Augmenting Discussion Effectiveness through the Implementation of Thinking Routines to Visualize Learners' Cognitive Processes

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ABSTRACT: The purpose of this study is to investigate the efficacy of implementing thinking routines in a classroom setting to augment learners' discussion proficiency. Adapting the theoretical framework proposed by Ron Ritchhart and his colleagues in their Visible Thinking Project, specifically focusing on three selected routines: See–Think–Wonder, Headlines, and Claim-Support-Question, this action study was conducted at an independent university in HCM City, Vietnam. The treatment was carried out in five direct meeting sessions with 35 intermediate English-level students in a communicative class. Data was collected through pre-while-post implementation aligning with interviews and observation. The results of this study reveal that these participants not only expanded their ideas to the given topic but also engaged in deeper questioning and exploring their peers' arguments, thereby nurturing logical thinking and fostering a culture of self-directed learning beyond the classroom.

KEYWORDS: Cognitive process, Classroom discussion, Communicative teaching, Thinking routines.

INTRODUCTION

Adapting to the continuous development in the innovative 21st century, individuals are expected to have strong interpersonal skills. In the matter of education, current teaching approaches involve several discussion activities to encourage individual participation. The more valuable ideas learners can think of and share, the more successful their discourse effectiveness will be. However, as "think" is an ambiguous term, learners usually struggle with it. Owing to class time limitations, discussion sessions are often replaced by delivering content because they do not have any ideas to share. In this situation, teaching time turns into feeding time, and learning assessment focuses more on the matter of information memory than on individual development [1].

As thinking is not a gifted skill, pedagogical intervention is necessary to help learners improve. If learners could "see" what it is in their cognitive processes, it would be easier for them to generalize ideas and speak up. While Thinking Routines have been introduced in The Visible Thinking Project (2010), a part of Project Zero as a powerful technique to guide students to think visibly, there have been several suspicions about its practical effectiveness. In this study, the researcher experimented with three typical thinking routines in her communicative class: (1) See-Think-Wonder, (2) Headlines, and (3) Claim-Support-Question aligned with three purposes of discussion: exploring ideas, synthesizing and organizing ideas, and delving deeper into ideas, in real classroom situations. The result of this study promises to gain practical evidence of thinking routines' merits and how they support learners' discussion efficiency.

LITERATURE REVIEW
Discussion In Modern Teaching And Learning

Having been around for decades, cooperative learning has been highly appreciated as it encourages learners to conduct assignments in teams, and based on the process of working together, they naturally acquire knowledge. Compared with the teacher-centered model, Terenzini and his colleagues (2001) concluded in their study that group work results in higher academic achievement including deeper understanding and more creative ideas [2]. Moreover, teamwork benefits learners' motivation by minimizing nervousness and maintaining a supportive learning atmosphere [3].

Whenever a group works together, a discussion among members of the group happens. As Slavin (1980) originally portrayed one out of three cooperative learning components is task structure which combines lecture and discussion [4] Later on, Johnson and his colleagues (1998) expanded the ideas of five necessary conditions to build an effective cooperative learning environment [5]. In which, the researchers figured out the importance of face-to-face promotive interaction and group processing. In other words, discussion is a required activity during class time as it demonstrates task structure, and group processing, as well as gives learners a responsibility to engage with ideas. Thanks to discussion tasks, learners have opportunities to experience social interchange that

promotes not only social improvement but also information acquisition [6]. Although rewards are given to the whole group, this activity highlights individual roles such as sharing ideas, analyzing groupmates' views, and giving comments to finalize the issue. Therefore, it illustrates higher-order thinking [7], and contributes to deep thinking practice individually. Instead of being given directly, students logically work out under the lecturer's instruction by thinking individually first, sharing their ideas next, then analyzing peers' views, and finalizing key points. To sum up, discussion supports learners' experience with an effective learning approach that benefits their long-term memory.

Learners' Cognition In Discussion Activities

One out of five crucial keys leading to a successful discussion is each member of the group feels free to share ideas through communication without any pressure [8]. It means although the final result of a discussion belongs to the whole group, every participant is responsible for self-thinking and self-evaluating. There is also a wealth of agreement that modern teaching and learning methods benefit students' thinking abilities [9],[10], [11] because most of the learning activities demand the power of group work and to work in a group effectively, learners are forced to think and discuss to each other. However, practical teaching and learning conditions reveal difficult situations in which discussions usually end sooner than expected because learners do not have many opinions to share. They are having trouble with cognitive processes. In fact, human cognition includes two codes which are verbal code for language and nonverbal code for mental image and it always contains a special link between them [12]. It explains the need to combine language support and pictural imagination for complete cognitive development.

The term "visible thinking" should be defined as any observable facilitates that helps individuals imagine their thoughts in plain sight [13] so that it improves learners' cognition about a given topic. In terms of discussion tasks, visible thinking meets the purpose of analyzing concepts, revealing a flow of thoughts, and generating idea expression [14]. In other words, whenever the teacher can picture the things in students' minds, it becomes understandable and rememberable. The competence of visualizing learners' cognition is also tested and affiliated with the CLIL (Content and Language-Integrated Learning) approach by Forey and Polias (2017). This method benefits the learning process because it supports learners in linking their previous knowledge with current notions and so far connects them to their real-life experience [15] resulting in an active learning environment where learners are fostered to curiosity, open-mindedness, and critical thinking [16]. As a result, when individuals pay attention to their thinking process they tend to conduct discussions effectively. The more learners develop their habit of visualizing their thinking, the better they expose their views logically, and due to the clear exchange of ideas with peers, they understand the concept deeply and acquire knowledge completely.

Visualising Thinking Strategies

As visible thinking is a flexible notion, multiple explanations align with suggesting techniques to support learners' thinking in a way that is observable have been recorded. One of the most agreeable explanations is due to human cognition. Human cognition is formed through a series of mental processes in which humans operate problems, reasoning, analyzing, classifying, judging, and finalizing them [18], [19]. This intricate process indicates the necessity of step-by-step thinking to reach a complete understanding. For instance, Agustan and his colleagues assert that if a student is trained to question himself first, link a certain context with his previous experience after, and be aware of the strengths and weaknesses of the given issues, he might be able to control his thinking process better, express his ideas in logical ways, and so far interact with his teammates productively [20]. In another aspect, listening is also considered a useful tool to support visible thinking. Sue Patton Thoele believes that deep listening expands one's spirit, allowing for a more profound engagement with the material (quoted in Rao, 2010, p.24) [21]. When individuals listen intently, they are better able to absorb and process information, which in turn makes their thinking more transparent and comprehensible to others. Another technique to make thinking visible is to organize the thinking structure. Teachers play a crucial role in suggesting by guiding learners' thoughts in logical steps known as thinking routines. These routines help learners break down complex problems into parts, facilitating a clearer understanding and more effective problem-solving skills [22]. By implementing these strategies, educators can significantly enhance the visibility of learners' thinking processes, making discussion activities more interactive and collaborative.

RESEARCH FRAMEWORK

In this study, the researcher adapted Visible Thinking Routines – a part of Project Zero [23], developed by Ron Richhart and his research group at the Harvard Graduate School of Education.

A routine, as Ritchhart explains, is a sequence of actions that happen again and again to create a habit while conducting a thing. A routine helps individuals control their minds while thinking, promote idea production, and especially, express their views in processes [24]. Applying thinking routines, students are trained to move their thinks from basic to advanced involving eight levels. Without following these steps, it might be very challenging for learners to complete the picture of thinking resulting in difficulties in expressing ideas verbally.
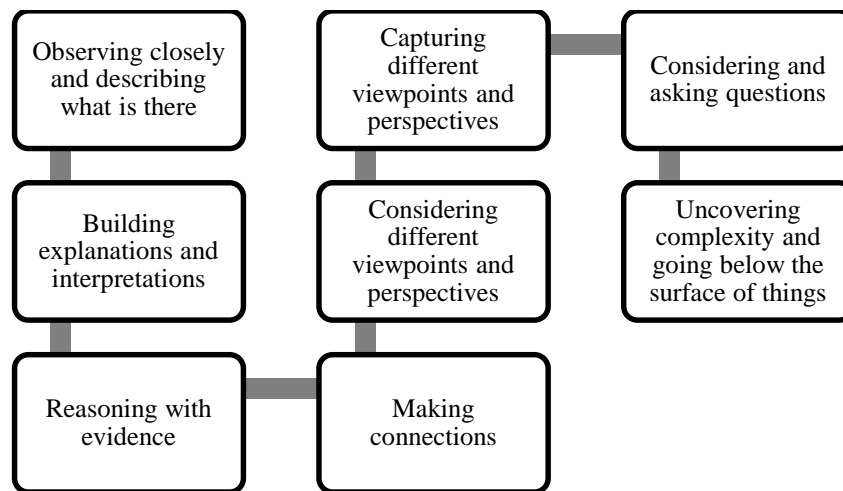

Figure 1. **Visible Thinking Routine (Ritchhart, et al., 2011, p.33-35).**

The authors explain the principle of this strategy extends beyond merely making thinking visible; it also fosters engagement and interaction, thereby enhancing discussion activities in the classroom and contribute to more successful discussions. Building on this foundational idea, they further developed a series of twenty-one routines categorized into three groups based on discussion purposes, all aimed at supporting visible thinking. When thinking moves and thinking routines are understood and implemented by learners, the thinking itself can become visible and the group's discussion is not a hard task anymore.

Table 1. Thinking Routine Matrix (Richhart, et al., 2011, p.57)

Introducing and Exploring Ideas		Synthesizing and Organizing Ideas		Digging Deeper into Ideas	
1	See – Think – Wonder	8	Headlines	15	What Make You Say That?
2	Zoom In	9	Color – Symbol - Image	16	Circle of Viewpoints
3	Think – Puzzle – Explore	10	Generate – Sort – Connect – Elaborate: Concept Maps	17	Step Inside
4	Chalk Talk	11	Connect – Extend – Challenge	18	Red Light – Yellow Light
5	3-2-1 Bridge	12	The 4Cs	19	Claim – Support – Question
6	Compass Points	13	The Micro Lab Protocol	20	Tug-of-War
7	The Explanation	14	I Used to Think – Now I Think	21	Sentence – Phrase - Word

Research Questions

To fulfill the purpose of the study, the survey sought to answer the following research questions:

1. What strategies do students in a private university in Ho Chi Minh City use to think effectively during discussion?
2. To what extent do visible thinking routines influence students' discussing ability?

METHODS

Pedagogical Setting & Participants

The study was conducted at an independent university in HCM City, Vietnam. During five meetings continuously, with one weekly lesson, the researcher explored the practicality of using three typical thinking routines as tools to support students' visible thinking development illustrated through their discussing competence. The data was collected from participants' interview responses before and after the treatment and observations from the teacher during treatment. A group of 35 university students including 22 females and 13 males were invited to take part in the research. This sample was purposely selected. The subjects were senior students majoring in English so they are masters in English communication. This was because the researcher aimed to eliminate the second language proficiency barrier that might affect participants' discussing capabilities. After being explained the purpose and procedure of the study, students who agreed to participate in the research were required to set an agreement that they were willing to follow the researcher's instructions during the experiment time and would answer the interview questions honestly.

Design of The Study

The researcher decided to apply the qualitative research design which included interviews and observation method because it was suitable for gathering data to figure out the two research questions. The design of this single case study is summarized below.
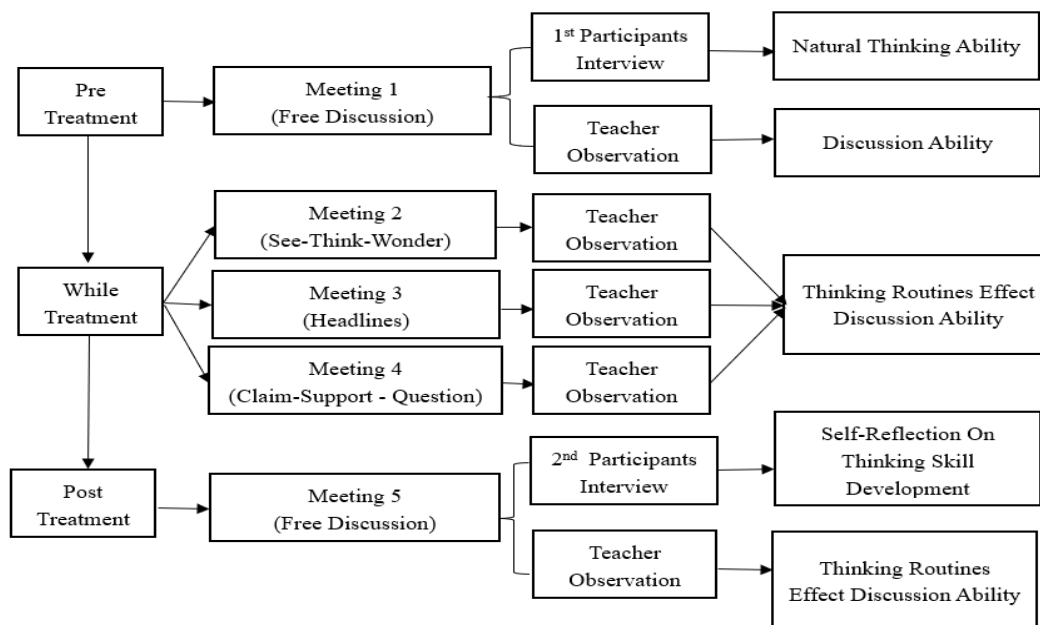
Figure 2. Research Design

Data Collection and Analysis

The interviews were carried out two times, in the first meeting and the last meeting with the same question " What did you do to get ideas during discussion time?". Data collected from the first interview was used to evaluate each individual's awareness of the thinking strategies. Likewise, in the second interview, those participants were encouraged to list all the things they truly did during the period. In this way, the researcher aimed to determine evidence if students apply any visible thinking routines to support their discussion after training.

Aligned with the participant's interview, the teacher's observations were used to make a comparison. The researcher recorded students' behavior during discussion time and then compared it with the participants' interview responses to consolidate the findings. The observation focused on four essential clues that reflect the quality of discussion involving (1) the number of students who were likely to contribute, (2) the number of viewpoints that were put forward, (3) the student's responses toward peer's arguments, and (4) the discussion atmosphere estimating based on silent time and teacher's talking time. The procedure was repeated with four stages (1) the teacher instructed a thinking routine (2) students thought individually (3) students discussed in groups (4)

representatives of each group shared ideas before class. Data collected support the researcher in analyzing the change in students' thinking processes.

See-Think-Wonder: This routine was applied at the beginning of the lesson to introduce the topic "Saving The Wild" and promote students' curiosity. The teacher delivered a photo taken by National Geographic. The photo shows villagers in the Democratic Republic of Congo carrying a huge dead silverback gorilla from Virunga Park to a special burial place. The teacher instructed students to examine the photo carefully and answer three questions (1) What do you see? (2) What do you think? (3) What do you wonder? By discussing three questions, learners experienced the first two thinking moves which are observing closely and describing what's there, building explanations and interpretations.

Headlines: This routine was applied in the middle of a lesson to train students to reason with evidence and make connections. After conducting a reading text "Living On The Edge", the teacher invited each student to think of a replaceable title. They were asked to discuss in groups and introduce their title with the reasons. Those students were encouraged to analyze their peers' ideas and give arguments on them. During this time, the researcher had a chance to consider the impact of this routine on creating a rich mental picture of what was centered in students' minds.

Claim-Support-Question: This routine was applied in a brainstorming discussion before a writing task. First, the teacher introduced a phenomenon that gap years between high school and university have been a flowering trend these days. Then, the teacher divided the class into two half groups depending on their claims: for and against. There would be time for students to list all evidence supporting their claims. After that, students were invited to express their claims and explain by giving support while other students on the opposite side were encouraged to examine their friend's ideas and consider evidence on the other side. Many questions were encouraged to be raised relating to things that might happen beyond the support, things that might make one hesitant about the claim. Taking turns to express arguments made students' thinking visible and allowed them to challenge others' thinking. By the end of the discussion, the teacher hoped that students would master the last three thinking moves which are considering different viewpoints, wondering questions, and exploring things below the surface.

FINDINGS

Participants' Interview Responses

Before the treatment, although every participant was able to describe more than a single action, most of their answers did not link to thinking strategies. To be specific, 28 out of 35 answers described the effort of copying ideas from Google, accounting for 80% in total. Similarly, scanning textbooks and asking friends were priorities aligning with 24 and 18 responses. Particularly, 5 students honestly admitted, " *I don't know what to think, I usually wait for my teachers' suggestion*". There was only a minority of proof that those participants truly control their thinking like drawing a mind map (31, 43%), making a comparison (22,86%), and putting themselves in given situations (17,14%).
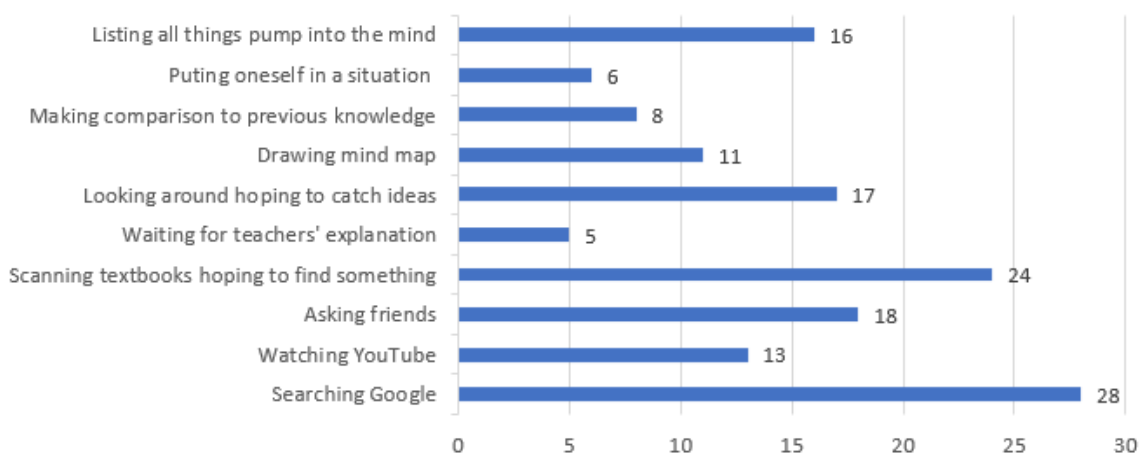
Figure 3. Students' actions during thinking time before treatment

On the other hand, the results gathered after treatment showed a significant change in participants' awareness of thinking. There was a wide range of responses from participants about the actions they did during thinking time. Among those answers, there was a great number of evidence linked to the thinking process such as " *I ask myself why and try to find the reason*", "*I consider surrounding factors and guess whether they affect the issue.*", or " *I try to find evidence for my claims.*", etc.
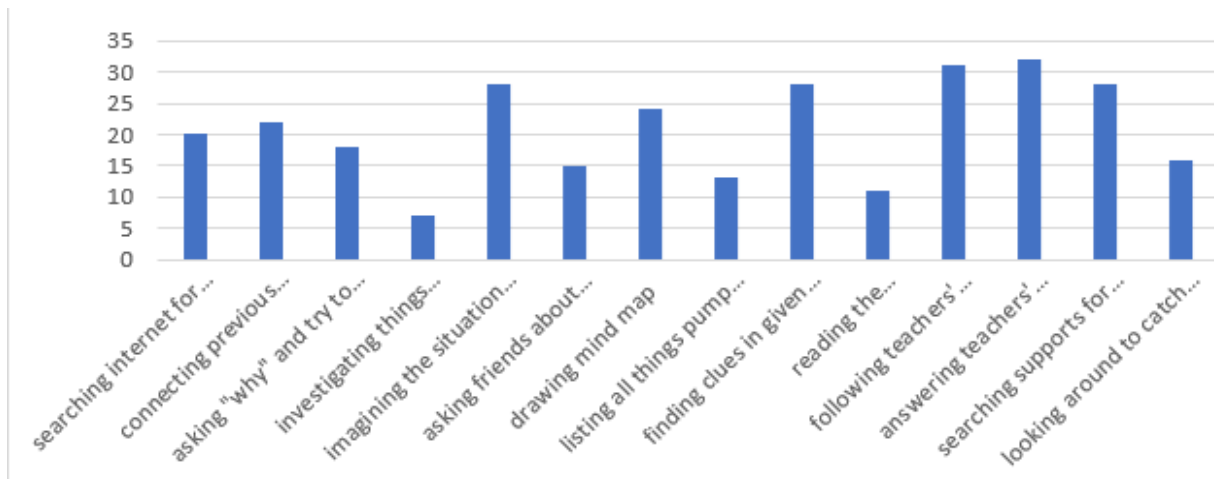

Figure 4. Students' actions during thinking time after treatment

Teacher's Observation

Meeting 1: Documents recorded from observation also show the unsuccessful discussion in the first meeting. Instead of spending time talking with friends about the given topic, most of the students kept their eyes on their phones while others used this time to do their stuff. There was very little communicative evidence among the groups. As a result, there were only three students volunteered to express their ideas with limited support. When the teacher invited other students to give more comments on their friends' ideas, there was silence.

Meeting 2: The achievement in the second meeting which applied the See-Think-Wonder routine is unclear as students were not familiar with the instruction. It took more time than expected for the teacher to instruct students what to think and for students to prepare their thinking. As a result, the class ended the discussion session by completing only two steps "*I see…*" and " *I think…*". Along with the teacher's instruction, students were able to describe things appearing in the given picture and speculate on the cause of it. However, they still had difficulty in exploring the hidden meaning of the photo which refers to the third step, "*I wonder…*". Furthermore, there was only a third of the participants took part in the discussion effectively while others still depended on their phones or kept silent and just listened to their peers.

Table 2. Students' responses in See-Think-Wonder routine

I see…	I think…	I wonder..
"A big black gorilla"	*"The gorilla was dead."*	*"Why is it dead?"*
"Many people, men"	*"That people come to help"*	(no ideas)
"People are carrying the gorilla"	*"They bring the gorilla to another place."*	(no ideas)
"Plants, trees, some flowers"	*"They are in a field."*	(no ideas)
"The people look serious"	*"They are not happy."*	(no ideas)

Meeting 3: There was evidence that students adapted the Headlines quicker than the first one. Although the amount of replaceable titles introduced by students was still limited and most of them were similar, those students were able to explain their works by giving proofs. It revealed students' capabilities to link their previous knowledge with their current learning. Furthermore, the discussion atmosphere became more dynamic as more than half of the students raised their hands and were happy to be called to voice up their thinking.

Table 3. Students' response to Headlines routine

Replaceable Title	Supports
"Reason for risk-takin"	*"good feeling, goal achievement, job, daily life"*
"Who are risk-takers?"	*"thrill seekers, goal-driven risk-takers, professional risk-takers, every risk-takers"*
"Four types of risk-takers"	*"thrill seekers, goal-driven risk-takers, professional risk-takers, every risk-takers"*
"The benefits of taking risks"	*" to improve mental health, to help others, necessary for careers, experience in life"*
"Why do people want to take risks?"	*"because of emotion, job requirements, donating, and getting experience*
"What kind of risk-taker are you?"	*"thrill seekers, goal-driven risk-takers, professional risk-takers, everyday risk-takers"*

Meeting 4: Based on identifying what was going on and the evidence of it, participants showed the competence to look for patterns and spot generalizations. Applying Claims-Support-Question, the evidence given by learners was also varied and meaningful. Furthermore, they also noticed their friends' claims, held them up to thoughtful thinking, and raised questions about the beyond situation. Those argument questions were valuable as they pointed out special cases that need to be investigated.

Meeting 5: Observation in post-treatment also revealed an effective discussion in the classroom. The interactive activity before the lesson was conducted successfully as learners took turns to express their guesses and curiosity about the upcoming topic. While thinking time was shortened, discussing time was lengthened because more students were eager to voice their opinions. Each student seemed to have different viewpoints with different supports. Those viewpoints were also dimensional and valuable. All of the evidence demonstrated a successful discussion session when almost all students remained highly energetic in debating until the end of the time. By the end of the discussion, most of the students were pleased by what they discovered together.

DISCUSSION

Data collected from the two interviews showed a significant change in student's awareness of thinking processes. Before the training, those participants showed their limitations of self-direction and reliance on external sources. This passive learning habit not only inhibits autonomy but also hampers the development of essential cognitive skills. This finding explained the unsuccessful discussion session observed by the teacher initially when there was not any thinking routine appliance. However, there were huge differences in participants' answers about what they did during discussion time after the treatment. Most of the responses from the interview revealed students' awareness of cognitive actions that make their thinking logical and visible. Findings from the second interview indicated a transformative shift in the utilization of thinking processes. When students become more aware of their thinking processes, they will be successful in metacognition [25]. Therefore, thinking routines can be used as tools to support learners' thinking moves, and help them to strengthen their thinking in any topic [26].

Results from the teacher's observations furthermore consolidated that the use of three thinking routines benefitted discussion quality. The See-Think-Wonder routine, which should be applied at the beginning of the lesson, helped to stimulate learners' curiosity before heading to the topic through the process of observation, interpretation, and speculation. Despite initial difficulties in transitioning through the routine's steps, those students exhibited growth in their ability to brainstorm ideas and so far found excitement in learning and discussing. Besides, the Headlines routine proved to be a successful technique as it was used to engage the students in apprehending and capturing the implication or core of the topic, issue, ideas, or thought being explored. These steps empowered students to distill key concepts and ideas from discussion topics, fostering critical thinking skills and facilitating more dynamic discourse. The enhanced engagement observed during Headlines discussions reflected students' growing confidence in expressing their ideas and providing supporting evidence, signaling a positive shift in classroom dynamics. In addition, the Claims-Support- Question routine emerged as a transformative catalyst in fostering critical inquiry and collaborative discourse. By prompting students to identify patterns, evaluate evidence, and pose insightful questions, this routine facilitated deeper exploration of complex topics and encouraged active participation. The diverse range of evidence presented by learners and the thoughtful

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interrogation of peers' claims underscored the development of robust critical thinking skills. The valuable insights generated through this process not only enriched collective understanding but also highlighted areas for further investigation, fostering a culture of intellectual curiosity and scholarly inquiry within the classroom.

Those three typical routines were carried out repeatedly during the meetings improving learners' discussion competence by making their thinking visible resulting in easy-to-orally sharing ideas, and above all, supporting a cooperative learning environment. The post-treatment observations revealed a notable transformation in classroom dynamics, characterized by heightened engagement, diverse perspectives, and sustained discourse. The interactive activities preceding the lesson effectively primed students for active participation, fostering anticipation and curiosity about the topic at hand. Reduced thinking time coupled with extended discussion periods facilitated more robust dialogue, with students demonstrating a willingness to share their viewpoints and engage in constructive debate. The sustained energy and enthusiasm observed throughout the discussion underscored the transformative impact of thinking routines in nurturing a vibrant learning community driven by intellectual curiosity and scholarly discourse. The findings of this research aligned with Wolberg and Goff's conclusion that thinking routines provide a protocol for enabling thoughtful discussion in the classroom [27].

CONCLUSION

Learning begins with an individual's idea and knowledge is built through discussion time. By discussion, each member of the group shares his opinion and develops on his peers' ideas. However, good thinking is not a matter of talent, but a matter of logical processes. While thinking is usually believed unseeable, educators are responsible for helping learners change their awareness by making it visible. According to this research result, applying thinking routines to support visible thinking built a great effort to facilitate students' understanding, enhance their engagement and independence while discussing, and so far benefited active learning. It is aligned with Barahal's agreement that by using thinking routines often, students can organize their ideas and gain effective arguments in any discussion tasks [26].

Besides, the study also presents noted limitations that should be put into consideration. Firstly, there were only three out of twenty-one thinking routines selected to conduct the study. This limitation may restrict the generalizability of understanding regarding the effectiveness of all thinking routines in fostering learners' discussion skills. Secondly, conducting the study over a short period might not provide sufficient time to observe the full spectrum of effects and adjustments that could occur with prolonged exposure to thinking routines. Consequently, the findings may lack robustness and fail to capture the nuances of long-term implementation and sustainability. Addressing these limitations, in future research, the researcher plans to expand the scope of the investigation and conduct comparative analyses across different thinking routines to identify their relative effectiveness in various contexts. Therefore, future studies are hoped to contribute to enhancing educators' knowledge of effective pedagogical strategies for promoting meaningful student discussion and learning outcomes.

ACKNOWLEDGMENTS

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