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Empowering Pre-service English Teachers' Metacognitive Awareness in Teaching Through Reflections

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Abstract: Successful teaching requires teachers' reflections and metacognitive awareness. However, few studies have investigated the impacts of reflections on teachers' metacognitive awareness in teaching. This study aimed to examine whether or not reflections can empower Indonesian pre-service English teachers' metacognitive awareness in teaching. Mixed-methods research was conducted to collect quantitative and qualitative data from 36 pre-service English teachers (PSETs) in two micro-teaching classes at the Undergraduate Program, Sanata Dharma University, Yogyakarta, Indonesia. Quantitative data from the pre-semester and post-semester were analyzed descriptively and statistically. Qualitative data from reflections and focus group discussions (FGD) focused on determining key issues related to PSETs' metacognitive awareness in teaching. Data analyses revealed that Indonesian PSETs' perceived metacognitive awareness in teaching increased post-semester. They also admitted the positive contributions of reflections in enhancing their metacognitive awareness in teaching. The increase was primarily attributable to the implementation of explicit reflections of the elements of metacognitive awareness in teaching. This research provides recommendations for teachers, lecturers, and future researchers.

Keywords: *Knowledge of cognition, metacognitive awareness, pre-service English teachers, reflection, regulation of cognition.*

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Introduction

Successful teaching and learning processes cannot be separated from effective teachers (Bakar et al., 2019; Holzberger et al., 2019; Lupascu et al., 2014). Intensive preparation and rigorous teaching practice in college are required in order to be able to teach effectively since teachers cannot give what they do not have (Okogbaa, 2017). The professional development of pre-service English teachers (PSETs) in college is crucial in preparing them for actual classroom teaching. This paper aimed to examine the perceived impacts of reflections on pre-service teachers' metacognitive awareness in teaching. It begins by discussing the challenges facing teachers' professional development. It then addresses teachers' metacognitive awareness in teaching, demonstrating that it could lead to teacher professional development. In addition, reflections were reviewed as one of the tools to empower teachers' metacognitive awareness in teaching, followed by the method, result, discussion, conclusion, recommendation, and limitations. This paper argues that PSETs' professional development in teaching could be enhanced through direct reflections of the elements of metacognitive awareness. It was expected that this research would enrich, extend and partly fill the gap in the current literature about reflections and their impacts on pre-service English teachers' metacognitive awareness in teaching.

Teachers face complex challenges in actual classroom teaching, ranging from the teaching workload, big class sizes, and time limitations (Al-Shaboul et al., 2020). Other challenges include who assesses teachers' competence and performance (Utami et al., 2021). Accordingly, they need strong guidance from their mentors to face challenges and develop professionalism in teaching (Ambrosetti & Dekkers, 2010; Filiz & Durnali, 2019). The training may encompass content knowledge, pedagogical skills, attitudes, social and emotional intelligence, and technological skills (Bakar et al., 2019; Filiz & Durnali, 2019; Gabrijelčič et al., 2021; Utami et al., 2021).

Several studies have examined pre-service teachers' professional development with positive and negative results. A study by Külekçi (2018) of 165 PSETs at a Turkish University revealed three elements that they believed future English teachers should possess, i.e., providing examples from real-life contexts, well-prepared lessons, and continual self-development. Another study (Holzberger et al., 2019) involving 3,483 high school students and their 155 mathematics

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teachers revealed that high-quality teaching corresponds with students' achievement but does not predict their excitement. A recent study (Şenel, 2021) of four Turkish English language teaching (ELT) students performing practice teaching at school found that their professional identity changed from positive to negative.

The studies above suggest that becoming an effective teacher is as complex as producing good-quality teaching. The demand for teachers at different school levels to deliver good quality teaching is even greater in classroom learning involving higher-order thinking skills (HOTS). Since pre-service teachers could teach at primary and secondary schools, reviewing what happened at these schools concerning the implementation of HOTS was beneficial in preparing them for future teaching. Integrating HOTS into the teaching practice was also a requirement in our university's micro-teaching Syllabus (see the method section on learning contents and activities). Studies concerning these important topics have found mixed results across the globe. Exploring primary school examination questions in Uganda, Mitana et al. (2018) discovered that more than 85% of the questions were related to lower-order thinking skills (LOTS), and only 13% were related to HOTS.

Similarly, in research examining HOTS of senior high school students in the Philippines, Subia et al. (2020) revealed a low level of HOTS in mathematics subjects. A similar result was found in a study of student science teachers in Australia (de Jager, 2019). The study revealed students' reluctance to engage in reflective learning and higher-order thinking activities. This study urges lecturers to promote independent learning to students. However, training students to become independent and good critical thinkers requires teachers' ability to design, implement and assess thinking-oriented classrooms continually since knowing the importance of HOTS does not necessarily lead to teachers' successful implementation of HOTS in the classroom (Fakhomah & Utami, 2019).

Possessing metacognitive awareness in teaching will help teachers become better planners, implementers, and assessors of their teaching and student learning. The term metacognitive, which derives from the word metacognition, means thinking about thinking or understanding one's thinking processes while engaging in cognitive activities such as teaching (Flavell, 1979). Several recent studies have acknowledged the impacts of metacognition on students' learning and success (Bećirovic et al., 2017; Cao & Lin, 2020; Oxford, 2017).

Metacognitive Awareness in Teaching

Recent years have witnessed researchers' interest in teachers' metacognitive awareness in teaching (Abdellah, 2015; Aktağ et al., 2017; Alkan & Erdem, 2014; Gopinath, 2014; Palantis et al., 2017). Although they generally stress the importance of teachers' metacognitive awareness in teaching, these researchers seem to offer little information about how teachers' metacognitive awareness could be harnessed for their professional development. For example, Alkan and Erdem (2014) suggested a close relationship between college pre-service teacher candidates' metacognitive awareness, self-efficacy, and perceived subject matter competence. Gopinath (2014) found that teachers' metacognitive awareness impacted their teaching positively and affected class learning, atmosphere, and students' engagement in learning. Another study (Abdellah, 2015) revealed the need for pre-service teachers to possess metacognition and more research on their strategies to increase their metacognitive awareness in teaching performance. Other researchers (Aktağ et al., 2017) argued that teachers' metacognitive awareness in teaching affected students' learning positively and urged explicit metacognitive awareness training for pre-service and in-service teachers. Similarly, research on primary school teachers in Puchong, Selangor (Palantis et al., 2017) revealed a positive relationship between students' academic achievements and teachers' high metacognitive awareness. Their findings suggested that metacognitive awareness should be trained and practised regularly and intentionally for the teachers' teaching to impact students' learning positively.

Considering its increasing popularity, the current researchers felt the need to use a more comprehensive inventory of teachers' metacognitive awareness in teaching. Balcikanli's (2011) Metacognitive Awareness Inventory for Teachers (MAIT) met our needs. Balcikanli (2011) created a detailed inventory for implementing metacognition in teaching by modifying the metacognitive awareness of adults (see Schraw & Dennison, 1994), comprising knowledge of cognition and regulation of cognition. Knowledge of cognition constitutes declarative, procedural, and conditional knowledge. Declarative knowledge details what teachers know about teaching (the what). Procedural knowledge encompasses teachers' knowledge about doing things (the how), and conditional knowledge explains teachers' knowledge of 'the why and when' to use declarative and procedural knowledge in teaching. Regulation of cognition focuses on teachers' planning, monitoring, and evaluation of their teaching. Balcikanli (2011) argued that his inventory could help teachers to realize their thinking levels of teaching.

The studies reviewed earlier demonstrated the positive contributions of teachers' metacognitive awareness in teaching and students' learning. However, very few have examined strategies to empower it. Realizing the possible benefits of MAIT for PSETs led the researchers to pursue a tool to implement in the micro-teaching classes of pre-service teachers. Since the reflective practice had become an imperative for teachers in Indonesia, it was then adopted in this research as a strategy to empower PSETs' metacognitive awareness in teaching.

Reflection

Reflections are the self-conscious activities that support teaching, learning, and comprehension (Mattew et al., 2017) and have been used to enhance teacher professional development (Amalia et al., 2020; Fox et al., 2019; Mattew et al., 2017). Reflections derive from experiences and compel teachers to learn from them. The reflected learning experiences aid them in building new knowledge and understanding to grow professionally (Amalia et al., 2020; Chang, 2019; Fox et al., 2019). When conducted over time, reflections could increase self-awareness about themselves as teachers and their teaching (Arslan, 2019). Similarly, Davis and McDonald (2019) found that teachers' reflections focusing on self-evaluation could positively impact their professional development. Through reflections, teachers could increase their capability to examine their teaching and its results (Fox et al., 2019).

Several studies have investigated reflections to increase the teachers' understanding of themselves and their professional development (e.g., Amalia et al., 2020; Davis & McDonald, 2019; Mattew et al., 2017). Likewise, studies about the relationship between teachers' reflections and their professional development have been conducted by Indonesian researchers. Tosriadi et al. (2018) discovered the positive impact of reflections on teachers' pedagogical content knowledge. Because of a small sample (two teachers), this study needs to be strengthened with a bigger sample. In addition, this study has focused on two aspects of teachers' metacognitive awareness in teaching, i.e., teachers' pedagogical content knowledge (declarative knowledge and procedural knowledge). Another study (Hermagustiana et al., 2017) investigated the teachers' cognition in English as an EFL vocabulary instruction through their written reflections. Their research revealed that teachers had excellent awareness of their cognition when teaching EFL vocabulary. However, this research did not explore how reflections could be used increase teachers' cognition in EFL vocabulary instruction. The third study (Amalia et al., 2020) addressed one aspect of metacognitive awareness in teaching: lesson planning. They demonstrated the positive impact of reflective practice on the student teachers' lesson planning. The fourth study (Ong et al., 2020) revealed the pre-service teachers' tendency to practise reflections during teaching. However, they should be coached on strategies to effectively and successfully engage in these reflective practices.

The four studies above have partly revealed the contributions of reflections on several elements of teachers' metacognitive awareness in teaching. Though enlightening, a more comprehensive study examining the impacts of reflections on all elements of metacognitive awareness in teaching (Balcikanli, 2011) needed to be conducted, especially in the Indonesian educational context.

Schools in Indonesia have implemented the 2013 Curriculum for the past eight years. This curriculum emphasizes student-centered teaching. However, many teachers experience difficulty in implementing it. Poedjiastutie et al. (2018) mentioned a top-down policy, the absence of needs analysis, and curriculum evaluation as the inhibiting factors, while Sumardi et al. (2020) highlighted the lack of 21st century skills learning in many classes in primary school with the teacher as the primary source.

The lack of metacognitive awareness in teaching may be why teachers cannot teach effectively and empower students' metacognition in learning, resulting in the learners' lack of success in reading (Hamiddin & Saukah, 2020). On the other hand, teachers who possess and demonstrate metacognitive awareness can positively impact their teaching (Beziat et al., 2018; Mattew et al., 2017) and student learning (Mbato, 2019; Soodla et al., 2017).

Few studies have examined the impacts of reflections on teachers' metacognitive awareness in teaching. This current research aimed to enrich the existing literature by examining the perceived impacts of reflections on PSETs' metacognitive awareness in teaching at the undergraduate English education program at Sanata Dharma University, Yogyakarta, Indonesia. It addressed one overarching research question:

How can reflections empower pre-service English teachers' metacognitive awareness in teaching? The question was further elaborated into the following question, a null hypothesis and an alternative hypothesis:

Is there a difference in pre-service English teachers' perceptions of their metacognitive awareness in teaching at the pre-semester and post-semester?

H0: There is no significant difference in pre-service English teachers' perceptions of their metacognitive awareness in teaching at the pre-semester and post-semester.

H1: There is a significant difference in pre-service English teachers' perceptions of their metacognitive awareness in teaching at the pre-semester and post-semester.

Research Design

This research adopted a mixed-methods approach, collecting quantitative and qualitative data (Creswell & Clark, 2017; Daguay-James, & Bulusan, 2020). The approach aimed to gain a deeper understanding of the PSETs' implementation of reflections in empowering their metacognitive awareness in teaching and triangulate the findings from quantitative data with those from qualitative data (see Bowen et al., 2017; Kelle et al., 2019). These two data types were used to gain valid and reliable inferences and trustworthiness (Zohrabi, 2013).

Researcher Roles, Learning Contents and Activities

Since this was a practicum class, PSETs learned about teaching and practised peer, small groups, and the whole class teaching, with teacher researchers acting as facilitators rather than instructors. Each meeting usually ended with PSETs reflecting on their learning and teaching experiences. The class met once a week for 200 minutes. The class contents and activities can be seen in Appendix 2.

Sample and Data Collection

Using purposive sampling, thirty-six PSETs enrolled in two micro-teaching classes at the Undergraduate Program of English Education, Sanata Dharma University, Yogyakarta, Indonesia, participated in the study, which lasted four months, with 24 of them volunteering to fill out the pre-and post-semester questionnaire. As mentors for the class for more than ten years, we decided to introduce the Metacognitive Awareness Inventory in Teaching (MAIT) from Balcikanli (2011). This inventory covered all teachers' metacognitive elements and had good validity and reliability (Balcikanli, 2011). The KMO validity was 0.794, the value for Barlett TKest was 2513.474, and the reliability ranged from 0.79 to 0.85.

Quantitative data were collected through two questionnaires. Both questionnaires used a 5-point Likert scale of 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree). Twenty-four PSETs volunteered to complete them. The first questionnaire (MAIT) was derived from Balcikanli (2011) and distributed in the pre-and-post semester. The questionnaire asked PSETs to indicate their agreement with questions about their metacognitive awareness in teaching. The questionnaire consisted of 24 statements, which were divided into two parts. The first part focused on the knowledge of cognition, and the second on the regulation of cognition. Statements on the knowledge of cognition constituted four items on declarative Knowledge (Decl1-Decl4), four items on procedural Knowledge (Proc5-Proc8), and four items on conditional Knowledge (Con9-Con12). Statements on the regulation of cognition comprised four items on planning before teaching (Plan13-Plan16), four items on monitoring while teaching (Plan17-Plan20), and four items on evaluation after teaching (Eva21-Eva24). The second questionnaire (n=24) was adapted by the current researchers from Balcikanli's MAIT (2011) and distributed at the end of the semester. The questionnaire asked PSETs to indicate whether reflections could empower them to enhance their metacognitive awareness in teaching.

Qualitative data were gathered from students' answers to the questions about the dissemination of MAIT, summative reflections, and focus group discussions (FGDs) on the elements of metacognitive awareness in teaching. All thirty-six PSETs made seven reflections during the semester before the summative reflection. Before these activities, PSETs were introduced to the metacognitive awareness inventory through a two-hour class lecture. The inventory was disseminated one month after they practiced teaching in the micro-teaching class to have enough experience teaching without explicit implementation of MAIT. Data from the dissemination were gathered one month after the activity, while the other data sources were obtained at the end of the semester.

Summative reflections invited students to focus on how they might have developed their metacognitive awareness in teaching throughout the semester. The FGDs involved students' reflections and in-class small group discussions of these reflections. Students were given more than a week to write their reflections and then discuss three questions in small groups, i.e., (a) the benefits of metacognitive awareness in teaching; (b) the difficulties in implementing metacognitive awareness in teaching; and (c) suggestions for the implementation of metacognitive awareness in teaching.

Data Analysis

Descriptive statistics were used to analyze the participants' responses about their metacognitive awareness in teaching at the pre-and post-semester and their perceptions about the impacts of reflections on their metacognitive awareness post-semester. Hapsari and Mbato's (2019) mean category was used to interpret the mean, with the expression motivation replaced with perception.

Table 1. Mean Range for Perception

Mean Range	Interpretation
3.68 -5.00	A high degree of perception
2.34 - 3.67	A moderate degree of perception
1.00 -2 .33	A low degree of perception

A paired-samples t-test was performed using IBM SPSS Statistics (Version 17) to determine whether there was a significant difference in students' perceptions about their metacognitive awareness in teaching in the post-semester.

Qualitative data analyses from reflections and FGD focused on finding key issues in students' answers (Gibson & Brown, 2009) about their metacognitive awareness in teaching, mainly on whether or not there were indications of improvements.

Validity and Reliability in Data Collection and Analysis

Validity and reliability of the data analyses were observed through triangulation, long-term observation, participatory research, and the handling of research bias (Merriam, 2009; Zohrabi, 2013). Two types of triangulation were undertaken, i.e., methods and data triangulation. The data from the questionnaires, dissemination and summative reflections were triangulated in the analyses to corroborate the results. The researchers were involved in the research for four months (sixteen meetings), where they interacted with the research participants as facilitators in the micro-teaching class, designed the class contents and activities, repeatedly collected data on PSETs' metacognitive awareness in teaching through questionnaires, and students' reflections to arrive at data saturation. There was a collaboration with the participants in the data collection, so all the needed data in data analyses to answer the research questions were met. Research bias was addressed using Miles and Huberman's (1994) advice, namely: a) being in the micro-teaching class for four months (sixteen meetings); b) being less intrusive when students were doing practice teaching and conducting reflections based on MAIT; c) gaining rich data from pre-and post-semester questionnaires, a post semester questionnaire, students' reflections on the benefits of the dissemination of MAIT, and summative reflections; and d) preventing leading PSETs to expected answers. By comparing and contrasting different data to the elements of MAIT, the findings of this research attained credibility and consistency. Through thematic analyses, different codes and themes were recorded and compared with the elements of MAIT to reveal the perceived impacts of reflections in empowering PSETs metacognitive awareness in teaching.

Results

Quantitative Data

Students were asked 24 questions regarding whether or not reflections helped them increase their metacognitive awareness, i.e., knowledge of cognition and regulation of cognition before, while, and after teaching. The following Table 2 shows their responses.

Table 2. Students' Perceptions of the Role of Reflections in their Metacognitive Awareness

No.	Statement	Mean	SD
ReDecl1	Reflections increased my awareness of the strengths and weaknesses in teaching.	4.31	0.62
ReDecl2	Reflections helped me to know the most important skills	4.31	0.55
ReDecl3	Reflections helped me to have control over teaching	4.04	0.53
ReDecl4	Reflections helped me to know the teaching expectations	4.31	0.47
ReProc5	Reflections helped me to use proven teaching techniques	4.19	0.69
ReProc6	Reflections helped me to have a specific reason for using a teaching technique	4.04	0.77
ReProc7	Reflections helped me to have an awareness of the teaching techniques	4.15	0.78
ReProc8	Reflections helped my automatic use of teaching techniques	3.68	0.63
ReCon9	Reflections helped me to compensate strengths for weaknesses	4.19	0.63
ReCon10	Reflections helped me to motivate myself when having to teach	4.23	0.59
ReCon11	Reflections helped me to use different teaching techniques as required by the situation.	4.00	0.75
ReCon12	Reflections helped me to know when each teaching technique was most effective.	3.96	0.82
RePlan13	Reflections helped me to pace myself in teaching	4.31	0.62
RePlan14	Reflections helped me to set specific teaching goals before teaching	4.42	0.50
RePlan15	Reflections helped me to ask questions about the teaching materials	4.27	0.60
RePlan16	Reflections helped me to organize a time to accomplish teaching goals.	4.19	0.69
ReMon17	Reflections helped me to ask periodically if teaching goals were being met	4.12	0.52
ReMon18	Reflections helped me to assess how useful the teaching techniques were	4.12	0.59
ReMon19	Reflections helped my regular checking of students' comprehension	3.85	0.61
ReMon20	Reflections helped my self-questioning while teaching	4.19	0.49
ReEval21	Reflections helped me to ask myself about teaching goal accomplishment	4.19	0.57
ReEval22	Reflections helped me to ask myself if different techniques could have been used.	3.85	0.73
ReEval23	Reflections helped me to ask myself for more effective subsequent teaching	4.35	0.63
ReEval24	Reflections helped me to ask myself if all possible techniques had been considered	4.15	0.54
	Average	4.14	0.62

Adapted from Balcikanli (2011).

As indicated in Table 2, students generally admitted reflections' positive contributions in helping them develop their metacognitive awareness in teaching. The first four questions (ReDec1 to ReDec4) asked them whether or not reflections assisted them in enhancing their declarative knowledge in teaching. Their responses indicated a very high mean between 4.04 (ReDec3) and 4.31 (ReDec1, ReDec2, and ReDec4). The following four questions (RePro5 to RePro8) invited them to indicate their perceptions about the influence of reflections on their procedural knowledge. Their responses showed a very high agreement between 3.68 (ReProc8) and 4.19 (ReProc5). Four other questions prompted them to assess the

impacts of reflections on their conditional knowledge in teaching (ReCon9 to ReCon12). Their responses demonstrated a high mean between 3.96 (ReCon9) and 4.23 (ReCon10). The PSETs also indicated a very high agreement with the statements about the impacts of reflections on planning before teaching (RePlan13 to RePlan16), with the mean range between 4.19 (RePlan16) and 4.42 (RePlan14). When asked whether or not they perceived reflections as influencing their monitoring strategies in teaching (ReMon17 to ReMon20), they indicated a very high agreement with the mean range between 3.85 (ReMon19) and 4.19 (ReMon20). The last four questions (ReEval21 to ReEval24) invited them to indicate their opinions about the impacts of reflections on their evaluation strategies in teaching. They perceived the contributions highly, with a mean range between 3.85 (ReEval22) and 4.35 (ReEval23).

Overall, pre-service teachers viewed the impacts of reflections on their metacognitive awareness very highly, with an overall response mean of 4.14 on a scale of 5 (Nurhapsari & Mbato, 2019). PSETs' pre- and post-semester responses to the statements about their metacognitive awareness in teaching are strengthened by the results.

Table 3. Mean Comparison of Students' Responses to Metacognitive Awareness Statements in Teaching

No	Statements	Pre-semester		Post-semester		Mean Increase
		Mean	Std. Dev	Mean	Std. Dev	
Decl1	Awareness of the strengths and weaknesses in teaching.	3.59	0.78	4.36	0.53	0.77
Decl2	Knowing the most important skills	3.1	1.14	3.85	0.85	0.75
Decl3	Having control over teaching	3.03	0.90	4.36	0.48	1.33
Decl4	Knowing the expectations in teaching.	3.26	0.96	3.74	0.67	0.48
Proc5	Trying to use proven teaching techniques	3.31	0.86	3.85	0.63	0.54
Proc6	Having a specific reason for using a teaching technique	3.31	1.12	3.9	0.64	0.59
Proc7	Awareness of the teaching techniques while teaching.	3.1	0.91	3.67	0.73	0.57
Proc8	Using teaching techniques automatically.	2.79	0.92	4.1	0.55	1.31
Con9	Compensating strengths for weaknesses	3.26	0.91	3.77	0.77	0.51
Con10	Being able to motivate oneself when having to teach	3.15	0.96	3.82	0.68	0.67
Con11	Using different teaching techniques as required by the situation.	3.33	0.95	3.67	0.66	0.34
Con12	Knowing when each teaching technique is most effective.	2.77	1.01	3.77	0.62	1.00
Plan13	Pacing oneself in teaching to have enough time.	3.31	0.92	3.67	0.57	0.36
Plan14	Determining specific teaching goals before teaching.	3.1	0.85	3.77	0.53	0.67
Plan15	Asking questions about the teaching materials	3.56	0.75	4.15	0.67	0.59
Plan16	Organizing time to accomplish teaching goals	2.92	0.70	4.18	0.64	1.26
Mon17	Asking periodically if teaching goals are being met	3.03	0.95	3.59	0.63	0.56
Mon18	Assessing how useful the teaching techniques	2.92	0.83	4.23	0.58	1.31
Mon19	Regular checking of students' comprehension	3.28	0.72	4.23	0.53	0.95
Mon20	Self-questioning while teaching	3.33	0.89	3.56	0.55	0.23
Eval21	Asking oneself about teaching goal accomplishment	3.44	0.88	3.87	0.73	0.43
Eval22	Asking oneself if different techniques could have been used	3.1	0.94	3.92	0.62	0.82
Eval23	Asking oneself for more effective subsequent teaching	3.51	0.88	4.03	0.62	0.52
Eval24	Asking oneself if all possible techniques have been considered	3.15	0.70	3.74	0.54	0.59
	Average	3.19	0.89	3.90	0.62	0.71

SD: standard deviation.

The questionnaire in Table 3 above was adopted from Balcikanli (2011), and its complete version can be seen in Appendix 1. It shows PSETs' responses to their metacognitive awareness in teaching pre- and post-semester teaching. They indicated that they had improved their metacognitive awareness in teaching in the knowledge of cognition (Statements Decl1 to Con12) and regulation of cognition (Statements Plan13 to Eval24). PSETs demonstrated the highest responses to the declarative knowledge statements, with statement Decl3 gaining the highest mean increase (1.33). The second highest response was the PSETs' awareness of their strengths and weaknesses in teaching (Decl1/ 0.77 mean increase)

and their knowledge of the most important skills (Decl2/0.75 mean increase). The lowest increase in PSETs' response was shown by the statement Decl4 (Decl4/0.48 mean increase).

Students also acknowledged that they had improved their procedural knowledge in teaching (Pro5 to Pro8). The highest increase in PSETs' responses in this category was shown by statement Pro8, which is about whether or not they used helpful techniques in teaching automatically, with a mean increase of 1.31. The subsequent highest increase was indicated by PSETs' response to statement Pro6, which asked whether they had a particular reason for adopting a teaching technique in the classroom (Pro6/0.59 mean increase), and statement Pro7, which asked about their awareness of what teaching methods they used while teaching (Pro7/0.57 mean increase). The lowest response was given to statement Pro5, namely if they attempted to implement the previous successful teaching techniques (Pro5/0.54 mean increase).

Students further indicated that they possessed conditional knowledge in teaching, with the highest increase shown in statement Con12, i.e., whether or not they knew when each teaching technique they used would be most effective (Con12/1.00 mean increase). The second-highest increase in PSETs' response was indicated by statement Con10, that is, if they could motivate themselves when required to teach (Con10/0.67mean increase), and then Statement Con9, namely, whether they focused on what they could do rather than on what they could not in their teaching with the mean increase of 0.51 (Con9). The lowest mean was shown in PSETs' response to statement Con11, which is the ability to use various techniques demanded by the teaching contexts (Con11/0.34 mean increase).

Parallel with their increased knowledge of cognition was their regulation of cognition in teaching. In terms of planning before teaching, students showed that they did better in all four areas, including time organization to accomplish their teaching goals (Plan16/with the highest mean increase of 1.26) and determining specific teaching goals before starting teaching (Plan14/with the second-highest mean increase of 0.67). Students also indicated their agreement with statement Plan15 (Plan15/a mean increase of 0.59), viz., if they raised questions about the materials they would use. The lowest increase in the planning stage was indicated by PSETs' response to statement Plan13 (Plan13/a mean increase of 0.36), which is whether they could manage their teaching speed.

Similarly, students agreed with the four statements about monitoring strategies in teaching. The highest increase was indicated by PSETs' response to the statement Mon18. They agreed that they found themselves assessing how useful their teaching techniques were while they were teaching (Mon18/1.31 mean increase). The second-highest increase was indicated by PSETs' answer to the statement Mon19. They admitted having improved their comprehension of the material while teaching through regular checking (Mon19/0.95 mean increase). The last two statements (Mon17 and Mon20) also demonstrated improvements in students' responses, with statement Mon17 (i.e., asking themselves periodically if they had met their teaching goals while teaching) showing a slightly higher mean increase of 0.56 and statement Mon20 (i.e., asking themselves questions about how well they were doing while teaching) demonstrating the lowest mean increase (0.23).

Additionally, students agreed that they had improved their evaluation ability in teaching. The highest agreement for this category was shown by statements Eval22, i.e., whether students asked themselves if other techniques could have been used after each teaching topic (Eval22/0.82 mean increase). Statement Eval24 showed the second-highest response, viz., whether they asked themselves if all possible techniques had been considered after teaching a topic (Eval24/0.59 mean increase). Students also admitted to slightly improving their evaluation ability, as indicated in statements Eval23 and Eval21. Statement Eval23 focused on whether they asked themselves if they would teach it better in the future after teaching a topic. The mean increase for this statement was 0.52. Statement Eval21, which focused on whether they asked themselves if they had accomplished their teaching goals after teaching, demonstrated a mean increase of 0.43.

A paired-samples t-test was performed to determine the significance of the perceived improvement of students' metacognitive awareness in teaching.

Table 4. Paired Samples Statistics

Mean	N	SD	Std. Error Mean
3.19	24	0.22	0.045
3.91	24	0.24	0.049

Table 5. Paired Samples Correlations

	N	Correlation	Sig.
Pre-semester & Post-semester	24	0.031	0.887

Table 6. Paired Samples T-Test

	Pre-semester		Post-semester		t(23)	df	p
	Mean	SD	Mean	SD			
Students' perceptions	3.19	0.22	3.91	0.24	-10.88	23	.000

A paired sample t-test was performed to determine students' perceptions of metacognitive awareness in teaching as the dependent variable measured pre-and post-semester. The results indicated a significant perceived increase between the pre-semester level, 3.19, standard deviation (SD) = 0.22, and post-semester level, 3.91, SD = 0.24, $t(23) = -10.88$, $p < .05$. As a result, the null hypothesis was rejected, while the alternative hypothesis was accepted. It can be inferred that PSETs' perceived metacognitive awareness in teaching improved after participating in the research.

Qualitative Data

Qualitative data were collected through students' summative reflections and FGDs of the elements of metacognitive awareness in teaching. These activities were conducted after students had experienced teaching in the micro-teaching class for one month. Students practiced teaching their peers in small groups and the whole class in class. The practice aimed to give them sufficient experience in teaching and what they had to do to be a successful professional teacher.

1. *Reflections on the Dissemination of MAIT*

The researchers disseminated the ideas of the metacognitive awareness inventory (MAIT) to pre-service teachers through a 2-hour-class lecture. This activity was conducted after students had experienced teaching in the micro-teaching class for one month, where they taught their peers in small groups and the whole class. The practice aimed to give them sufficient experience in teaching and what they had to do to be a successful professional teacher.

Upon completing the dissemination activity, PSETs were given about a week to reflect on their teaching in light of the metacognitive ideas explained in class and the pre-semester MAIT survey they had filled out. The survey was the starting point for them to learn and implement the metacognitive awareness principles. Students mentioned six benefits of the dissemination of the MAIT. The first benefit was that it helped them to raise their awareness of metacognition in teaching. For example, SO8 wrote:

> *I learn something new from metacognition which is very beneficial for me as a prospective teacher in the future. Teachers should be aware that every student is unique in their intelligence. Even identical twins are not the same. The various intelligence is called metacognitive intelligence. In the future, teachers should compile lesson plan that includes students' various cognition.*

The second benefit was that it assisted them in understanding their strengths and weaknesses in teaching. S01 reported:

> *After understanding the metacognitive awareness inventory for teachers, I realize that it is important for me to be aware of my strengths and weaknesses in my teaching. Why is it so? Because I can evaluate myself to reduce my weaknesses and develop myself to improve my strengths. As a future teacher, it is also important for me to understand that there are some important skills in order to be a good teacher: (a) how to open a class to make the students full of spirit; (b) how to deliver the materials that make the students able to apply it in their lives; (c) how to manage the class that makes the condition of the class full of excitement; (d) how to close the class that can be the media for the teacher to make sure whether the students understand the materials or not. I also realize that doing reflection after the class is useful. It is helpful for me to understand whether the teaching goals are reached or not and what has to be improved.*

Students also described four other benefits of MAIT, i.e., (a) being more aware of the importance of teaching techniques; (b) being more aware of possessing teaching skills; (c) being more aware of knowing what to teach (planning); and (d) being more aware of planning, monitoring and evaluating their teaching.

2. *Summative Reflections*

Reflections were a significant force in our efforts to empower students' metacognitive awareness in teaching. After the dissemination of MAIT, students had 24 meetings to implement and reflect on their metacognitive awareness in teaching. Students made seven reflections based on MAIT throughout the semester, excluding the summative reflections. In this research, the researchers only reported the students' summative reflections conducted after they did their micro-teaching final exam. Most of PSETs wrote about one to two-page reflections. In general, students admitted the positive contributions of metacognitive awareness in teaching. They acknowledged improving their declarative, procedural, and conditional knowledge in teaching and their abilities to plan, monitor, and evaluate their teaching. The researchers summed up key ideas and, when relevant, cited a small portion of their reflections.

S09 reported that she had changed for the better in teaching due to the application of MAIT:

> *I am really excited because I finally did well in this course. I am proud of myself because, at the beginning of this semester, I felt uncomfortable and not sure I could do the teaching. But, now, I have become more confident in teaching and feel more challenged. The fact is that being a teacher is not as easy as I thought before. There are lots of requirements that a teacher should meet. MAIT really helps me prepare all of the things that should be prepared. It helps me to be more aware of anything about teaching before, while, and after teaching.*

Another student (S20) emphasized that MAIT helped her to compensate for her weak grammar with her cheerful personality in teaching. Understanding their strengths and weaknesses in teaching seemed to be one of the most important contributions of MAIT to many students. Similarly, S11 admitted, "*In the final test teaching practice, my friends and I have improved so much because we have applied MAIT, Higher Order Thinking, and Bloom's Taxonomy*." S28, in her long reflection constituting all aspects of MAIT, wrote:

> *I understand the materials that I am going to teach. I also remind myself that when I am teaching, I am supposed to be a good model for my students, so I try my best to pay attention to every aspect, such as material mastery, pronunciation, grammar, and even small things as appearance and eye contact. I want to inspire my students to learn English and motivate them.*

S17 described that the class had helped him understand teaching better. He reflected:

> *This class has given me a whole new world of college life. I got many experiences in this class, especially how to teach something. Teaching is not easy, but it is quite challenging. In this class, I should challenge myself to do something that I never do before. This class makes me realize that being a teacher is not easy. Many preparations that the teacher should prepare before they teach.*

Most PSETs admitted that they had improved their declarative, procedural, and conditional knowledge in teaching. They also acknowledged regulating their teaching better through planning, monitoring, and evaluating. Their improvements are strengthened by the data gained in the FGDs.

3. Focus Group Discussions

FGD was conducted in small groups in class at the end of the semester. Individual students were given more than a week to write their reflections about the implementation of MAIT before the implementation of the FGDs. These FGDs discussed three main questions, i.e.: (a) benefits of metacognitive awareness in teaching; (b) challenges in implementing metacognitive awareness in teaching; and (c) suggestions for the implementation of metacognitive awareness in teaching. The results are discussed below.

3.1 Benefits of metacognitive awareness in teaching

Students acknowledged that metacognitive awareness in teaching helped them before, while, and after teaching. Before teaching, Group 1 asserted, *"We can understand what points we have to prepare before teaching in the class."* Students also admitted gaining benefits from metacognitive awareness while teaching. For example, Group 3 expressed that they could control their classroom management strategies, change to another strategy if they felt bored, and manage their time while teaching well. Similarly, Group 4 acknowledged:

> *When we teach, we learn how to manage time allocation to have enough time. We try to implement and organize the material well. The teacher knows and explains the learning objectives and tries to implement the teaching technique chosen in class. Then, we know how to monitor our students by asking them questions to ensure they understand the materials. In teaching-learning activities, we try to evaluate ourselves by asking ourselves how well we are doing while teaching.*

MAIT was also beneficial for students after teaching. For instance, Group 5 reflected that MAIT helped them to know the best teaching strategies for their students, the lack of their teaching, and the aspects to be improved.

3.2 Challenges in implementing metacognitive awareness in teaching

Students encountered challenges in implementing metacognitive awareness before, during, and after teaching. For example, before teaching, Group 2 admitted:

> *To be aware of our strengths and weaknesses at the beginning of our teaching. To reflect on what we have to improve and what we have improved. To be used to classroom situations that dynamically change. To be able to make a good lesson plan.*

Similarly, Group 3 revealed the challenges in finding suitable strategies, creating suitable materials for the students' needs, understanding their character, and handling the nervous feeling (Group 1). Group 4 mentioned the challenge in terms of time management while teaching so they could help enhance students' understanding. After teaching, students found challenges in implementing metacognitive awareness in teaching and avoiding overthinking (Group 5). Group 2

mentioned that metacognitive awareness in teaching challenged them to (a) *"revise our lesson plan and the whole teaching; (b) find different techniques that will work better for the next teaching, and (c) ask ourselves how well we have accomplished our teaching goals once we are finished"*. Group 4 realized that metacognitive awareness used after teaching helped them "*always think about what we have done and what we should improve. If the teaching technique should be improved, we will improve it in the next teaching. Briefly, we just want to be better in the next chance".*

3.3 Suggestions for implementing MAIT

Students gave suggestions mainly to the teachers who wanted to implement metacognitive awareness in teaching rather than to the lecturers who taught them MAIT. Group 1, for example, gave two suggestions, namely: *(a) "focus on each point of MAIT; and (b) try to implement each point of MAIT in the learning activities"*. Group 3 came up with three suggestions, i.e.:

> *(1) The teachers should have a list of teaching goals to be achieved; (2) The teachers should be aware of their weaknesses and strengths; and (3) The teachers should have a self-reflection after they finish their teaching to know what should be improved for the next teaching*.

As demonstrated in their reflections, students generally showed favourable perceptions toward implementing metacognitive awareness in teaching. They also acknowledged the positive contributions of the increased metacognitive awareness in their teaching.

Discussion

This research was conducted to answer one main question, i.e., how can reflections empower Indonesian PSETs' metacognitive awareness in teaching? Quantitative and qualitative data analyses indicated the power of reflections to raise and increase PSETs' metacognitive awareness in teaching.

Quantitative data analyses of their responses to the pre-and post-semester questionnaire indicated that they were more aware of the knowledge of cognition and regulation of cognition in teaching post-semester. The PSETs' knowledge of cognition in teaching improved, consisting of declarative, procedural, and conditional knowledge, which helped them in their teaching. For example, PSETs admitted to having control over how well they taught (i.e., declarative knowledge), as indicated by the mean increase (Decl3/mean increase of 1.33). Declarative knowledge in teaching, which constitutes their concept of teaching (Balcikanli, 2011; Mbato, 2019), aided PSETs in developing their knowledge base about teaching. They also admitted having improved their procedural knowledge, i.e., knowing the skills in teaching (see, e.g., Balcikanli, 2011; Mbato, 2019). Quantitative data showed, for example, that PSETs had increased their awareness of using helpful teaching techniques automatically (Pro8/Mean increase of 1.31). Similarly, they acknowledged that they had improved conditional knowledge in teaching, namely, knowing when, why, and with whom to use specific knowledge and skills (Balcikanli, 2011; Mbato, 2019). They also reported improvements in the four areas of conditional knowledge in teaching: (a) knowing their strengths to compensate for their weaknesses in teaching; (b) being able to motivate themselves to teach when they needed to teach; (c) being able to employ various teaching techniques as required by the situation; and (d) knowing when a teaching technique they used would be most productive.

Furthermore, they admitted that they had increased their ability to regulate their teaching in planning, monitoring, and evaluation. Before teaching, metacognitive awareness had helped PSETs better prepare for their teaching. For example, they admitted possessing the ability to organize their time to best accomplish their teaching goals (Plan16/mean increase of 1.26). In addition, PSETs stated that they could monitor their teaching more often. For instance, they acknowledged assessing how useful their teaching techniques were while they were teaching (Mon18/Mean increase of 1.31).

Similarly, PSETs mentioned being more capable of evaluating their teaching after participating in the research. An instance of this improvement was shown in PSETs' response to statement 22. PSETs mentioned they asked themselves if they might have utilised other techniques after teaching (the mean increase of 0.82). Paired samples t-test clearly indicated the significant increase of PSETs' perception about the implementation of metacognitive awareness in (the pre-semester level, 3.19, SD = 0.22, and post-semester level, 3.91, SD = .24, $t(23) = -10.88$, $p < .05$).

The results from these quantitative data had much support from the qualitative data analyses where PSETs acknowledge the increase in metacognitive awareness and its impact on teaching. Data from the dissemination of MAIT, summative reflections, and FGDs highlighted the considerable benefits of metacognitive awareness training for PSETs' teaching in preparation, implementation, and evaluation. For instance, S09 reported the positive contribution of MAIT in helping her to become more prepared and aware before, while, and after teaching. Another example was from Group1: "We can understand what points *we have to prepare before teaching in the class."* PSETs also appreciated the benefits of becoming aware of their metacognition while teaching. Group 3 expressed that they could control their classroom management strategies, change to another strategy if students felt bored, and manage their time well while teaching.

Findings in this study corroborated previous studies (e.g., Aktağ et al., 2017; Gopinath, 2014; Palantis et al., 2017), which asserted that being metacognitively aware benefits not only the teachers but also PSETs' learning and the class atmosphere. Additionally, the results indicate the importance of teachers learning strategies to effectively and

successfully engage in reflective practices (Ong et al., 2020). While acknowledging that metacognitive awareness in teaching benefits teachers and students, few studies have used strategies to train teachers to be metacognitively aware. Because of its importance in the teachers' profession and its impact on teaching and learning, intentional learning and explicit training of metacognitive awareness for teachers need to be implemented (Aktağ et al., 2017; Palantis et al., 2017).

This research has shown that reflections have the power to increase teachers' metacognitive awareness in teaching. The positive impacts were also evident in PSETs' increased responses to the metacognitive awareness questionnaire post-semester. Their responses to the questionnaire about the role of reflections in their metacognitive awareness (see Table 4 above) demonstrated that reflections helped them develop their metacognitive awareness in teaching before, while, and after teaching. They positively perceived the impacts of reflections on their metacognitive awareness, as indicated by the average mean of 4.14 out of 5 and supported by the qualitative data. The findings in this study enrich the views of many authors about the power of reflections in increasing teachers' professional learning and development (see, e.g., Arslan, 2019; Davis & McDonald, 2019).

However, as indicated in the introduction and literature sections of the article, few studies have been done to facilitate pre-service teachers' metacognitive awareness in teaching. Some studies have partially focused on several aspects of teachers' metacognition. For example, the research conducted by Tosriadi et al. (2018) focused on the teachers' reflections on pedagogical content knowledge, which, in the light of metacognitive awareness, was related to declarative knowledge and procedural knowledge (Balcikanli, 2011). Another recent study by Davis and McDonald (2019) discovered that reflections focused on self-evaluation could positively impact the teachers' professional development. This study focused on one element of regulation of cognition, i.e., evaluation (Balcikanli, 2011). The current study corroborated Abdellah's (2015) urge for pre-service teachers to possess metacognition in teaching and more research on pre-service teachers' strategies to increase their metacognitive awareness in teaching performance. This study indicated that increased metacognitive awareness in teaching could improve pre-service teachers' self-belief and perception of subject matter competence (Alkan & Erdem, 2014).

The current research partly fills the gap and enriches other studies about the importance of metacognitive awareness in teaching (Aktağ et al., 2017; Gopinath, 2014; Ong et al., 2020; Palantis et al., 2017) in that it used a more comprehensive metacognitive awareness inventory (Balcikanli, 2011). The MAIT implemented in this research also strengthened the use of reflections and their potential to enhance teachers' metacognitive awareness in teaching (Amalia et al., 2020; Arslan, 2019; Davis & McDonald, 2019; Tosriadi et al., 2018). Reflections, used in this research to train PSETs' metacognitive awareness in teaching, could increase their capability to examine their teaching and its results (Fox et al., 2019). The increased metacognitive awareness in teaching could profoundly impact teachers' teaching and student learning.

Conclusion

This study provides significant evidence of the PSETs' positive perceptions of implementing reflections in empowering their metacognitive awareness in teaching. The quantitative and qualitative data indicated that their metacognitive awareness in teaching was empowered. The increased metacognitive awareness enabled them to prepare their teaching well and anticipate what was likely to occur in the actual teaching. Such awareness before teaching prompted them to prepare strategies and materials to cope with 'the unexpected' in class. Being metacognitively aware while teaching empowered them to focus on students and their learning and the strategies to solve the problems encountered in the teaching-learning process; thus, they were more in control of their teaching. Being metacognitively aware after teaching assisted them in evaluating their teaching, the strategies, the learning materials, and PSETs' learning progress. Facilitated through explicit reflections, possessing and displaying heightened metacognitive awareness in teaching could empower teachers, their teaching, and student learning. It was evident in this research that reflections could be utilised to increase PSETs' metacognitive awareness in teaching.

Recommendations

This research suggests that, while beneficial, enhancing metacognitive awareness in teaching takes time, patience, a strong commitment, and purposeful efforts from teachers and students.

Future researchers and university lecturers interested in investigating teachers' metacognitive awareness in teaching are advised to conduct their study over a more extended period. Teachers, lecturers, and future researchers may also need to focus on the impacts of teachers' and peers' feedback when training metacognition for pre-service and in-service teachers.

Limitations

This research was conducted for a short period of only four months. This study did not collect data about the impacts of teachers' and peers' feedback on students' reflections and metacognitive awareness in teaching. In addition, the validity of the second questionnaire had not been tested before its administration. Future researchers may need to test its validity before using it.

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Authorship Contribution Statement

Mbato: Conceptualization, design, data acquisition, data analysis/interpretation, drafting manuscript, critical revision of manuscript, statistical analysis, securing funding, admin, technical or material support, supervision, final approval. Triprihatmini: Data acquisition, securing funding, admin, technical or material support, supervision, and final approval.

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Appendix 1

Metacognitive Awareness Inventory in Teaching

No	Statements
Decl1	I am aware of the strengths and weaknesses in my teaching.
Decl2	I know what skills are most important
Decl3	I have control over how well I teach.
Decl4	I know what I am expected to teach.
Proc5	I try to use teaching techniques that worked in the past.
Proc6	I have a specific reason for choosing each teaching technique in class.
Proc7	I am aware of what teaching techniques I use while I am teaching.
Proc8	I use helpful teaching techniques automatically.
Con9	I use my strengths to compensate for my weaknesses in my teaching.
Con10	I can motivate myself to teach when I really need to teach.
Con11	I use different teaching techniques depending on the situation.
Con12	I know when each teaching technique I use will be most effective.
Plan13	I pace myself while I am teaching in order to have enough time.
Plan14	I set my specific teaching goals before I start teaching.
Plan15	I ask myself questions about the teaching materials I am going to use.
Plan16	I organize my time to best accomplish my teaching goals.
Mon17	I ask myself periodically if I meet my teaching goals while I am teaching.
Mon18	I find myself assessing how useful my teaching techniques are while I am teaching.
Mon19	I check regularly to what extent my students comprehend the topic while I am teaching.
Mon20	I ask myself questions about how well I am doing while I am teaching.
Eval21	I ask myself how well I have accomplished my teaching goals once I am finished.
Eval22	I ask myself if I could have used different techniques after each teaching experience.
Eval23	After teaching a point, I ask myself if I'd teach it more effectively next time.
Eval24	I ask myself if I have considered all possible techniques after teaching a point.

Source: Balcikanli, E. (2011).

Appendix 2

Contents and Activities

Week	Contents	Activities
1	• Introduction: Overview of the course • Competencies required for a teaching profession	• Lecture • Discussion • Student reflection
2	• Classroom Management Activities for Creating • A Positive Learning Environment (Positive classroom management activities) • Class Interaction	• Short Lecture • Presentation • Discussion • Student written reflection
3	• Skill Practice 1: set induction, and set closure • Skill Practice 2: stimulus variation skills • Skill Practice 3: questioning skills	• Peer teaching • Peer evaluation based on the observation sheet • Teacher feedback • Student written reflection
4	Integrated teaching skill practice (1)	• Teaching small groups using the most appropriate teaching methods and strategies in their classes • Teacher oral feedback • Student written reflection
5	• Dissemination of Metacognitive	• Teaching small groups
6	Integrated teaching skill practice (3)	• Whole class teaching
7	Lesson Planning 1 using MAIT	• Workshop • Teacher feedback
8	Mid-Test 1 using MAIT	• Individual teaching of the whole class @ 25-30 minutes**
10	Mid-Test 2 using MAIT	• Individual teaching the whole class @ 25-30 minutes*
11	Mid-Test 3 using MAIT	• Individual teaching the whole class @ 25-30 minutes* • Peer feedback • Teacher feedback • Student written reflection based on MAIT
12	Lesson Planning 2 using MAIT	• Discussion • Workshop • Peer feedback • Teacher feedback • Student written reflection based on MAIT
13	Final Test 1 using MAIT	• Individual teaching the whole class @ 25-30 minutes* • Whole class feedback • Teacher feedback • **SUMMATIVE REFLECTION BASED ON MAIT****
14	Final Test 2 using MAIT	• Individual teaching the whole class @ 25-30 minutes** • Whole class feedback • Teacher feedback • **SUMMATIVE REFLECTION BASED ON MAIT****
15	Final Test 3 using MAIT	• Individual teaching the whole class @ 25-30 minutes* • Whole class feedback • Teacher feedback • **SUMMATIVE REFLECTION BASED ON MAIT****
16	Final Test 4 using MAIT	• Individual teaching the whole class @ 25-30 minutes** • Whole class feedback • Teacher feedback • **SUMMATIVE REFLECTION BASED ON MAIT****

* depends on the number of students in the class
** Applies to the students who taught in that particular week