

**The Use of Mind Mapping Technique to Enhance Writing Skills of Grade Four
Bhutanese Students**

Kinley Wangmo*

M.Ed. Program Student, Suryadhep Teachers College,
Rangsit University, Thailand.

E-mail: kinleyw1984@gmail.com

*Corresponding Author

Dr. Nipaporn Chalermnirundorn

Lecturer, Suryadhep Teachers College,
Rangsit University, Thailand.

E-mail: x_huijia@hotmail.com

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Abstract

This study adopted mixed-methods to explore the effectiveness of mind mapping technique in enhancing grade four Bhutanese students' writing skills. It was carried out in one of the primary schools in central Bhutan with one target group, comprising 18 grade four students. Quantitative data gathered using pretest and posttest achievement tests were analyzed using descriptive statistical analysis. Content analysis was conducted to analyze the qualitative data gathered through students' learning behavior observation and focus group discussion. The mean scores of the pretest and posttest were 11.56 and 15.86 respectively. The mean score of the posttest was statistically higher than the mean score of the pretest indicating the significant improvement in descriptive writing skills after the intervention of the mind mapping technique. This study also revealed the positive impact of the mind mapping technique in improving students' writing confidence. This study recommends the integration of the mind mapping technique in Bhutanese English curriculum to promote writing competency.

Keywords: mind mapping technique; descriptive writing; students' learning achievement; students' learning satisfaction

1. Introduction

“...Today I speak on behalf of our teachers and students – our teachers will always be committed and dedicated teachers – our students will always be diligent and loyal students – but it is the duty of parents, policymakers and the government to put the right tools in their hands – the right books, the right curriculum, the right direction” the words of His Majesty the King, 3rd Convocation of the Colleges of Education, Royal University of Bhutan, February 17, 2009.

The above royal message was issued following the worrisome speculations on the deteriorating quality of education in Bhutan. It was a wake- up call for the relevant stakeholders to initiate effective measures to upscale the quality of education. Following this, several studies and surveys were conducted to determine the quality of education in Bhutan, which resulted in discovering some alarming realities.

The survey by Royal Education Council & Education Initiatives (2011) revealed that high proportion of Bhutanese students completed their primary education with limited basic skills in reading, writing, and numeracy, which eventually resulted in performing at or below national average level in high-skate examinations. Majority of Bhutanese students lack the abilities to perform basic literacy tasks and answering open-handed questions requiring more expressions and high order thinking.

Records with Bhutan Council for School Examination and Assessment (2013a) showed that students with good command over language performed extremely well in Mathematics as well, indicating the impact of students’ English competency on learning other subjects. Therefore, it was imperative for Bhutanese students to be proficient in English, particularly in writing and reading as it defined their competency in other subjects (LaPrairie, 2014). English has always been the driving force of the Bhutanese education system and the basis for the other subjects like science, mathematics, and social sciences. In a nutshell, students’ English language competency is always synonymous to the quality of education in Bhutan.

However, a study by Bhutan Council for School Examination and Assessment (2013b) claimed that English proficiency level of Bhutanese students was below average (50%) with 38.13% in reading, 39.38% in writing and 26.53% in grammar. The poor performance of a mere 39.38% in writing was quite alarming since writing is the hallmark of learning in Bhutan and one of the fundamental ways through

which students explore, construct and express various forms of knowledge. Above finding was reiterated in the study by Thinley (2013), where it was revealed that majority of Bhutanese students lacked essential writing skills such as organization, sequencing, paragraphing and focus. Further, Tshering (2016) supplemented that students exhibited extreme weakness in lexical, grammar and redundancy of ideas.

Lack of reading and writing habits, learning English as the second language, preference for their local dialect and prevalence of conventional teaching methods were few of the many hindrances to the writing skills acquisition (Namgay, 2016). Thinley (2013) warned that failing to use effective writing skills could definitely hamper the achievement in other subjects, and consequently demeaning the quality of education in Bhutan more than ever. Bhutan's vision to attain international standards by 2020 would remain a vision if aptly and timely actions are not taken. This can only be possible if classroom practices are shifted from the conventional method to child-centered teaching strategies. In line with the problem stated above, this study proposed the mind mapping technique as an alternative strategy to enhance grade four Bhutanese students' writing skills, particularly in terms of organizing ideas and information in good paragraphs with unity and coherence.

The researcher initiated this study after considering the positive findings of the previous studies conducted in the different parts of the world. The studies by Keles (2012); Nurlaila (2013); Vijayavalsalan, (2016) concluded that the use of mind mapping technique could facilitate in enhancing some of the essential writing skills like structuring, sequencing, generating new ideas and drawing relationship between ideas. The study by Hallen and Sangeetha (2015) spelled out that the amount of understanding and application level needed in students for writing can be raised through the incorporation of the mind mapping technique. Davies (2011) based on the positive outcomes of his study, suggested mind mapping technique as an effective instructional tool for familiarizing writing process and simultaneously providing a diversion from conventional methods. Some researchers claimed that the mind mapping technique was more effective in teaching writing skills than other linguistic skills. Since both writing and mind mapping technique required optimum use of one's cognitive capacity, they seemed to complement each other. The aforementioned encouraging outcomes of the previous studies, the researcher had ventured into studying the effectiveness and possibility of mind mapping technique in the Bhutanese classrooms.

2. Research Objectives

1. To examine grade four Bhutanese students' learning achievement in writing essays through mind mapping technique.
2. To identify grade four Bhutanese students' learning satisfaction in using mind mapping technique to write essays.

3. Literature Review

3.1 Writing Standards of Grade Four Bhutanese Students

Reading and listening aspects of English language entail how learners receive, understand and acquire information by constructing meaning (Saygili, 2017). Receiving information, however, does not serve the purpose of language learning. It is also essential for learners to communicate to disseminate information they have acquired through reading and listening; express their emotions and thoughts; and voice their opinions and suggestions (Ahmad, 2016). As quoted by the renowned French writer, Voltaire, "*Writing is the painting of the voice.*" Besides speaking, writing is an excellent tool to communicate and deliver information, ideas and theories using symbols to form words and sentences, (Al-Zyoud; Jamal & Baniabdelrahman, 2017; Bulut, 2017). Thus, writing is an integral aspect of the English language as it encourages learners to be more creative, reflective and interactive by comprehending, analyzing and applying new knowledge to solve problems (Defazio, Jones, Tennant & Hook, 2010).

Generally, writing is considered as one of the primary basis upon which learners' academic works, learning, intellect and language competency are being judged (Marquette University, 2011). As we live in an era where the quality of education is being determined based on learners' proficiency or competency in English writing skills, the need for learners to possess adequate writing skills has become even more important or indispensable now than ever (Wright, 2011). In this regard, one can experience a similar scenario in the Bhutanese education system, where the quality is measured based on students' performance in English written examination, (Lhamu, 2016). Recognizing the importance of writing, a strong emphasis has been placed in promoting English writing skills of Bhutanese students ever since Bhutan instituted modern education with English as the language of instruction (Namgyel, 2014; Special Committee for Education, 2016). Over a few decades, Ministry of Education (MoE) and its relevant stakeholders have been putting

an extensive effort in initiating reforms, policies and innovations to uplift the standard of English, particularly reading and writing skills of Bhutanese students across the levels. One of the most prominent milestones in MoE's venture to elevate the quality of education is the introduction of the new English curriculum in 2008 with the main focus on enhancing reading and writing skills (Royal Education Council and Education Initiatives Pvt. Ltd, 2008).

As prescribed in the new English curriculum, Bhutanese students are introduced to academic writing beginning from grade four with objectives to meet certain national writing standards endorsed in *The Silken Knot: Standard for English for Schools in Bhutan*, 2002; enhance high order thinking abilities and prepare them for further advanced studies by equipping them with rudimentary academic writing skills. Accordingly, grade four students embark on their academic writing journey by writing simple descriptive essays and then gradually moving on to the next complex ones. Additionally, poems, letters, short stories, journals and book reviews for their writing portfolio are also deemed mandatory for their learning achievement assessment including English written examination twice a year (Curriculum and Professional Support Division, 2014).

3.2 Definition of mind mapping technique

Mind mapping technique is not a new concept. It has been existing since the third century. History has it that the mind mapping technique originated when ancient thinkers and philosophers preferred to present concepts or theories in graphical diagrams with words and ideas relating to a central thought. Porphyry of Tyros, a third-century Greek philosopher, was regarded as the first person to use mind map when he made a graphically visualized representation of Aristotle's concept categories. Followed by Leonardo Da Vinci and some sources even suggested that Albert Einstein, Winston Churchill, and Pablo Picasso were amongst the famous personalities who favored the representation of concepts visually and graphically. However, previously, the graphical way of presenting concepts was not known by the term "mind map."

The term, "mind maps" came into being when the British psychologist, Anthony Peter Buzan, popularly known as Tony Buzan in late 1960s, popularized the use of visualized graphical representation of concepts in the field of education and coined it as "mind maps" (Tee, Azman, Mohamed, Muhammad, Mohamad, Yunus, &

Othman, 2014). Mind mapping technique emerged when Buzan in 1977 identified connection and similarities between computers and human brains as the latter functions to process information received through observations (Ingemann, 2011). Buzan and Buzan (2013) defined the mind mapping technique as a universal key to unlock potentiality or capacity of our brain and also as an excellent way to express ideas and concepts verbally and visually.

Ingemann (2011) defines the mind mapping technique as a learning tool that uses a non-linear approach to explore concepts through visualized graphical representation establishing a connection between the central theme and peripheral branches. Mind mapping is an effective tool for taking notes and brainstorming for ideas based on the central theme. It is also defined as the idea of mental literacy and a thinking technique. Purnomo (2014) stated that the mind mapping technique is an appropriate tool which can be employed in every aspect of our life or every activity we undertake. With the help of mind mapping, the improvement in learning and mental ability is inevitable, and that will subsequently boost human performance. Mind mapping technique is also defined as a powerful tool that simplifies the transferring of details and knowledge, at the same time emphasizing the relationship between information (Garrick, Romanowski & Slifka, n.d).

Some educators favored mind mapping technique for its benefits in logical lesson planning and stimulating their teaching confidence (Boyson, 2009). Further, mind mapping technique was widely used in teaching various subjects due to its power to boost students' memory, foster their creativity and facilitate students' comprehension level through visual-spatial arrangement (Buzan, Buzan, & Harrison, 2010; Jain, 2015; Parikh, 2016). Findings of previous studies also substantiated the effectiveness of mind mapping technique in promoting linguistic skills. For instance, through mind mapping technique students remembered new vocabulary and enhanced grammatical competencies (Fitriani, 2012). Some researchers even claimed that mind mapping technique is more effective in teaching writing skills than other linguistic skills. Since both writing and mind mapping technique required optimum use of one's cognitive capacity, they seemed to complement each other.

3.3 Mind mapping techniques for enhancing writing skills

Writing is one of the most productive skills of the four English language skills as it benefits people in achieving their objectives and plans of their day to day

life (Salem & Al Gyar, 2014). Students mainly write to complete their assignments, reports and to pass examinations to climb higher up the academic ladder and for their future career (Putra, 2012; Vijayavalsalan, 2016).

However, acquiring writing skills is neither a piece of cake nor a cup of tea to be ravenously savored, particularly for those students who learn English as the foreign or second language (Ballantyne, 2016; Wahyuni, 2017). Writing skills acquisition is virtually a complex task requiring considerable effort and time to master, as it is definitely not all about mastering grammatical and rhetorical devices, but also of conceptual and judgmental elements, in short, a complete mental production (Graham, 2008; Grami, 2010).

Therefore, the need for the adoption of effective strategies and approaches is deemed necessary. In order to enhance writing skills, there must be approaches which allow students to reconcile new knowledge to their past experiences and ignite their cognitive power to explore further. Writing constitutes intensive brainstorming, note taking, planning, organization, structuring, association and focus (Fiktorius, 2013; Reima, 2009). One such approach that suitably meets the requirements mentioned above is mind mapping technique as it enables brainstorming, association, and organization of ideas or knowledge. It is also useful in graphically representing ideas and concepts as it is a visual thinking tool that helps in structuring information and also helps to analyze and comprehend better to generate new idea (Buzan & Buzan, 2013). Furthermore, the use of mind mapping technique enriches vocabularies, creativity and encourages a deeper level of understanding regarding the chosen essay topic (Nurlaila, 2013).

The findings of the study initiated by Vijayavalsalan (2016) confirmed the effectiveness of mind mapping technique in the planning of any essay before actually writing it. Additionally, it is also a general perception that the mind mapping technique can actually make essay writing easier, fluent and enjoyable. Findings of this study were further substantiated by the study carried out by Al Naqbi (2011), where outcomes suggested that mind mapping technique is effective in guiding students to plan and organize their ideas for writing tasks under exam conditions.

The use of mind mapping technique urges students to view writing course with a positive attitude as they can brainstorm for relevant ideas and structuring of paragraphs become much more accurate and coherent (Reima, 2009). Similarly, a

study by Yunus and Chien (2016) discovered that students showed positive perceptions toward writing after using the mind mapping technique.

The use of mind mapping technique provides opportunities for students to come up with original and useful ideas. With the help of mind mapping technique, actively in the thinking process, which activates their prior knowledge, was resulting in the generation of ideas through group work and oral discussion (Al-Zyoud et al., 2017).

4. Research Methodology

The researcher adopted a concurrent mixed methods (quantitative research supplemented by the qualitative study) approach to investigate grade four Bhutanese students' learning achievement and satisfaction in using mind mapping technique in writing descriptive essays. Detailed explanation of research design, participants, and research instruments are mentioned below.

4.1 Research Design

This study followed “One group pretest-posttest” experimental research design. This research design was considered appropriate as there was only one class of grade four students in the chosen research school. The pretest-posttest intervention was employed to collect quantitative data to determine students' learning achievement, while qualitative data to identify students' learning satisfaction was garnered through observation of students' learning behaviors and focus group discussion. Figure 1 shown below describes the research design of the study.

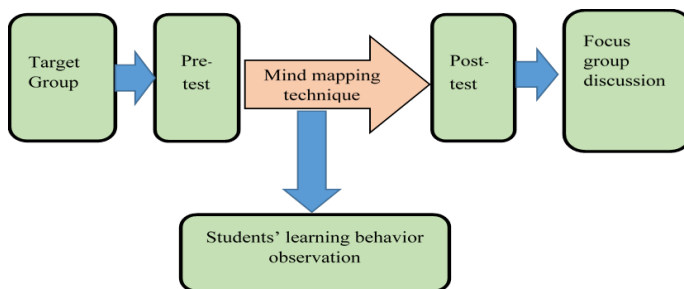


Figure 1 Illustration of the Research Design

4.2 Participants

The research school, which is located in central Bhutan had only one class of grade four students for the 2018 academic year, which compelled the researcher to form only one target group. The target group comprised of 18 Bhutanese grade four students (nine males and nine females). Grade four students were specifically selected as the research participants after considering their inability to perform well in their English written examinations due to lack of necessary writing skills (Namgay, 2016; Royal Education Council and Education Initiatives, 2011; Zangpo, 2005). Moreover, the researcher believed that enhancing writing skills using the mind mapping technique at this level should be considered a good practice to prepare students for their future academic advancement.

5. Research Instruments

Following research instruments were employed to gather quantitative and qualitative data.

5.1 Learning achievement tests

To investigate the effectiveness of the mind mapping technique in promoting students' learning achievement, the researcher administered pretest and posttest before and after the intervention of the mind mapping technique respectively. For both the pretest and posttest, participants were made to write an essay about 150 on the same topic "My Friend." This was intended to see the disparity between participants' pretest and posttest learning achievement scores and then determine the level of improvement. In addition, the main rationale behind using the same essay topic for both the pretest and the posttest was to obtain authentic outcomes.

The selection of essay topics for the achievement tests was done in accordance with the existing English curriculum guidelines for grade four (Curriculum and Professional Support Division, 2014). Essays were assessed using the rubrics developed by Bhutan Council for School Examinations and Assessment. Further, to ensure the validity of the rubrics, item-object congruence (IOC) was carried out by three experts with IOC result index range from -1 to +1 (Turner & Carlson, 2003). All the three experts had rated the rubrics +1, which indicated the accuracy of instruments to the stated objectives.

5.2 Students' learning behavior observation

The structured observation with eleven kinds of learning behaviors specified was employed. These eleven learning behaviors were categorized into two themes; *Students' attention and interest*; and *Students' confidence in writing using mind maps*. To avoid unnecessary bias, the researcher assigned a peer teacher, who was a competent English teacher with 20 years of teaching experiences. The peer teacher observed three of eight lessons prepared for the study. This was intended to capture the gradual progress in students' learning and to draw a comparison between their initial and final learning behaviors, and then eventually quantify students' level of satisfaction in learning writing skills through mind mapping technique.

Items for students' behavior observation were validated by three experts using the item-object congruence (IOC) result index (range from -1 to +1) by Turner and Carlson (2003), where all the items were rated +1, which indicated their alignment to the stated objectives.

5.3 Focus group discussion

Focus group discussion with five guiding questions was carried out at the end of the study. Questions for the discussion were framed focusing on exploring students' learning satisfaction. Questions had been selected after being validated and accepted by the three experts using the item-object congruence (IOC) result index (range from -1 to +1) by Turner and Carlson (2003). All the questions were rated +1 by the experts, which indicated their alignment to the stated objectives.

All the 18 students participated in the discussion, and this led to the formation of three groups with six members each. The peer teacher was invited to lead the discussion. Groups took a turn to attend the discussion. The discussions with all the groups were videotaped for the transcription and the content analysis.

5.4 Lesson Plans

For this study, the researcher designed four lesson plans. One lesson plan was administered for two sessions with the time limit of an hour per session. Participants attended two sessions per week to learn how to use mind mapping technique for writing. Lesson plans were validated and accepted by the three experts

using the item-object congruence (IOC) result index (range from -1 to +1) by Turner and Carlson (2003). All the lesson plans were relevant to the stated research objectives as the experts had rated them +1.

6. Results and Findings

Students’ achievement scores from the pretest and posttest were analyzed using descriptive statistic to compute mean and standard deviation. Data gathered through students’ learning behavior observation and focus group discussion were analyzed using content analysis.

6.1 Quantitative Data Analysis Results (Students’ learning achievement)

The first overarching objective of the study was to examine grade four students’ learning achievement in writing descriptive essays using mind mapping technique. To ascertain the students’ learning achievement, the pretest and posttest were administered before and after the intervention of the mind mapping technique respectively. In order to identify the discrepancy between learning achievement scores of the target group in the pretest and posttest, a descriptive statistical analysis was computed. In the absence of population sampling, the researcher computed descriptive statistical analysis to find μ .

Table 1: Comparison of the pretest and the posttest scores of the target group

Group	Pretest		Posttest		Mean difference
	Mean (μ)	SD	Mean (μ)	SD	
Target Group	11.56	1.432	15.86	1.473	15.86 – 11.56= 4.306

Table 1 shows the result of the descriptive statistical analysis for the target group. The pretest and posttest mean score (μ) of the target group were 11.56 and 15.8 respectively. The statistical significant difference between the mean score of the pretest and posttest was 4.306. The mean score of the posttest was significantly higher than the pretest. A high mean score of the posttest indicated the effectiveness of mind

mapping technique in enhancing students' descriptive writing skills. Chart 1 was presented to support the result mentioned above.

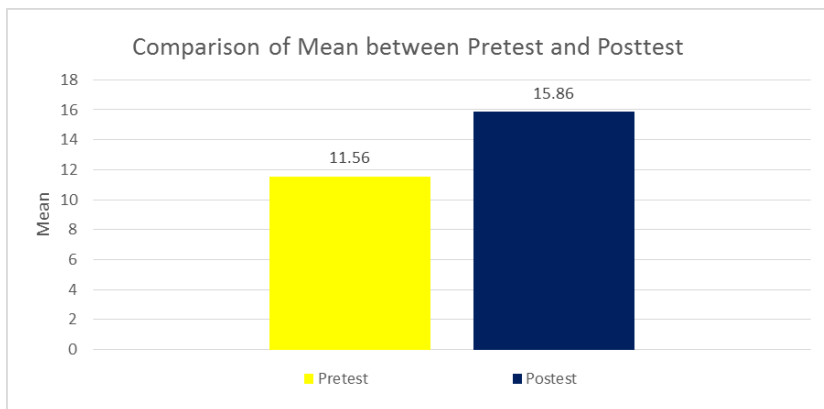


Chart 1 Comparison of mean between pretest and posttest

The standard deviation of the pretest and posttest of the target group were 1.432 and 1.473 respectively as shown in Table 1. There was an increase of 0.041 in the standard deviation of the posttest when compared to the pretest. The increase in the standard deviation of the posttest explained that the concentration of scores around the mean was quite less. The smaller standard deviation of the pretest showed that the variation in the scores achieved by the target group was seemingly narrow suggesting that the writing standard of students was more or less similar. However, the higher standard deviation of the posttest indicated that the impact of mind mapping technique on improving writing skills varied from student to student and hence there was a large variation in the scores achieved by each student.

6.2 Qualitative Data Analysis result (Students' learning satisfaction)

6.2.1 Students' learning behavior observation by the peer teacher

Observations made by the peer teacher were thoroughly read and then analyzed through the identification of themes. The researcher decoded two distinct themes from the data garnered through observing students' learning behaviors.

- Active participation (Theme 1)

- Boosted confidence (Theme 2)

Theme 1: *Active participation*

As mentioned earlier, the peer teacher observed three lessons, and after comparing all three observation records, the researcher could proudly state that students' showed a massive interest in using mind mapping technique. The peer observer found them all the time attentive and focused on their assigned tasks if the following statement is anything to go by:

“There was strong cooperation amongst the group members. I believe that is the reason why the lesson went very well, as they completed their work on time.”

A strong cooperation was noticed amongst students during group and pair works, which aided them to accomplish the assigned tasks within the allocated time. Moreover, participants' positive and cheerful responses created a lively learning environment, as the peer observer was prompted to note down the following observation:

“Students were responsive and ready to participate or answer questions without any hesitation. I could see maximum students taking initiatives to ask questions to clear their doubts.”

Hence, the above observations described students' elevated satisfaction in writing essays using the mind mapping technique. Students exhibited their learning satisfaction by responding actively and attentively with strong cooperation amongst themselves while on tasks and completing their tasks on time.

Theme 2: *Boosted confidence*

The peer teacher noticed confidence and self- assurance in writing essays when guided by the mind maps. This was probably not the case during the pretest as she detected some kind of confusion and reluctance in students while writing. She noted that participants exhibited the signs of lack of confidence in the beginning and hence students took a longer time to complete the essay during the pretest.

However, as students got familiarized with the usage of mind mapping technique, their confidence in writing was also elevated simultaneously. In the latter part of the study, participants were noticed writing essays with improved confidence, which had definitely aided in completing their essays within the allotted time and surprisingly, some even completed it way before the time.

Moreover, the peer teacher also managed to identify a noticeable difference between the essays written by the students in their usual English classes, prior to the study and essays are written using mind mapping technique during the study period. She had stated that essays written by students using mind mapping technique looked more formal and academic than before. Therefore, in the view of the above observations, it was clear that the mind mapping technique should be perceived as an effective tool to stimulate confidence in students and motivate them to write more.

6.2.2 Focus group discussion

The data collected from the focus group discussions were transcribed and analyzed through the identification of themes. After in-depth thoughts and interpretation on information provided by the students, the researcher concluded on the following themes for further interpretation;

- Mind mapping technique and learning satisfaction in descriptive writing (Theme 1)
- Mind mapping technique enhances writing skills (Theme 2)
- Mind mapping technique promotes high order thinking (Theme 3)

In the presentation of each theme, three groups were named group 1, group 2 and group 3, while students in each group were referred as student 1, student 2, student 3, student 4, student 5 and student 6.

Theme1: Mind mapping technique and learning satisfaction in descriptive writing

Views and experiences shared by students during the focus group discussion clearly exhibited the sense of satisfaction they felt while writing essays using mind mapping techniques. Students shared about the improvement they had seen in their writing after using the mind mapping technique. Student 1 (Group 1) mentioned,

“Mind mapping technique is quite interesting. It helped me to get good marks. This time I was able to score higher than before. I am happy that I can write essays better now.” Similarly, Student 3 (Group 2) remarked, *“I enjoy drawing mind maps because when I draw mind maps, I understand what to write and how to write. So essay writing becomes much easier.”*

Prior to the study, students had perceived writing as a daunting task, whereas, now, after learning the mind mapping technique, their notion regarding writing had a positive change. This change was evident in the statement made by the Student 3 (group 1): *“Essay writing is confusing and daunting. But with the help of mind maps, I can write quite well now. I even got good marks this time. I feel really satisfied. I will use mind maps every time I write, especially in exams”.*

It should be believed that mind mapping technique had definitely brought a positive change in students’ attitude towards writing. Students realized writing could actually be fun with mind mapping technique in place to guide them through. Improvement in writing was visible as they achieved high scores, which not only motivated them, but also boosted their writing confidence level. As expressed by Student 2 (Group 3), *“Writing essay using mind maps with fun because I love drawing. So when I draw mind maps, I feel really excited as I get good ideas and words to use in my writing. In this way, I feel motivated to write more. I am confident that I can write better than before because I can use mind maps. That is why I have decided to use mind maps to write Dzongkha (national language) essays as well.”*

Theme 2: Mind mapping technique enhances writing skills

This study also saw some noticeable improvements in students’ writing skills, particularly with respect to the organization of information and ideas in coherence paragraphs, focus and layout. For instances, Student 4 (Group 1) and Student 1 (Group 3) said, *“Mind mapping is useful because it helps me to break my essay into beautiful paragraphs. Moreover, we can avoid repetition of sentences and words.”* Similarly, Student 6 (Group 1), Student 3 (Group 2) and Student 2 (Group 3) stated, *“It is important to draw mind maps and then write essays because when we write essays using mind maps, we do not go out of topic. We know what to write next as we follow mind maps.”*

Through this study, students realized that a good piece of writing was not all about infusing varieties of words and forming grammatically impeccable sentences, but it is also of absolute importance to maintain focus and meaning while writing through accurate sequencing of content in good paragraphs with unity and coherence. This realization was visible in the following excerpts:

- Student 6 (Group 2) mentioned, *“When we write essays, it is very important to arrange information in the correct order. Before we did not know how to do that, but now we can do it because we use mind maps. We know what to write in each paragraph. It prevents us from mixing ideas.”*
- Further, Student 6 (Group 3), Student 5 (Group 2) and Student 3 (Group 3) remarked, *“When we follow mind maps, we do not forget to write introduction, body, and conclusion of the essay. We understood that writing is more than using varieties words and using correct language.”*

Theme 3: Mind mapping technique promotes high order thinking

Mind mapping technique is associated with brainstorming, analyzing and creating, requiring a great deal of cognitive utilization. In line to this, students remarked that they obtained a lot of new ideas by drawing mind maps as they needed to think a lot. For instance, Student 3 (Group 3) shared, *“We need to think a lot when we draw mind maps. So when we think, we get lots of good ideas to use in our essays.”*

Some students found designing mind maps enjoyable. Student 5 (Group 2) stated, *“From all the activities, I love to draw mind maps the most. Now I can draw mind maps in different styles.”* The researcher assumed that students enjoyed designing mind maps as they were given freedom to draw in any way they preferred, rather than restricting to one particular design. This had possibly given them an opportunity to use their cognitive abilities to create something new which they were proud of. As students designed mind maps, they related the new knowledge to their existing experiences, encouraging them to understand the meaning of learning. Also, they realized the purpose of learning which, in turn, gave them the enthusiasm for further learning and at the same time, strengthening their high order thinking skills.

The above-mentioned findings suggest the positive impact of mind mapping technique on promoting high order thinking skills in students. Students

shared about acquiring immeasurable ideas by designing mind maps indicating that they had made good use of their cognition. This had benefited them by stimulating their critical thinking abilities. Students opined that they were able to design mind maps in different styles, which indicated that use of mind mapping technique created a platform for them to utilize their previous knowledge to create something new. Such opportunities should be deemed necessary to enhance their creativity, analytical skills and the power of memory retention.

6.2.3 Error Analysis

The error analysis was conducted to ascertain the effectiveness of mind mapping technique in improving students' writing skills, in terms of written language skills such as mechanics and grammar. Participants wrote a 150 worded descriptive essay each for the pretest and posttest. Both the pretest and posttest essays were on the same topic, "My Best Friend." Essays were assessed using the writing assessment rubrics, and common written language errors were identified for the error analysis. Error analysis was carried out for each individual student. To achieve an authentic result, written language errors were identified from the pretest essays to form the bases for the error analysis. Accordingly, the error analysis for the posttest essays was done based on the written language errors identified from the pretest essays. The major written language errors identified from the pretest essays were categorized as follows:

Set 1: Mechanical errors

- 1) Punctuation errors
- 2) Spelling errors
- 3) Capitalization errors

Set 2: Grammatical errors

- 1) Verb errors (tenses & subject-verb agreement)
- 2) Article errors
- 3) Singular/ Plural errors

6.2.3.1 Comparison between pretest and posttest essays based on the error analysis results

Table 2: Comparison between pretest and posttest essays based on the error analysis results

Linguistic errors		Frequency of occurrence	
		Pretest essays	Posttest essays
Mechanical errors	Punctuation	47	39
	Spelling	79	82
	Capitalization	37	15
	Total	163	136
Grammatical errors	Usage of verbs (tenses & subject-verb agreement)	127	160
	Singular/plural nouns	54	52
	Usage of articles	40	41
	Total	221	253
Grand total		384	389

The table 2 presents the comparison between the pretest and posttest essays based on the error analysis. From the table, it is deemed that the total number of mechanical errors occurrence in the pretest essays was 163, whereas posttest essays contained 136 mechanical errors only. Compared to the pretest essays, the participants had committed less mechanical errors in their posttest essays. However, the occurrence of spelling errors was more in the posttest than the pretest.

As per the table 2, all the students together had committed 221 and 253 grammatical errors in their pretest and posttest essays respectively. It was quite alarming to face fact that the grammatical error occurrence in the posttest essays was higher than the pretest essays. However, in posttest essays, there was slight reduction in singular/ plural nouns and article error occurrences as compared to the pretest essays.

The overall written language errors committed by the students in their pretest and posttest essays were 384 and 389 respectively. Apparently, the students committed more written language errors in their posttest essays than the pretest essays. Therefore, it is a clear indication that the mind mapping has less or no impact on improving students' mechanic and grammatical skills.

7. Discussion

7.1 Students' Learning Achievement

The previous studies by Hallen and Sangeetha (2015); Nurlaila (2013); Soltani and Kheirzadeh (2017) recognized the mind mapping technique as an effective instructional tool for enhancing students' learning achievement in writing essays. Likewise, the overall findings from this study in terms of learning achievement were encouraging, with all the students scoring 60% and above in the posttest. The mean score of the posttest (15.8) was 4.306 higher than the pretest (11.56). So a drastic improvement in students' achievement scores entails the effectiveness of mind mapping technique in enhancing writing skills.

This study accounts three possible factors that contributed to the students' significant gain in learning achievement scores. The first possible factor is the facilitation of cognitive learning through the implementation of the mind mapping technique. This statement correlates to the cognitivist learning theory, which states that learning occurs by processing and interpreting received information using our cognition (Akdeniz, Bacanlı, Baysen, Çakmak, Çeliköz, Doğruer, & Yalin, 2016).

It was further explained by Fiktorius (2013), stating that the mind mapping technique constitutes planning, creating, analyzing and construction of new ideas. Also, after designing mind maps, there is a need to evaluate the ideas and then apply them appropriately in writing. Mind mapping technique involves students in independent learning and creates space to utilize their cognitive capacities, at the same time, promotes their retention power, which consequently, upgrades their achievement scores.

The second possible factor that supports the finding of this study is the occurrence of constructivist learning through the use of mind mapping technique. The constructivist learning states that learners can best learn through experiencing or when they are completely involved in the learning process, from where they derive their own understanding of knowledge or create new knowledge (Cobern, 1993). Similarly, in this study, students designed mind maps based on the central themes assigned to them. For this very purpose, participants had to ponder on the central themes and reconnect them to their prior experiences and knowledge.

In the process of reflecting on their experiences, they generated new ideas through brainstorming, which enabled them to create mind maps. New ideas they had generated were, then arranged into sequential order as per their understanding to produce new knowledge in the form of essays. Therefore, in this study, students were actively involved in the construction of their own knowledge which had probably enabled them to score higher in posttest than pretest.

The third possible factor that brought a remarkable increase in the participants' achievement scores is the potential of mind mapping technique in stimulating Bloom's six level of thinking abilities. Al Naqbi (2011) believed that creating mind maps require a high level of thinking orders. Learners brainstorm for ideas, words, and sentences for mind maps, followed by visualization and generation of ideas, which are then structured and classified according to their importance and appropriateness maintaining the connection between the portions of information. In this way, learners get the opportunity to remember, comprehend, apply, analyze, evaluate and then create. Therefore, the mind mapping technique is effective in stimulating Bloom's six level of thinking abilities in students which are considered indispensable in learning (D'Antoni, Zipp, Olson, & Cahill, 2010).

7.2 Students' Learning Satisfaction

According to the data gathered through students' learning behaviors observations, students exhibited a high level of learning satisfaction in writing essays through mind mapping technique. Students were observed participating actively, responding promptly to the researcher's questions and asking questions to clear their doubts. Moreover, the gradual increment in their writing confidence level had also been noticed. Thus, the above mentioned positive learning behaviors resonate students' elevated satisfaction in learning descriptive writing through mind mapping technique, and hence, this very finding is the probable answer to the second research objective.

Further, with the rationale to supplement the data from students' learning behavior observation, coupled with the intention to take in-depth study to elicit the gravity of students' learning satisfaction, the researcher carried out focus group discussion at the end of the study. After analyzing students' views and experiences shared during focus group discussion, it was understood that students had high regard

for the mind mapping technique. Therefore, the researcher, in the following paragraphs presents the three major findings from the focus group discussion.

Firstly, students shared that writing had become much easier compared to before. Using mind mapping technique, they remarked that they could organize ideas and information in good paragraphs while writing essays without losing the focus, which, otherwise was not possible prior to their introduction to the mind mapping technique. Coincidentally, Al Naqbi (2011) acknowledged the similar outcome from the study conducted to investigate the effectiveness of mind mapping technique in developing writing skills in UAE schools. The study also saw improvement in students' ability to organize ideas in sequential order.

Secondly, it was apparent that the mind mapping technique had invoked high order thinking abilities in students (O'Connell, 2014). This conclusion was drawn based on the students' experiences and opinions expressed during the focus group discussion. Students opined that mind mapping technique was advantageous as it helped them to think intensively to the optimum of their cognitive abilities, and consequently enabled them to create and generate new ideas to be included in their essays. This finding was consistent with the finding of the study carried out by Buran and Filyukov (2015). They recognized the mind mapping technique as a powerful tool to solve problems, brainstorm and create new ideas.

Thirdly, almost all the students expressed their satisfaction in writing essays following the mind maps. Their high level of learning satisfaction could be attributed to the drastic hike in scores in writing after the implementation of the mind mapping technique. It was obvious that the use of mind mapping technique had enhanced writing skills in students, which had most probably driven the writing anxiety out of their mind. Due to this, students realized that writing could be easier and fun with mind mapping technique to guide them. Therefore, mind mapping technique had motivated students to perceive writing with positive attitude and enthusiasm, rather than dreading it as a complex task. This finding was supported by the study conducted by Rafii (2017). The study was carried out with the objective to investigate the improvement in students' motivation in writing descriptive texts by using mind mapping technique. The study affirmed that the use of mind mapping technique not only developed writing skills but also increased the level of motivation in students.

Therefore, the researcher concluded that the mind mapping technique is effective in enhancing learning achievement and elevating learning satisfaction of students in writing descriptive essays. It is evident that the mind mapping technique can bring a possible shift in the paradigm of teaching writing, or in other words, a diversion from the conventional learning methods (Reima, 2009). Moreover, to support the aforementioned conclusion, the researcher took consideration of similar findings of previous studies on the use of mind mapping technique to enhance descriptive writing skills - Al Naqbi (2011); Aprilia, Setiyadi & Mahpul (2015); Hallen and Sangeetha (2015); Nurlaila (2013).

7.3 Error analysis

To reduce the research bias, the researcher carried out an error analysis to identify students' written language weaknesses in writing essays. In the process of thorough reading conducted on the 18 pretest essays, the researcher spotted a total of 385 errors, out of which 163 were mechanical errors, and remaining 221 were grammatical errors. Likewise, a total of 389 errors were identified in 18 posttest essays altogether, of which 136 were mechanical errors, and rest 253 constituted grammatical errors. According to the error analysis, the total number of written language errors committed by the participants in the posttest essays is slightly higher than in the pretest essays. Therefore, it is admissible to conclude that the use of mind mapping technique has little or no impact on enhancing written language skills.

This finding is supported by one of the findings of study initiated by Reima (2009), where it was mentioned that one of the main constraints faced by students in writing descriptive essay through mind mapping was grammar. Due to the inadequate knowledge on the correct use of grammar, students were observed enduring difficulties in expressing their ideas.

Grammar and mechanics of written language are made up of numerous rules, which require constant practice and usage. The effective ways to improve grammatical and mechanical skills are by constant reading and writing. Since mind mapping deals with thinking, planning, and organizing, it does not have much to do with practicing and usage of written language rules. Therefore, mind mapping technique is not very appropriate for enhancing written language skills.

8. Recommendations

Taking all the major findings of this study into consideration, the researcher humbly shares the following recommendations for the classroom practice and for further studies with the intention to widen the scope of mind mapping technique.

8.1 Recommendations for practice

The intervention of the mind mapping technique in this study saw a positive impact on the students' descriptive writing skills and learning satisfaction. Hence, the mind mapping technique should be considered as an alternative approach to enhance Bhutanese students' writing skills in particular and cognitive thinking skills in general. Findings of the study should motivate Bhutanese English teachers in incorporating mind mapping technique to subsequently uplift students' performance in English written examinations. The positive evidence produced by this study might urge Bhutanese curriculum designers and educators to include mind mapping technique in the curriculum to provide various student-centered strategies for the Bhutanese teachers to integrate into their teaching.

9. Conclusion

Considering the positive outcomes of this study, the use of mind mapping technique would be instrumental in providing Bhutanese students with basic skills of writing. Therefore, it would be a wise initiative by the Bhutanese curriculum developers to integrate mind mapping technique in English curriculum as one of the innovative approaches to promote writing competency of the Bhutanese students. The integration of the mind mapping technique would signify the assignment of right tools to Bhutanese teachers and students in accordance to the royal command of 2009.

Moreover, the infusion of the mind mapping technique in Bhutanese English curriculum would be an appropriate measure to enhance Bhutanese students' high order thinking skills, which would upscale their performance in high-stake examinations. Most importantly, a delivery of quality education in Bhutan that incorporates mind mapping technique would divert Bhutanese teachers and students from conventional learning styles which probably had stagnated learning progress so far. Finally, the inclusion of mind mapping technique would mean taking a step towards realizing Bhutan's vision to meet international standards by 2020.

10. Directions for future research

The researcher recommends future researchers to study the effectiveness of mind mapping teaching technique in enhancing descriptive writing skills with the different levels of students. This study was limited to 18 grade four students. Therefore, future researchers are suggested to conduct research on the similar topic with the larger sample size and also for longer time duration for more authentic results.

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