry out follow-up actions to perform a comprehensive and sustainable process of professionalism.

The reflective practice that had been done previously for Thai teachers indicated that Belief and Confidence for Learning Reflection and the Reflection Behaviors and Skills were at a moderate level [11] while the reflective practice carried out by teachers when preparing student learning could improve the quality of content [12] from the perspective of teacher. In addition, a category of 'high' has resulted from the research conducted on science teachers on reflective activities, which focuses on reflective areas and how to practice reflection [13]. However there is still a big question whether the teachers know the term 'reflection' or not. On the contrary, they may have knowledge of the term 'reflective practice' and the importance of being a reflective teacher, but they may not actually apply it to their real teaching experience, because most of the knowledge does not directly lead to action [14]. Furthermore, since scientific studies that investigate how science teachers' perspectives on reflective practice are still limited and not widely studied, the urgency of this research focuses on three aspects, namely

reflection actions, forms of reflection actions, and follow-up of reflection. This study is focused on knowing to what extent science teachers' perspectives on reflective practice, how reflective practices are carried out in schools and how the result is followed up in their teaching practices. The result of this research is targeted to provide an overview of reflection practices conducted by science teachers that enable them to be open minded in accepting other people's thoughts, learn from peers, able to design follow-up plans, regularly and constantly perform effective reflection on their own professional experiences and share best practices both with professional colleagues and community.

2. RESEARCH METHOD

This research is a qualitative descriptive study. Data was derived from online questionnaires, interviews, and observations [15]. The questionnaire was developed using closed-structured questions followed by open questions to identify further statements or give reasons for each answer/response that were previously given. The research subjects were 16 science teachers from 16 junior high schools in Kendari City, Southeast Sulawesi. Interviews and observations were carried out on certain participants only to clarify or dig information deeper regarding the required data when the responses given were not sufficient to provide a clear picture of the aspect studied. The analysis procedure is carried out by identifying the main intended data based on the answers/responses for each of the problem statements of the study followed by checking and re-examine the data from the respondent's response. The data were then classified into several themes by coding and regrouping them into other codes or themes. The next stage in data analysis is using the strategy of selective coding which is carried out by identifying, developing, and evaluating the themes generated from the coding. Finally, the main concepts and categories generated are then used in reporting the findings.

3. RESULTS AND DISCUSSION

This study discusses the practice of reflection carried out by science teachers in their learning and teaching practices. The discussion theme was divided into 3 aspects namely reflective action, the form of reflective action and follow-up of reflective activities. The overview of the background of the participants who provided data for this study is displayed in Table 1.

TABLE 1: Demographic of Participants.

Aspect	Gender		Education Qulification			Teaching Experience (year)	
	Female	Male	S1	S2	S3	≤ 10 year	≥ 10 year
Participants (n=16)	10	6	15	1	0	4	12

Based on Table 1, it can be seen that the science teachers who participated in this study were dominated by female teachers. One of the teachers already had a master’s degree qualification while the others (n=15) had an undergraduate education background either from science or biology or physics education. This indicates that all of these science teachers have met the minimum qualification standards for the competence of educators required for a teacher in Indonesia (UU No. 14 of 2005 article 8). However, some of these teachers expressed that they were not satisfied enough with their current qualifications and wanted to improve their qualifications. This expression shows that these teachers have the desire and motivation to continue to learn and improve their knowledge. From the aspect of teaching experience, it can be seen that most of the science teachers (n=12) have had teaching experience of more than 10 years and only a small proportion (n=4) are under 10 years. This teaching experience can make a positive contribution to perform a more flexible and more focused learning and teaching process [16].

3.1. Reflection Action

The reflection action explores information to find out whether the teacher does reflection action in their learning and what their perspective is about the reflection action itself. The results of data analysis are briefly described in Table 2.

TABLE 2: Perspective on Reflection Action.

Reflection Action (n)	Teachers perspective about reflection action			
	a	b	c	D
Always Be Reflective (n=16)	The process of rethinking what has been learned whether it has going well or not	Evaluating the problems faced in learning and teaching process	Self-awareness in assesing learning and teaching process and use it to improve the next one	Consideration about strategies, tools/media used, material content and student understanding during learning

Table 2 shows that all participants always carry out reflection actions without exception (n=16). The understanding of reflective actions differ among the teachers where based on data analysis it is grouped into four main themes of perspective. The first

understanding that many participants put forward is the process of rethinking whether or not the learning and teaching process was going well (a). Other participants claimed that reflection action is an evaluation of problems faced in learning (b). Some also participats revealed reflection action is self-awareness assesing in learning and teaching process and use it to improve the next one (c) and a small part of participants consider reflection action as consideration of good thoughts about strategies, tools/media used, material content and students' understanding during learning (d).

Based on the four perspectives summarized from the variation of teachers respons, it can be seen that the tendency of participants' understanding patterns is limited to the thinking process or self-awareness in seeing how learning can take place well. This is supported by data from interviews when the teachers were asked whether they used instruments or notes to record their self-reflection most of the teachers answered that they did not use instruments or reflection notes. The reflection process occurs spontaneously only when it is considered important, especially when they experience problems during the learning and teaching process or there are things that hinder the students' effective learning, both in terms of learning strategies, material content, use of learning tools/media, practicum procedures and learning environment.

This analysis illustrates that in fact for the teachers reflections are actually still limited to reflective thinking and have not led to reflection actions which are supported with evidence. This becomes very important because empirical thinking and thinking in a scientific scope requires evidence in the process of finding or compiling scientifically correct statements [17].

3.2. The Form of Reflection Action

The form of the reflection action in this study focuses on how the reflection action is carried out by the teacher. One form of reflection used in developing reflective abilities is the involvement of colleagues. Peer engagement is a process that involves the collaboration of colleagues in terms of sharing ideas, thoughts and observations, about teaching practices. Through this process teachers can take the various perspectives that emerge from this collaborative process and use them to derive conclusions and essence information for better teaching and ultimately better learning. The results of data analysis can be shown as Figure 1.

Figure 1 illustrates that self-reflection on their own, reflection carried out by the teacher him/herself was done by 13 participants, limited collaborative reflection with colleagues was done by 2 teachers, and collaborative reflection which involved colleagues, school

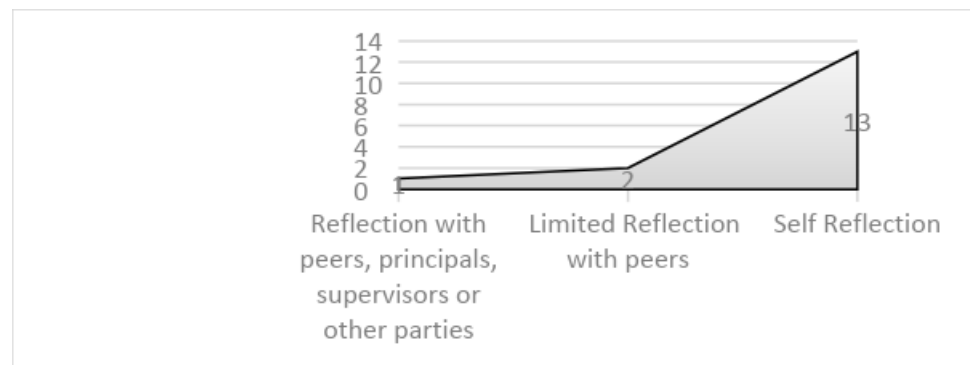


Figure 1: The form of reflection action.

principals, supervisors and other parties is done only by 1 participant. Based on the results of the interviews, it was revealed that the form of reflection actions taken by the teacher is highly dependent on the school's policy in facilitating reflection activities. The tendency of teachers to prefer to do self-reflection on their own is due to 3 factors. First, in terms of teacher experience; teachers know more about the characteristics of their students and the problems that occur during learning. Second, in terms of time spent; thinking reflectively, planning and making improvements and plans for follow-up does not take much time. Third, the number of colleagues who teach the same subject; the existence of peers who teach the same subject makes it possible to reflect or share teaching experiences. Based on this study, science teachers who had friends with the same subject/family were only found in 6 schools.

The form of reflection that is rarely carried out by science teachers is to reflect together with other people or in groups. It can be seen from the data that there is only one teacher who does this activity. Based on the answers given, this activity is not carried out regularly and continuously but is only when the teacher is involved in certain programs. This condition can be caused by the fact that teachers are not accustomed to doing teaching reflection in groups, both in their small professional community in school or bigger professional community outside the school [18]. In fact, the existence of this community can be a forum for science teachers to continuously achieve effective classroom quality and improve student performance as well as a vehicle for achieving professional learning, expertise, and performance skills development [19].

3.3. Follow-up to Reflective Activities

The next research finding that has low achievement is the aspect of reflection follow-up actions. The main focus of this study is to see if there is a follow-up plan and actions or improvement based on the results of reflection that can be found either

as improvement in the teachers' learning scenario document, notes document about the results of reflections that have been carried out, or video recording of the improved learning and teaching process. The results of data analysis are presented in the following figure.

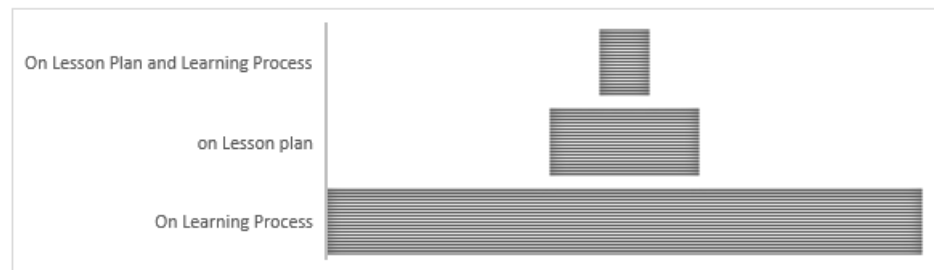


Figure 2: Reflection follow up activities.

Figure 2 shows that only small proportion teachers who carried out follow up actions by improving the teaching and learning plan document followed by improvement in conducting the teaching and learning process ($n=1$). The follow-up carried out by teachers is mostly on improvements in the learning process. Based on the results of interviews, teachers focus more on changes in their teaching and learning because can have a direct impact on students, so that the teaching and learning plan is like a permanent document that will be changed and improved only if there are exceptional circumstances needed. The teacher only sees what are the shortcomings or weaknesses both when teaching or dealing with students in the classroom, so that any improvements or developments remain untold and unpublished. Based on the study of teachers' teaching and learning plan documents owned by 12 teachers, it can be found that there are no changes or improvement as a result of reflections that have been made. Likewise, teachers also do not have other documents such as notes of reflection results in the form of reflection journals [20], journals, interview reflections, peer observation conferences, group discussions, videos, blocks, and electronic portfolios [21].

This finding shows that teachers' views regarding the quality of learning are still oriented to student learning outcomes. This condition is closely related to the understanding and prior knowledge the teacher has regarding reflective action, which is only limited to the thinking process so that has an impact on the implementation of the process [22]. The quality of learning and good learning success, must be comprehensive, meaning that it must consider two aspects, namely the process and results [23]. One aspect of the process is to see the teacher's ability to plan and prepare the subject matter to be taught even though it has become a daily routine, which is outlined in a lesson plan, in which it can be described how to build a learning atmosphere at school. classroom,

learning process that can motivate students to be active in learning, facilities, media and learning assessment so that participants can learn optimally. While the outcome aspect looks at how students are able and have the ability to solve problems based on the understanding and knowledge received in the learning process that leads to increased learning achievement. Therefore, it is very important to see that the follow-up actions of reflection are not only seen in the learning process and student learning outcomes but are also stated in the complete learning plan document.

4. CONCLUSION

This study concludes that the practice of reflection has been carried out by science teachers. The teachers' perspective on reflective action is a process of rethinking or self-awareness to do self-evaluation on the learning and teaching process. However, reflection actions are mostly carried out if they are considered important, such as when teachers encounter problems that are quite disturbing during the learning and teaching process. Understanding of reflective practice in teachers has an impact on the form of reflection action taken. Each teacher does reflection mostly by him/herself without involving colleagues or other related parties, and also without any supporting instruments or evidence. Reflection actions carried out together with colleagues only occur if the school has two or three science teachers. The reflection follow-up actions carried out have not been accompanied by changes and improvement in the learning and teaching plan and process so that the plans are still limited as administrative documents. Teachers assume that the change or improvement of their reflection practice focuses more on changing teaching practices in the classroom because this is considered more impactful for students.

ACKNOWLEDGMENTS

We express sincere gratitude to the science teachers who have given their time and energy and also to the principals who have given permission for their teacher to be involved in this research.

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