

The Effect of the Six Thinking Hats Technique on Iranian EFL Learners' Writing Skill and Their Attitudes Toward it

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10.22080/iselt.2025.27524.1073

Received

August 2, 2024

Accepted

September 16, 2024

Available online

November 3, 2024

Keywords

Attitude, Critical thinking, EFL learners, Six thinking hats (STH) technique, Writing skill

Abstract

Fostering thinking skills can lead to better achievements in general and writing ability in particular. Accordingly, the present study aimed to find out the effect of the six thinking hats technique as a new model of thinking on the writing ability of Iranian English as a Foreign Language (EFL) learners. To this end, 80 learners who were homogenized based on their performance on the Oxford Placement Test (OPT) were randomly and equally assigned to experimental and control groups. The experimental group received instruction on writing through the six thinking hats technique, while the control group received instruction through the conventional method, and the treatment lasted for ten sessions. Both groups participated in a writing pretest and a writing posttest to compare their performances. The results of repeated-measures two-way ANCOVA showed that the experimental group outperformed the control group in terms of their writing ability. Moreover, 23 participants from the experimental group were interviewed about their attitudes toward the six thinking hats technique, and the results indicated that they had positive attitudes toward this technique and found working with peers very useful in improving their writing ability. Despite being uncomfortable with some color hats and putting various ideas together which were the main challenges, the majority of the respondents expressed they could write better and easier after using this technique. The most important implication of the study is that EFL teachers and learners should use the six thinking hats technique as an effective technique to promote writing skill.

1. INTRODUCTION

Writing serves as a crucial medium of communication through which language learners can effectively articulate their perspectives, concepts, and cognitive processes in a manner that allows for creative expression (Almelhi, 2024). Moreover, the significance of being proficient in a second language in speaking and writing is increasingly acknowledged as the educational, business, and personal demands of the global community expand. However, writing is frequently regarded as the most difficult among the four primary language skills, posing challenges for both students and teachers. This is especially true for EFL learners, who commonly face obstacles during the writing process (Wale & Bogale, 2021).

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There is a nexus between thinking and writing in that one cannot write clearly without clear thinking. Writing helps people think more clearly. Since it calls for the expression of ideas and arguments in a style that promotes higher-order thinking, it improves thinking and aids individuals in developing their thinking skills (Esmaeil Nejad et al., 2022). Moreover, writing is related to innovation, which prompts critical thinking in students (Teng, 2020). Elder (2007) stated that the traditional approaches to education are incapable of developing the intellectual abilities required for academic achievement. The students are expected to write down information without questioning and reflecting. As Al-Tarawneh (2022) asserted, a mindful classroom should be developed to feed students' thinking. In the pursuit of meaningful learning, a mindful classroom not only actively engages students but also supports, encourages, and motivates them. To promote, inspire, and encourage people to think and reason freely, a thinking-friendly environment should be established. People who work in such environments ask questions about current practices and operations and look for, create, and assess information, knowledge, and fresh mental models. They also actively seek out, evaluate, and synthesize knowledge (Esmaeil Nejad et al., 2022).

De Bono (2002) Six Thinking Hats (STH) technique is a tool for both individual and group reflection which aims at assisting the learners to foster critical thinking as well as problem-solving skills. This technique has been unexplored in EFL contexts. According to Duncan (2020), this technique is both pedagogical and meaningful which lets the students think in both effective and authentic manners. As Ercan and Bilen (2014) clarified, the STH approach is more organized when contrasted with the current instructing exercises. Moreover, this technique promotes more interaction between the learners. Payette and Barnes (2017) stated that the STH technique leads to more classroom interaction since the learners are involved in six different cognitive features, which cooperatively improve problem-analyzing skills.

Despite its potential to foster critical and creative thinking in various language skills, the utilization of the Six Thinking Hats technique remains relatively unfamiliar in the Iranian EFL context. In this particular context, students face challenges in developing critical thinking and reasoning skills, primarily due to the nature of the education system in Iran. The emphasis on rote memorization of subject matter limits their ability to engage in independent and innovative thinking. Traditional teaching methodologies restrict the expression of ideas, further hindering the cultivation of critical thinking skills in their native language. Consequently, Iranian students are not provided with opportunities to engage in diverse thinking approaches (Fahim & Sa'eepour, 2011). A thorough examination of this phenomenon reveals that the methodology employed in Iranian education is the primary factor responsible for this issue. To address this problem, it is crucial to prioritize the promotion of critical thinking and reasoning skills. One effective strategy that can be employed is the utilization of the STH approach, which encourages students to explore various perspectives and modes of thinking. By implementing such strategies, Iranian students can enhance their ability to think critically and develop their reasoning skills.

In addition, Iranian EFL teachers predominantly focus on providing feedback based on the final product of students' writing, emphasizing the evaluation and marking of grammatical accuracy and structural correctness. Consequently, the process of writing itself is often undervalued, resulting in the neglect of vital elements such as critical thinking, creativity, and organizational skills. Additionally, students in the Iranian EFL context have limited exposure to authentic writing tasks that authentically reflect real-world contexts. Instead, their writing instruction primarily revolves around mundane exercises and prompts that do not effectively stimulate creativity or cultivate critical thinking abilities (Birjandi & Malmir, 2009). Research results have also demonstrated that Iranian EFL learners encounter serious obstacles in the English writing process (Rezaei & Jafari, 2014), such as generating ideas, organizing thoughts, and developing coherent and cohesive written texts. The STH approach, with its focus on different modes of thinking (e.g., creative,

analytical, practical), can potentially help learners overcome these challenges and enhance their writing. According to the researchers' experience and considering the context of the problem, this technique can be employed to improve EFL learners' writing. Additionally, numerous researchers have affirmed the necessity of writing development, and the absence of appropriate writing instruction in the Iranian EFL context has previously been highlighted (Du, 2020; Jabali, 2018). Due to the complex nature of writing and the lack of attention to this skill, writing problems emerge at any level, and the difficulties the learners face have attracted a great body of research (Bitchener & Basturkmen, 2006). Different strategies have been examined to promote self-regulation during writing stages and proposed different methods to teach writing in the future methods (Kanlapan & Velasco, 2009). Moreover, there may be a lack of research on the implementation of the STH approach, specifically in the Iranian EFL context. By conducting this research, the study aimed to contribute to the existing body of knowledge on writing instruction and provide insights into the effectiveness of this approach within the Iranian educational context. To achieve this goal, the current study attempts to answer the following questions:

- 1 - Does the thinking hats technique have any statistically significant impact on the writing ability of the Iranian intermediate EFL learners' writing skill?
- 2 - What are the attitudes of the Iranian intermediate EFL learners toward the thinking hats technique regarding their writing skill?

2. LITERATURE REVIEW

Theoretical Framework

According to Vygotsky (1978), social constructivism is a learner-centered paradigm that emphasizes the value of social interactions in the process of knowledge construction. According to social constructivism, knowledge is created by active learning, interpreting, and experiencing in social contexts. Students construct knowledge through engaging with contexts or other students as well as analyzing the environment they are located in Fu et al. (2019).

The overarching objectives of social constructivism, which support students in becoming active meaning-makers and self-regulatory learners, are compatible with the aims of critical thinking education. Social constructivism emphasizes that knowledge is actively generated by learners through engaging in meaningful social interactions as a general concept. This shows that learning is a social process and that it is impossible to learn something new without having some prior experience or prior knowledge structure. Social interactions with other people are where effective and long-lasting learning occurs (Pritchard & Woollard, 2013). From a social constructivist perspective, writing is a process through which one constructs meaning. This approach helps the learners to reconsider the traditional isolated writing activity as a more meaningful activity that motivates them in academic writing (Hidi & Boscolo, 2007). Having a social perspective in mind, the learners need to be taught about the social functions of writing. Viewing writing as a multi-disciplinary activity allows teachers to provide opportunities for their learners to improve their awareness of writing as a medium by which we assume roles in communicating (Graham et al., 2007). Fostering thinking skills can lead to better academic achievements and better reasoning and evaluating skills, which are developed through the roles of both the teacher and interactions among students (Costello, 2000). Critical thinking and social constructionism are both beneficial to add a dimension to academic writing. The six thinking hats technique can be implemented in various contexts and improve collaborative thinking, concentration, interaction, creativity, and productivity in a way that establishes a universal language that is effective across various cultures, ensuring improvements in both products and processes (Serrat, 2017).

Within a classroom environment, the implementation of a social constructivist approach to learning and writing would entail the incorporation of collaborative activities and discussions among students, which aligns with the goals of critical thinking. As students engage in collaborative problem-solving and peer feedback, they develop both social interaction skills and critical thinking abilities. The STH technique fosters critical thinking in learners by encouraging them to analyze issues from various perspectives. For instance, the white hat promotes fact-finding and information gathering, the black hat encourages problem identification, and the yellow hat helps students explore positive solutions. A concrete example of this technique in action is a writing assignment on climate change, where students consider the issue from economic, environmental, and political angles. This application of the STH technique not only enhances critical thinking skills but also results in well-rounded, thoughtful compositions.

The Relationship between Writing and Thinking Skills

The term writing refers to the act of thinking, creating, and encoding language into written material (Namaziandost et al., 2022). Writing and thinking skills are related in the sense that without clear thinking, one cannot write clearly. Writing serves as a catalyst for the development of thinking skills by promoting higher-order thinking. It allows individuals to express ideas and arguments in a manner that encourages critical thinking, thereby facilitating the growth of their cognitive abilities (Jiang et al., 2021). Critical thinking, characterized by active analysis, evaluation, and synthesis, is essential for effective writing. It involves questioning assumptions, examining evidence, considering multiple perspectives, and employing logical reasoning to assess the credibility and coherence of arguments or claims. Without a foundation in critical thinking, writing may lack a broader context or purpose, potentially giving rise to the presence of prejudices, biases, myths, and stereotypes (Paul & Elder, 2008). Therefore, it is essential to make sure that writing in a classroom setting incorporates critical thinking abilities. This will imply that knowledge is efficiently applied and used. In research on the relationship between writing ability and critical thinking, one of the early studies was carried out by Condon and Kelly-Riley (2004), who found that although pupils may start writing on their own, they soon understand they need to first think about it before putting pen to paper. Their research suggested an inverse relationship between writing and critical thinking, challenging the prevailing belief that these two skills are inherently connected. While it is acknowledged that cognitive abilities tend to correlate to some extent, the authors clarified that the findings might stem from insufficient assessment methods and the inherent difficulty in measuring such abilities.

The Sapir-Whorf hypothesis, which asserts that language determines cognitive activity, is intriguing in the EFL context since it suggests that there is a relationship between the (Wale & Bogale, 2021). The ability of the language to convey ideas clearly to the audience will decide how well the cognitive activity is mirrored in written text (Esmail Nejad et al., 2022). (Elbow, 1981) believed that voice was one of the most significant factors in evaluating student writing, and McLaughlin and Moore (2012) suggested that it is common for a piece of work that is well-written and organized to be rated as mediocre because it does not have a unique and novel thought. Without using open-minded thinking as the foundation for approaching the writing task – thinking that encourages the writer to take into account various strategies and potential outcomes – the writer may not achieve the standard of deductive reasoning required for writing. One of the characteristics of college-level thinking and writing may well be this thorough, impartial approach with meticulous reasoning that results, frequently conveyed in a clear yet neutral tone (McLaughlin & Moore, 2012).

Even though many approaches to teaching writing have developed from various teaching techniques, studying EFL writing is still one of the most difficult subjects for both teachers and students. According to Ahmed (2010), students' writing in an EFL classroom setting should

demonstrate their understanding of their own communicative goals, the context of the writing, and the intended readers. Iranian students' writing, according to (Birjandi et al., 2004), clearly lacks both the macro (content and organization) and micro (grammar, vocabulary, and mechanics) writing skills. Contrastive analysis has revealed additional proof of this lack of both micro and macro skills and that the other problems in the Iranian language learning environment include the learners' errors rooted in their mother tongue. Furthermore, significant pedagogical attention must be directed towards the instruction of English in order to enhance the writing skills of Iranian TEFL sophomores (Alifatemi, 2008).

Golpour (2014) examined the correlation between the critical thinking abilities of Iranian EFL learners and their performance across various writing modes among advanced students at the Kish Institute of Science and Technology in Rasht, Iran. The results demonstrated those who thought more critically employed more cohesive sentences, proper grammar, and content terms in their writing. In other words, those who were more capable of critical thought scored higher in writing. Moreover, providing a writing structure accompanied by an evaluation rubric that takes into account critical thinking standards has the potential to guide less experienced writers in their journey toward producing sophisticated and analytical compositions instead of relying on predictable and formulaic writing (Chason et al., 2016).

Six Thinking Hats (STH) Technique

As Nunan (2004) elaborated, tasks are of two kinds: an authentic piece of a task in which the learners manipulate the language in everyday social contexts and tasks with a pedagogical purpose. Pedagogical tasks necessitate the learners' involvement in the learning setting and manipulation of the target structure. The STH activity is related to the manipulation of language, and it is based on De Bono (1985) Six Thinking Hats (STH) model. It causes various reasoning modes and makes the members check various parts of the issue and make inferences (Swamy et al., 2019).

The six colored hats represent various thinking modes or behaviors. The hats are an instrument to trigger thinking and they serve as physical representations which elicit information and help them think beyond the regular patterns. As Jensen and Nickelsen (2008) stated, by wearing each hat the learners activate a certain thinking mode consciously. The principal concern of the STH technique is to enable the learners to discuss a certain issue and reach an agreement to find the best solution for the problem (Pang & Burri, 2018). On the other hand, teachers enable their students to handle situations in real life. Teachers can encourage the students to work together in a non-threatening environment despite having different learning styles. As such, through the six hats technique, teachers can create positive attitudes among the learners and motivate them (Khadzhiev & Rakhimov, 2019). STH helps the learners view the issue from six different angles by shifting attention through different colors. The various modes of thinking include positive or negative thinking and creative or emotional reactions (De Bono, 2002). Teachers design tasks incorporating the hats as tools, guiding students' thinking and encouraging consideration of different perspectives. By leveraging the hats, teachers create a conducive learning environment that promotes creative language manipulation among students. (Al-Khataybeh & Al-Tarawneh, 2015). The long-believed idea that viewed the teacher as the sole knowledge provider and the learners as passive beings is eliminated in this technique, and the learners are supposed to have a more active and creative role (Litak, 2015).

In EFL instruction, STH has been applied to assist in better achievements for EFL students. The study carried out by Kwayotha and Tantriratna (2008) examined the effects of STH and mind mapping on the improvement of reading, thinking, and writing skills. The research sample comprised nine students over the course of one semester. Data collection instruments included 24 learning management plans and lessons, assessments of student performance, a teacher observation form, a learning behavior observation form, and an interview. The findings indicated that students

demonstrated superior performance in reading, thinking, and writing. [Al-Bakri \(2011\)](#) employed STH as a teaching methodology for EFL students engaged in composition writing in Iraq, aiming to introduce innovative techniques that highlight the practical elements of teaching this skill. The study observed a notable enhancement in the performance of the experimental group, particularly regarding writing scores, quality, style, sentence structure, usage, and mechanics.

[Ballantyne et al. \(2001\)](#), for instance, examined the STH in contrast with a different thinking strategy, named story walk, in primary and secondary Australian schools. The outcome showed that both strategies had led to success in awareness raising of environmental issues. In another study, [Kumari \(2014\)](#) suggested the implementation of STH as a distinctive teaching approach that aids students in developing higher-order thinking skills, including parallel thinking, lateral thinking, as well as creative and critical thinking. He stated that some of the outcomes of STH include becoming more critical, constructive, and creative thinkers which are revealed in writing and speaking of the Indian students in their everyday lives. [Hani et al. \(2017\)](#) also examined the impact of STH on speaking skill among students with high, mid, and low levels of critical thinking. A factorial design was implemented involving 48 students who were categorized into experimental and control groups. The findings indicated that the experimental group exhibited greater enhancement in speaking proficiency. Nonetheless, a partially significant interaction effect was observed between the STH and the students' critical thinking concerning speaking achievement, particularly in the area of pronunciation. Furthermore, the results revealed notable differences in students' critical thinking levels within the experimental group, especially regarding comprehension, pronunciation, and fluency.

Several studies specifically examined the STH impact on writing skill. For instance, [Al-Khataybeh and Al-Tarawneh \(2015\)](#) investigated the impact of the STH method on developing EFL female eleventh-grade students' writing skill in the Al-Mazar directorate of education during the academic year 2013/2014. The findings of their study revealed a significant impact of the STH technique on the participants' writing skill by fostering creativity, imagination, thoughtful thinking, and problem-solving skills among students. Similarly, [Swamy et al. \(2019\)](#) explored the effect of implementing De Bono's STH method on the enhancement of university students' paragraph writing skills in Saudi Arabia. The study confirmed the effectiveness of the STH method in promoting university students' writing ability. Through engaging in discussions and receiving scaffolding support from the teacher, students successfully acquired the relevant vocabulary and phrases essential for effective writing. The collaborative nature of the discussions and the guidance provided by the teacher created an enabling environment that facilitated the students' ability to gather and incorporate appropriate linguistic elements into their written compositions. In a similar vein, [Al-Khataybeh \(2020\)](#) examined the effect of conducting the STH technique and the fishbone strategies on the improvement of Jordanian EFL students' writing skill. The findings of the study indicated statistically significant differences that favored the group that received the treatment involving the Six Thinking Hats and fishbone strategies. These strategies proved to be valuable in assisting students with organizing and clarifying their ideas before engaging in writing tasks. As a result, students were able to independently revise their drafts with minimal need for teacher intervention. The collaborative nature of cooperative activities and oral discussions further enhanced student engagement and fostered a heightened commitment to completing writing assignments. In another study, [Phuntsho and Wangdi \(2020\)](#) probed the influence of employing the STH technique on EFL learners' creativity and writing skill in higher secondary schools in central Bhutan. They found a significant difference in the writing skills and creativity of the experimental group, which received the Six Thinking Hats (STH) technique. Assigning specific thinking hats to students during group work positively impacted their engagement and responsibility. The students actively participated and shared information within their designated

thinking hat roles. The STH strategy also motivated the experimental groups, fostering creativity, imagination, and thoughtful consideration of their thoughts before writing their answers. In a recent investigation conducted by [Fahmy Hashem \(2021\)](#), the impact of the STH strategy on enhancing English language speaking skills and attitudes towards these skills was examined among 32 online EFL students. The study employed a checklist for speaking sub-skills, a speaking test, and an attitudes scale. Over a period of twelve weeks, the experimental group received instruction utilizing the STH. The findings provided substantial support for a positive influence of the STH strategy on the development of English language speaking skills and positive attitudes towards these skills among online EFL students.

The above-mentioned studies have proved that the STH technique effectively improves students' writing, including creativity, imagination, thoughtful thinking, and problem-solving abilities. It facilitates vocabulary acquisition through guided discussions and teacher support while promoting independent revision and reducing reliance on teachers. The technique enhances student engagement, fosters collaborative participation, and improves the organization and clarity of ideas in written compositions. However, this technique has hardly been addressed in teaching writing skill in the Iranian EFL context. To fill the gap in research and solve the problems of writing skill among Iranian EFL students, the researchers attempted to both examine the learning outcome of the STH technique on writing and explore the students' attitudes toward this critical thinking mode of teaching.

3. METHODOLOGY

Participants

The participants of the current study comprised 80 EFL female learners at the intermediate level selected through convenience sampling from Iran Language Institute (ILI) in Kermanshah, Iran. They were native Kurdish speakers of the age range from 14 to 22. It is worth mentioning that the age distribution of the participants deviates from conventional categorizations such as adolescents, adults, and older individuals. This deviation arises from the application of the Iran Language Institute (ILI) policy, which designates individuals aged 14 and above as adults. Consequently, the researcher had access to a sample population that necessitated a slightly adjusted age range criterion compared to traditional categories. However, it is important to note that the majority of the learners fall within the age range of 14 to 17 years. In order to make sure of the participants' homogeneity, they were required to participate in the Oxford Placement Test (OPT). Then, they were assigned randomly into two groups of 40 participants: one experimental and one control group. Additionally, 23 students were selected randomly from the experimental group to take part in a semi-structured interview and provide the researchers with their ideas on the six thinking hats technique after the treatment.

Instruments

Oxford Placement Test (OPT)

The researchers administered an OPT, version 2001, to 90 EFL female students to make sure they were a representative sample of the intermediate EFL female learners in Iran, out of which 80 students were selected. Sixty cloze and multiple-choice items testing grammar, vocabulary, reading comprehension, and writing are included in this test. This test was selected because it offers a reliable and efficient way to categorize the participants into different proficiency levels and to measure global language abilities ([Brown & Abeywickrama, 2010](#)). As [Brown and Abeywickrama \(2010\)](#) stated, in a normal distribution, proficiency test results are interpreted in terms of how each student's performance relates to the performance of all other students. OPT frequently evaluates general language proficiency and comprises 50 multiple-choice items that test

the students' understanding of basic to intermediate grammar and vocabulary. Ten additional multiple-choice items require students to select the best word from a list of alternatives to complete the given sentences. The time allotment for the test is 30 minutes. An optional writing task that tests the pupils' ability to write the language was also utilized whose time allotment is around 20 minutes. The participants with scores above 51 based on OPT criteria were chosen as intermediate-level EFL learners for the present research.

Writing Pretest and Posttest

Since the EFL learners in this study were at the intermediate level, they were asked to write a paragraph for the pretest and another one for the posttest. In addition, because the purpose was to improve thinking in writing through the STH technique, the writing topics were about promoting thinking in learners. The topic for the pretest was "Should there be an exam to enter university?" and the topic for the posttest was "Should teachers be responsible for students' failure?" To conduct the pretest and the posttest, the participants were given a task to compose a concise paragraph on the assigned topic within a time limit of seven minutes. This timeframe was determined based on the understanding that, typically, after engaging in critical thinking for approximately two minutes, students would require approximately five minutes to complete their written responses. Additionally, to ensure a reasonable level of content, students were instructed to produce a minimum of 70 words in their paragraphs. However, it should be noted that certain students failed to meet this criterion, resulting in the application of penalties for paragraphs that fell short of the required word count.

To ensure the validity of the assessment of students' writing ability, it was deemed necessary to avoid using the same topic for the posttest as the pretest. Extensive research has established that utilizing identical test content can yield unreliable data, as any improvement observed may be attributed not only to enhanced skills but also to familiarity with the specific question. However, in order to maintain a comparable level of difficulty in terms of the writing topic, a subject matter related to schools and the education system, which all students were familiar with, was selected. Although the underlying theme of the questions remained consistent, students were required to approach them from various perspectives and critically analyze both the advantages and disadvantages.

Six Thinking Hats Technique

The six thinking hats technique was used based on De Bono (1985, 2002) as the following:

The White Hat: It covers facts, data, and numbers. The learners collect the available or missing information and try to distinguish facts from interpretations. The inquiries posed here incorporate what the students know, what data is missing, what data they need to know, and what data they can obtain.

The Red Hat: It analyzes the issue by guts, feelings, and instincts. The inquiries for the red hat thinking incorporate what sentiments students have. Should learners include or exclude their emotions from thinking, to what degree emotions should be included, and is the learner passionate, terrified, or doubtful concerning the thinking?

The Black Hat: It perceives problems, dangers, and negative features of the issue. It promotes productive criticism and considers if a solution fits the information or facts. The black hat proposes the issues this speculation includes, what limits this speculation has, and what troubles a student in the reasoning might have.

The Yellow Hat: It encourages positive reasoning as opposed to the black hat. It offers critical thinking abilities and helpful reasoning. The questions posed with this hat include what the best feature of the issue is, what advantages there are, and how advantages can be enacted.

The Green Hat: This hat promotes creative thinking. The questions incorporate what ways can solve the problem, how the ideas differ from one another, and what the impact of these thoughts will be in real life.

The Blue Hat: It controls the thinking process, so it may be called the metacognitive thinking hat like summaries, overviews, and conclusions. The inquiries incorporate what the outcome is, what the most ideal way is to characterize the issue, and how we can accomplish more.

Semi-structured Interview

In the second phase of this study, a semi-structured interview was conducted with 23 participants selected randomly from the experimental group to explore their attitudes toward utilizing the STH technique to improve their writing skill in an EFL context. The semi-structured interview was administered to a total of 23 participants for two primary reasons. Firstly, conducting a personal interview with a larger number of participants proved to be less feasible due to the time constraints faced by both the researchers and the participants. Therefore, a decision was made to limit the number of participants for practical reasons. Secondly, not all participants expressed a willingness to provide their opinions regarding the use of the STH strategy. Out of the 33 participants who expressed interest in participating, a random selection of 23 individuals was made by the researcher, taking into consideration the limitations imposed by time constraints.

In order to provide the researchers with rich data, the interviewer requested the interviewees to expand more on their responses because this was a semi-structured interview (Dornyei, 2007) with 6 key questions (Appendix). Each interview lasted roughly 20 minutes and was audio recorded, later transcribed, and coded by two researchers. Another researcher then double-checked their coding to guarantee correctness and consistency. Negotiations were conducted in cases of disagreement in order to come to a consensus.

Research Design

This study used an explanatory mixed methods research design (Creswell & Creswell, 2018) to generate appropriate answers to the research questions. In the quantitative phase, the researchers controlled the conditions to which participants were exposed, conducted an intervention, and then determined whether the intervention affected the outcome. When measuring such an effect, researchers subject one or more groups (the experimental group) to a particular treatment while keeping the control group unaffected by it. The researchers then collected qualitative information after an intervention to further analyze the results and explain whether the intervention was successful. The effectiveness of the intervention and the participants' attitudes were then assessed through a semi-structured interview.

Data Collection Procedure

First, 90 female participants were homogenized by administering an OPT test. Next, based on their performance on OPT, 80 intermediate EFL female learners were selected and were randomly assigned into two groups: one experimental and one control. Then, a writing pretest was administered to both experimental and control groups to test their initial status in writing skill. Afterward, the experimental group was instructed in writing through the STH technique, whereas the control group received the routine teaching of writing. The treatment took ten sessions and, in each session, 30 minutes were allocated for the treatment. In the experimental group, students first selected a topic and brainstormed ideas using the green hat for creativity and the white hat for gathering facts. Next, they planned and outlined their writing by considering the problems and advantages of the black and yellow hats, respectively. During the drafting stage, students expressed their emotions using the red hat and linked different sections for coherence. They then engaged in peer review and revision, employing the hats to provide constructive feedback. Lastly, students finalized and edited their work before reflecting on their experience using the Six Thinking Hats

technique. Both groups' performances were evaluated after the intervention through a writing posttest. Finally, to investigate the experimental group's attitudes toward the STH technique, 23 of them were randomly asked to take part in a semi-structured interview.

Scoring Procedure

In order to score the participants' writings, the researchers used a rubric by Han and Huang (2017) with a 100-point analytic scoring checking the indices of syntax, content, arrangement, style, nature of articulation, and mechanics. Every category got different points based on the information in Table 1.

Table 1: The Score Weights of Han and Huang's (2017) 100-point Analytic Scale

Category	Weight Percentage
Syntax	30%
Content	20%
Arrangement	20%
Style and nature of articulation	15%
Mechanics	15%

Intervention

The intervention took place for ten sessions in a row. For every session, 30 minutes were allocated for the treatment. Prior to the implementation of the treatment, the teacher, who was one of the researchers, explained the STH technique and showed images of the hats to the class. Through the intervention, the teacher divided the class into groups of six. Each group was responsible for discussing the topic, and each individual was assigned a different hat. In the first session, the students could pick up the hat they felt more comfortable with. However, they were assigned different hats in each session to experience various reasoning modes. If a student refused to take the assigned hat responsibility, another student who felt the same would announce to exchange their hats.

During the 30-minute treatment sessions, the class was partitioned into groups of six students each. At the commencement of each lesson, a rapid review of the ideas associated with each thinking hat was conducted, with the active participation of the students. Following this, each group member selected a hat based on their personal interest, and a total of 10 minutes was allocated for the selection process and the consolidation of ideas within the group. Subsequently, a period of five minutes was dedicated to individual writing, during which each student crafted their own initial draft paragraph, taking into consideration all the ideas generated during the group discussion. Following the writing phase, the students were given 10 minutes to share their written work and engage in peer editing or provide feedback on their peers' paragraphs. Toward the end of the session, the teacher provided additional guidance and tips for improving the final drafts. In contrast, the control group received conventional Iran Language Institute (ILI) writing instruction. They were instructed to write a paragraph in class while receiving general tips from the teacher. They were encouraged to organize their writing by incorporating a topic sentence, supporting sentences, and a concluding statement. Similar to the experimental group, they were also allowed to assist each other with editing. However, the timing differed as there was no hat selection or idea-pooling process involved. The control group was given a total of 15 minutes for writing and editing, with the same five-minute duration allocated for the writing phase.

4. RESULTS

Quantitative Data Analysis

Since two raters were correcting the writings, the inter-rater reliability was checked through correlations. Moreover, because of the normality of the data sets, the suitable correlation type was Pearson Correlation.

Table 2: Inter-rater Reliability of the Writing Pretest and Posttest Scores of the Control and Experimental Groups

		Pre, CG, 2 nd rater	Pre, EG, 2 nd rater	Post, CG, 2 nd rater	Post, EG, 2 nd rater
Pre, CG, 1 st rater	Pearson Correlation Sig. (2-tailed)	.94** .00			
Pre, EG, 1 st rater	Pearson Correlation Sig. (2-tailed)		.95** .00		
Post, CG, 1 st rater	Pearson Correlation Sig. (2-tailed)			.92** .00	
Post, EG, 1 st rater	Pearson Correlation Sig. (2-tailed)				.91** .00

** Significant at .05 level

To check whether the reliability of a test is strong or not, [Muijs \(2004\)](#) categories, provided here, were used. The closer the values are to +/-1, the stronger the reliability will be and the closer it is to 0, the weaker the reliability will be. Based on the above criteria and the correlation values in Table 3, which are all above .8, the conclusion is that there was a very strong correlation between the scores assigned by the two raters to the students' writing in the pretest and posttest.

To make sure of the homogeneity of the groups in the present study, their pretest scores were analyzed through an independent-sample t-test. Checking the homogeneity of the scores is necessary to be able to claim the progress of the participants, if there is any, has been the result of the treatment they have received.

Table 3: Descriptive Statistics of the Pretest Scores of the Two Groups

	N	Mean	SD
Control Group	40	64.06	10.27
Experimental Group	40	71.37	9.23

Checking the mean scores of the two groups in their pretest, 64.06 for the control and 71.37 for the experimental group, it seemed that there was a difference between the two groups' performance at the start of the inquiry. However, whether this is a significant difference, the two groups' pretests were investigated through an independent-sample t-test.

Table 5 further confirms the results obtained in Table 4. Because of the significant value reported for Levene's Test for Equality of Variances, which is a value higher than the critical value ($p=.38$; $\alpha=.05$; $p>\alpha$), equal variances were assumed. However, the significant value for the t-test for Equality of Means is .00 and smaller than the critical value ($p=.00$; $\alpha=.05$; $p<\alpha$), meaning that there was a significant difference between the mean scores of the participants of the two groups on the pretest. Therefore, the homogeneity of the groups was not approved at the start of the research. Thus, this difference has to be taken into account when investigating the research questions.

Table 4: Independent-Samples T-Test on the Pretest of Two Groups

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Pretest	Equal variances assumed	.75	.38	-3.34	78	.00*

** Significant at .05 level

Investigation of the First Research Question

To check whether the performance of the control and experimental groups showed a significant improvement from the pretest to the posttest and compare their improvement level, a repeated-measures two-way ANCOVA was run to take into consideration the two groups' initial differences. In all the analyses on the writing pretest and posttest scores, the two raters' mean scores were utilized. First, the descriptive statistics of the two groups' writing scores in their pretest and posttest are presented.

Table 5: Descriptive Statistics of the Writing Pretest and Posttest of the Control and Experimental Groups

		Pretest	Posttest
Control Group (N=40)	Mean	64.06	64.00
	SD	10.27	10.32
Experimental Group (N=40)	Mean	71.37	77.12
	SD	9.23	8.67

Since the mean scores of the pretest and posttest of the control group are 64.06 and 64.00, respectively, it could be said that the participants did not improve in the posttest. However, regarding the mean scores of the experimental group's pretest and posttest, which show a fair amount of development from 71.37 to 77.12, it could be concluded that they had a better performance in their posttest compared to their pretest. Checking the outcomes of a repeated-measures two-way ANCOVA run on the performance of the control and experimental groups could help conclude about such difference.

Table 6: Tests of Within and Between Subjects Effects (ANCOVA) of the Control and Experimental Groups

Effect		Value	F	Sig.	Partial Eta Squared
Time	Pillai's Trace	.13	11.95	.00*	.13
Group			413.94	.00*	.33
Time * Group	Pillai's Trace	.13	11.95	.00*	.08

** Significant at .05 level

The significance value for the within-subjects factor, represented by 'time' referring to the time interval between the pretest and the posttest, is .00, which is a value below the critical level ($p=.00$; $\alpha=.05$; $p<\alpha$). It means a noteworthy difference was observed in the performance of the participants from the pretest to the posttest. This difference size was moderate according to the Partial Eta Squared reported, which is .13. The effect size is considered large according to Pallant (2020) classification, where the Partial Eta Squared is small if it is .01, it is moderate if it is .06, and it is large when it is .14.

The significance value for 'group' indicates the outcomes of the effect between-subjects effect. Since the value is .00 and below the critical .05 level ($p=.00$; $\alpha=.05$; $p<\alpha$), the conclusion is that

the two groups performed considerably differently from each other on their pretest and/or posttest. The size of this effect is large as the Partial Eta Squared is .33. Such a difference is in line with the mean scores presented in Table 6 showing the improvement of the experimental group in comparison to the control group.

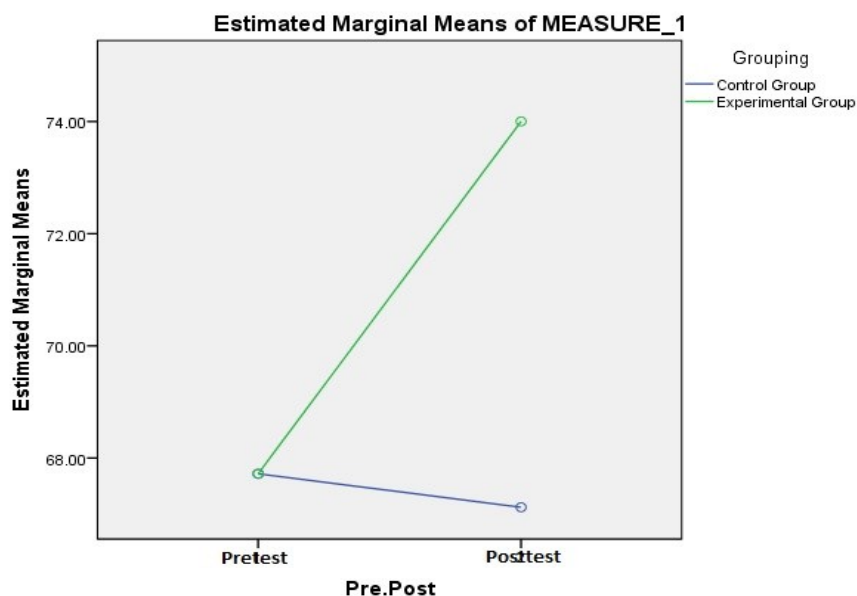
The third and most important row indicates the interaction between time and group. The significance value reported for the interaction is again .00 ($p=.00$; $\alpha=.05$; $p<\alpha$) and smaller than the critical value. This means that the participants of the two groups performed significantly differently from each other in the pretest and the posttest. That is, the amount of improvement seen in the two groups' performance was not the same from the pretest to the posttest, which confirms the experimental group's progress and the control group's lack of progress. The effect size of this interaction is .08 indicating a moderate effect size.

Table 7: Pairwise Comparison of the Two Groups in their Posttest

(I) Pre. Post	(J) Pre. Post	Mean Difference (I-J)	Std. Error	Sig.
Experimental group	Control Group	2.84*	.51	.00*

** Significant at .05 level

To check whether the two groups' performance was statistically different from each other in the posttest, a pairwise comparison was run on their posttest scores (Table 8). The significance value reported for comparing the two groups' performance in their posttest is .00 and below the critical level ($p=.00$; $\alpha=.05$; $p<\alpha$). The conclusion was that the two groups had significantly different performances in their post-test. Putting this outcome together with the previous results, it can be seen that the control group did not perform well and did not improve a lot, while the experimental group's performance was significantly better in the post-test.



Covariates appearing in the model are evaluated at the following values: Covariate = 67.7188

Figure 1. Differences between the Writing Pretest and Posttest of the Experimental and Control Groups

Figure 1 shows the two groups' progress from the pretest to the posttest visually. As can be seen in Figure 1, the control group did not improve, as shown by the lower line, while the experimental group performed significantly better in the post-test, as depicted by the upper line.

To wrap up, the results of Tables 6, 7, and 8, as well as Figure 1, indicated that the experimental group improved significantly from the pretest to the posttest, while such progress did not occur for the control group. Comparing the progress of the experimental groups with the control group makes it clear that such progress could be due to the treatment they received. Accordingly, the first research question could be answered as "the thinking hats technique has a statistically significant impact on the writing ability of the Iranian intermediate EFL learners' writing skill.

Qualitative Data Analysis

Investigation of the Second Research Question

To shed light on the contribution of the STH technique to the improvement of EFL learners' writing skill, a semi-structured interview ([Appendix A](#)) was run with 23 EFL learners. The interview responses were then transcribed and analyzed. The content analysis involved identifying major themes and sub-themes from the responses by carefully reading and reflecting on the content mentioned by the participants. Two researchers worked collaboratively to identify the themes and sub-themes, and the third researcher rechecked the coding to ensure accuracy and consistency. For instance, codes like "positive experience," "contributing to previous writing experiences," and "useful and fun steps" were grouped under the theme "perceived benefits of the STH technique." The emerged themes and sub-themes along with the frequency and the percentage of their occurrence in the interviews are presented in Table 8.

As illustrated in Table 8 and regarding the first interview question, the participants in the experimental group who received writing instruction through the STH technique pointed to its benefits and found it a positive experience. For example, Respondent 1 asserted:

"Actually, it was teamwork, it was great. I enjoyed talking to my classmates and getting their feelings and views but we had some problems, too. At first, it was hard for us to understand the Six Thinking Hats method and how to use it in our writing. Also, it was difficult to agree on different ideas because everyone had their own opinions. But even with these challenges, we learned to communicate better and think more carefully about our work."

Concerning the second interview question which asked whether this technique facilitated their writing, the respondents answered positively. Respondent 7, for instance, stated that:

"Actually, it was better and easier than before because, in this term, I learned how to write my opinions in a good and suitable way, so I think it was good. I could correct sentences better and easier than before so I learned to write better."

Respondent 11 answered:

"I think in future I can use this method through my writing because it regulates our mind."

Interview question three asked whether the experience of writing by the STH technique contributes to learning in comparison with their previous writing experience. The majority of the respondents agreed that it contributed to their previous experience. Respondent 6 affirmed:

"Yeah, it contributes to those techniques of writing that we learned before. As you know, we had to write about similar feelings that we experienced in this exam and others."

Table 8: Themes and Sub-themes Extracted from the Semi-structured Interviews

Themes	Sub-themes	Frequency	Percentage
Perceived benefits of STH technique	Positive experience	23	100%
	Facilitative technique	23	100%
	Contributing to previous writing experiences	19	83%
	Clarity of what to do	5	22%
	Useful and fun steps	5	22%
Critical thinking development	Considering different thinking modes	13	57%
	Idea generation and sharing	7	30%
	Writing process improvement	23	100%
Improved writing skills	Teamwork and collaborative writing	20	87%

Interview question four asked which section of the STH technique they found most/least useful. Some respondents referred to the point that clarity of what to do was the most useful feature. Several students referred to the point that every step in this process was useful and fun. Some referred to different colors of hats since that aspect of thinking helped them a lot in writing. Respondent 14 stated:

“Black hat is the most useful because the subjects were very special and it has a lot of negative points. Especially when we were asked to write about the impact of technology on education. This subject was particularly special because it has an important influence on our daily lives as students. When I mentioned ‘negative points,’ I was referring to the potential drawbacks of technology in education, such as the risk of distraction and students’ potential challenge of access to technology. The black hat enabled us to critically analyze these concerns and develop well-rounded arguments in our writing.”

In a similar vein, Respondent 11 affirmed:

“All of it! My classmates were the best and very helpful and not only this but also teamwork is very good to teach students and make them enjoy writing.”

Interview question five asked if the students felt that this technique allowed them to write better. All of the students found this method very useful in writing better. The reasons varied, though. Some expressed that comparing ideas against each other was helpful and developed their critical thinking since they tried different thinking modes. Some argued that sharing different ideas for each hat let them write better. Respondent 7 argued:

“Yes, because each person can concentrate on a specific part or hat. Yeah, it helped me know new things and talk to different people with different points of view and write a better paragraph.”

Respondent 4 mentioned:

“It was good, a bit scary, and weird, because I am a shy and introverted person. When I thought about this work, I was nervous. But when I did it with my classmates,

I felt good because we could share our opinions and learn a lot of things that could help us be better in class and communicate with others better than before.”

The last interview question asked if working with peers was helpful. The majority of the students agreed that working together promoted more communication and teamwork. Respondent 5 stated:

“Yes, I think if all group members do their jobs properly, teamwork is so good. We should learn how to work with other people and I think my classmates did their best, and they were very kind and sociable with each other. We had a good time of teamwork.”

To sum up, the interview questions elicited the participants' attitudes toward the STH technique and revealed positive perceptions about using it. All of the respondents enjoyed the experience of writing through the six thinking hats technique. Several students affirmed the positive impact of teamwork on their writing, too. Some of them have asserted that different colors enhanced different thinking modes which they were not familiar with before. A number of students have specified that knowing what to do in their writing was the most advantageous feature. All of them found working with peers very fruitful.

5. DISCUSSION AND CONCLUSION

The current research intended to inspect the impact of the STH technique on the writing skill of Iranian EFL learners. The outcome of data analysis revealed that the STH had a significant impact on the writing ability of the learners, and the participants of the experimental group demonstrated positive attitudes toward this method. The outcomes of the explanatory mixed methods design indicated that the traditional teaching method of writing, which focused on the product, did not lead to considerable improvement in the EFL learners' writing ability. The reasons could be due to the teacher-centered method and lack of engagement on the students' part. The traditional teacher-centered approach in writing instruction limits student participation, hindering their ability to express ideas and develop writing ability. This lack of student involvement and agency hampers motivation and progress. Conversely, student-centered approaches, such as the Six Thinking Hats technique, foster active engagement, collaboration, and critical thinking. By providing opportunities for exploring perspectives, generating ideas, and engaging in meaningful activities, student-centered methods promote a deeper understanding of writing concepts and enhance motivation to improve writing abilities. Thus, transitioning from a teacher-centered to a student-centered approach is vital for significant improvements in EFL learners' writing skills, particularly in the Iranian EFL context. It is also admitted that in the Iranian context, teachers mostly provide feedback on the students' final product ((Birjandi & Malmir, 2009), and such an approach has led to serious problems in the writing ability of Iranian EFL (Rezaei & Jafari, 2014).

The results of this research are in agreement with the literature that De Bono's six thinking hats improved the writing skills of the learners in various contexts (Al-Khataybeh, 2020; Al-Khataybeh & Al-Tarawneh, 2015; Phuntsho & Wangdi, 2020; Swamy et al., 2019). The findings in this study confirmed that the STH technique taught the learners how to look at the issues from various perspectives. Each hat symbolizes a distinct viewpoint: white for objective facts, red for emotional responses, black for risks, yellow for benefits, green for creative solutions, and blue for metacognitive reflection. By systematically using each hat, learners analyze different facets of an issue, such as factual information, emotional reactions, drawbacks, and positive outcomes. This approach fosters a comprehensive understanding of the topic and cultivates critical thinking skills. The research results corroborated the ideas that viewed this technique as a trigger to improve classroom interaction (Ercan & Bilen, 2014). Writing necessitates critical thinking and social constructionism. The STH technique promoted writing in this study, most probably because it enhanced collaborative thinking, concentration, interaction, creativity, and productivity (Serrat,

2017). These findings can be understood within the framework of Vygotsky (1978) Social Cultural Theory (SCT). According to SCT, learning is socially constructed, with learners building knowledge via interactions within their cultural context. The STH technique aligns with SCT by promoting social constructionism, as it facilitates collaborative thinking, interaction, and shared understanding among learners. This method encouraged peer-to-peer learning through the exchange of ideas, feedback, and co-construction of knowledge, reflecting Vygotsky's "zone of proximal development" concept, where learners advance their skills with support from peers or instructors. Additionally, the STH technique enhanced critical thinking and creativity, which is consistent with Vygotsky's focus on higher-order cognitive skills. By employing different thinking modes, learners explored diverse perspectives, analyzed ideas, and generated unique solutions, resulting in improved writing and problem-solving abilities.

Further, the content analysis of the semi-structured interviews revealed that all of the participants expressed positive attitudes regarding STH. They expressed that STH was a facilitative technique that contributed to their previous writing experiences. They also mentioned that they had a positive experience with writing due to implementing teamwork and collaborative writing through comparing and sharing ideas. Moreover, utilizing different hats representing various thinking modes led to the clarity of the writing process and in turn improved their writing product.

The findings of this study have several pedagogical implications for EFL teachers, students, materials developers, and teacher educators. By encouraging learners to engage in different modes of thinking, the STH technique fosters the co-construction of knowledge as students collectively explore various perspectives, share ideas, and build upon each other's insights. Incorporating the STH technique into writing instruction aligns with the SCT principle of creating authentic learning environments that promote active engagement, collaboration, and problem-solving. As students participate in activities that require them to don different thinking hats, they develop critical thinking and communication skills while simultaneously honing their writing abilities. For EFL teachers, the STH technique offers a structured approach to guiding writing workshops and discussions, ensuring a balanced exploration of ideas and fostering a supportive learning environment. This method encourages active student participation and cooperation, reflecting the SCT emphasis on collaborative meaning-making and knowledge construction. Moreover, integrating metacognitive prompts and activities can help teachers foster students' awareness of their own thinking processes, empowering them to take greater ownership of their learning and development as writers. In terms of materials development, incorporating the STH technique into writing materials provides EFL learners with opportunities to engage in diverse thinking modes and collaborate with peers. This approach aligns with SCT principles by fostering critical thinking, creativity, and effective communication skills within authentic learning contexts. Additionally, materials developers can include prompts that encourage reflection on thinking processes and writing strategies, further promoting metacognitive awareness and self-regulated learning. EFL teacher educators play a pivotal role in introducing and promoting the STH technique within a social constructivist framework. By offering professional development opportunities that demonstrate the practical applications and theoretical underpinnings of the technique, teacher educators can equip pre-service and in-service teachers with the knowledge and tools needed to create engaging, collaborative learning environments that support the development of EFL students' writing skills.

The study also suffered some limitations. Time limitations posed a significant challenge, affecting the depth of research and the participants' exposure to the STH technique. Additionally, the reserved nature of some students hindered their engagement in group activities, potentially impacting the quality of their writing and the overall findings. It is worth noting that certain

students experienced discomfort while using specific hats, which might have further influenced the results. To enhance the effectiveness of the STH technique in fostering critical thinking, incorporating visual stimuli could provide a clearer representation of each thinking mode. Further research should focus on implementing and evaluating the impact of higher-order thinking skills in pedagogical settings, specifically exploring how students develop their abilities to reflect, analyze, coordinate, and summarize thoughts. Moreover, examining the effects of the STH technique on other language skills and components, as well as its application among diverse age groups and proficiency levels, would contribute to a more comprehensive understanding of its potential benefits in language learning. In future studies, researchers should strive for more coherent and elaborate discussions of limitations, ensuring that the impact of these constraints on the study's outcomes is clearly articulated. It is crucial to present substantial and innovative research ideas that can lead to more significant advancements in the field. By addressing these limitations and expanding the scope of investigation, the efficacy of the STH technique in various contexts can be more accurately assessed, ultimately benefiting language learners and educators alike.

Acknowledgment

We would like to express our profound gratitude to the reviewers for their insightful comments on our manuscript.

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Appendices

Appendix A: Semi-structured Interview Questions

1. How did you find the Six Thinking Hats (STH) technique to write?
2. Did the technique facilitate your writing?
3. Does the experience of writing through the STH technique contribute to your learning in comparison with your previous writing experience?

4. Which section of the STH technique did you find most/least useful?
5. Do you feel that the STH technique allowed you to write better?
6. Did you find working with peers helpful in improving your writing?