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# The role of learning-styles incorporation in the enhancement of EFL learners' narrative writing ability: A revelation of mental processes using think aloud protocol

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**Authors:**
Nafisseh Moosavi[1]
Behdokht Mall-Amiri[2]
Hamid Marashi[3]

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**Abstract**

This research tried to probe the effects of incorporating learners' preferred learning styles in instructions on their narrative writing development and their mental patterns and imagination. 74 homogeneous secondary EFL learners were divided into three groups based on their sensory styles of visual, auditory and tactile. The learners in the three groups were provided with instructions anchored to their learning styles. In the meantime, they were required to produce narrative writings on a number of topics in accordance with their course book. Prior to narrating, they had to think loudly and record their voices to reveal the approach and pattern they utilize for performing the required activities. Their voices were transcribed and later analyzed by the researchers for further investigations. The obtained results displayed a significant improvement in their writings as well as an ongoing progress of their thinking patterns. Furthermore, the data revealed the dominant mental approaches of top-down, considering the whole plot of the topic in advance, and bottom-up, considering the details prior to the entire story, used by the students. The study also displayed the positive impact of instruction on the improvement of learners' narrative writing revealing their self-imaging of the plot with which they could narrate the given topics in accordance with their own life experiences and understanding.

**Keywords:** Learning styles-related instruction, Mental processes, Narrative writing

1. English Department, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
2. English Department, Central Tehran Branch, Islamic Azad University, Tehran, Iran, (Corresponding Author): bmallamiri@gmail.com.
3. English Department, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

## 1. Introduction

Writing is one of the productive skills which reveals the inner sights of people towards their surrounding world. However, it is one of the most challenging skills to be improved since it requires a close coordination and cooperation of one's mind and thoughts. According to Banat (2007), writing is an immeasurable skill that can assist learners communicate and understand the go togetherness of language parts which should be mastered. Elsewhere, Al Souqi (2001) pointed out that writing consists of creating ideas in addition to capability of expressing them in a rationale and cohere way. Many scholars (Hyland, 2015; Kellogg & Raulerson, 2007; Megaiab, 2014; Quintero, 2008; and Rico, 2014) have emphasized the important role of writing as a productive skill on the improvement of mind development. Kellogg and Raulerson (2007, p. 237) stated "Writing well is a major cognitive challenge, because it is at once a test of memory, language, and thinking ability." Yundayani et al., (2019, p.169) proposed "Writing is a communicative skill, can be seen as a mechanism to experience students' knowledge by developing and presenting their ideas." Needless to say, instruction of how to write can play a vital role to scaffold the students' thoughts and assist them to find a suitable mind pattern with which they can develop their writings.

In the process of language acquisition, listening and speaking are learned naturally but writing and reading are 'culturally specific' learned behaviors (Brown 2001). In other words, writing requires training. Nunan (1999, p.271) viewed writing as "probably the most difficult thing to do in language". Elsewhere, he stated that writing is a "complex, cognitive process that requires sustained intellectual effort over a considerable period of time" (p. 273). To step to such a demanding process, how learners receive necessary implementations in addition to their own prior perception of their world plays an important role.

Enhancing the best performance of the learners need some factors to be included in the teaching process among which learners preferred styles of learning and contextualizing the data are great facilitators. Many scholars pointed out the beneficial role of involving learning styles in learning and teaching process including Gao (2003), Griffiths (2015), Leaver et al. (2005), Oxford (2011), and Puchta (2010). This means that including learning styles activates all sensory channels of their mind by which they

perceive more feasible information. On the one hand they can understand the data properly since it is compatible with how they receive, store, and retain the data. On the other hand, the processes they go through in their mind are actually in line with their comprehension since contextualizing the intended input deepens their perception of the data (Amerstorfer, 2016; Oxford, 2011; & Ushioda, 2009). The present investigation was inspired by their theoretical lens shedding light on incorporation of learning styles in education and its beneficial role in input comprehension.

Among different genres of writing, narrative style is the one that can involve the writer in an attempt to connect their thoughts in a rationale way. Macclure (2014) defined narrative as a writing style through which the writer tries to create a link between events or experiences of their life. Moreover, a good narration can create an amusing impact as well as a pleasurable time for the reader of the content similar to what a good story does. Jubhari et al., (2022) described narrative writing as a text which is usually written in the first person that should involve engaging experiences of the writer. Narrative as one of the genres of writing attracted many researchers (Ball, 2013; Bustmante, 2013, Kelly & Bailey, 2021; & Meyers, 2007). Bustmante (2013, p.179) believed that narrative writing "may center on facts, such as historical background. It may re-create an event, like in a personal essay to relate an anecdote to initiate a discussion or to exemplify a central theme". Similarly, Meyers (2006, p.145) described narratives as "The action, details, and dialogue of a well-written narrative allow your readers to respond to an event almost as if they were experiencing it themselves".

The effectiveness of using think aloud protocols has been proposed in many studies including Bowles (2010), Hu and Gao (2017), Wolcott and Lobczowski (2021), and Zhang and Zhang (2019). Bowles (2010, p.1) proposed that verbal reports are methods with which we can "provide insight on a variety of issues that production data alone cannot address, such as language learners' cognitive processing, thought processes, and strategies".

Practically and pedagogically, in recent years, Iran's official decision makers have tried to include more communicative curricula in addition to course book activities. However, the need of incorporating learning styles in the activities as well as instructions seems to be not entirely fulfilled. Moreover, the extent of the effectiveness of involving

learning styles on learners' improvement can reveal if teaching methods should be in accordance with learners' preferred styles of learning. This can also assist to follow their mental patterns while performing the required activities. The current study was an attempt to explore the effect of incorporation of learning styles in instructions on narrative writing ability of learners, and to reveal the thinking patterns of the language learners specifically in their narrative writing skill.

To fulfill that goal, the following research questions were addressed:

1. Does visual-based instruction significantly improve visual-oriented EFL learners' narrative writing ability across time?
2. Does auditory-based instruction significantly improve auditory-oriented EFL learners' narrative writing ability across time?
3. Does tactile-based instruction significantly improve tactile-oriented EFL learners' narrative writing ability across time?
4. How does exposure to visual-based instructions affect, if at all, the mental processes of developing a narrative writing activity in EFL learners with visual learning style?
5. How does exposure to auditory-based instructions affect, if at all, the mental processes of developing a narrative writing activity in EFL learners with auditory learning style?
6. How does exposure to tactile-based instructions affect, if at all, the mental processes of developing a narrative writing activity among EFL learners with tactile learning style?
7. Are the mental processes in writing of EFL learners with various learning styles different as a result of exposure to LS-related instructions?

## 2. Review of Literature

### 2.1. Writing

Writing is a vital need of everyone's communicative skill. It not only converts ones' thoughts into words and sentences but also enables them to create documents with which they can trace and follow their progress in this skill. Nunan (1999, p.273) defined writing as a "complex, cognitive process that requires sustained intellectual effort over a considerable period of time." According to Hedge (2005), writing necessitates the writers

to organize their minds in order to develop their ideas or information; writers should avoid any ambiguity and clearly state their aspects. Moreover, they should choose a variety of grammatical structures and vocabularies to create an appropriate writing production for their readers.

However, according to several researchers (Brown & Lee, 2015; Langan, 2012; Mohammad & Hazarika, 2016; & Richards & Renandya, 2002) ,writing seems to be an arduous task for the learners due to following reasons: a) some unrealistic or tedious course book activities they have to do; b) un-imaginative topics which are far from their background experiences or not included in their daily life routines; c) rigorous processes of gathering, organizing, and finalizing the ideas about those topics; and d) the stress of time limitation for performing well in their tasks.

Langan (2012, p.17) believed that a writer should consider certain goals while writing including “unity, support, organization, and error-free sentences”. He argued that cognitive skills such as idea gathering should be in accordance with the topic which itself needs a logical order among the text. Sequentially, the writers are required to express their opinions within a draft, then edit and finalize their written production which seems to be difficult for them. Comparably, Richards and Renandya (2002, p.303) stated that in the context of school, students confront problems getting their ideas into “eligible sentences and paragraphs”. Consequently, and following mentioned factors, writing seems to be hard to become master at. This shows itself in focusing on particular genre of writing among which narration, as the main goal of the current study. Following Manik and Sinurat (2015, p. 173), narrative writing is defined as “a type of writing which tells an event or process chronologically in certain time. Narrative writing is writing that tells a story, whether true or fictional”. Narration, assists learners to express what they have in their mind, their life experiences or a report on an event, in a simpler yet sequencing way.

All the mentioned reasons make writing a less attractive skill for the learners. Needless to say, this vital tool of communication can be more pleasant for the students if they learn how to maintain their thoughts, create satisfactory performances, and trace their own development. To attain such a goal, establishing an environment in which students feel comfortable can lead to desirable results. Obviously, no one can learn how to go through writing process without being instructed efficiently and appropriately. Novice

writers need to practice a lot and passing the process requires teachers' help so that learners can exploit their minds and thoughts, convert them into words, and finally present their productions.

### 2.2. Learning Styles and Contextualization

Students' styles of learning are observable at all levels of their education. Considering the preferred styles during the process of learning should be a determining factor for the teachers to present the most matching instructions to their students' ways of learning attested by some authors like Miller (2001) and Oxford (2001). Miller (2001) mentioned that educators are responsible to find out the diversity of their learners and should implement the information in different ways so that they can accommodate all preferences of the learners. Oxford (2001, p.2) stated that "if there is harmony between (a) the student (in terms of style and strategy preferences) and (b) the combination of instructional methodology and materials, then the student is likely to perform well, feel confident, and experience low anxiety." She classified sensory styles into four major kinds of visual, auditory, kinesthetic (movement-oriented), and tactile (touch-oriented). These sensory preferences display 'physical, perceptual channels' that learners feel comfortable with. She referred to visual learners as the ones who enjoy reading and obtain data from images and visual stimulations. To them, speeches, dialogues, and directions without visual references seem confusing. On the contrary, auditory learners do not need much visual data; therefore, they take advantage of oral representation of the information. Kinesthetic and tactile learners are interested in movements; they become excited working with tangible items, flashcards, and handcrafts. They prefer moving around and frequent breaks to sitting still (Oxford, 2001, p.3- 4). The effective role of learning styles on the better learning of the learners have been proposed by many scholars (Ariastuti & Wahyudin, 2022; Brown & Kelsey, 2013; Griffith, 2015; Pashler et al., 2009; Oxford, 2011). According to Ariastuti and Wahyudin (2022, p. 67) "the students' learning style preferences can be the insight for the teachers in managing the classroom practice". They believed that involving student's preferred styles can be beneficial for teachers "when they prepare a lesson, manage the classroom task, and conduct the assessment to achieve the learning goals". Similarly, Albeta et al., (2021, p.116) claimed "educators must consider learning styles and learning strategies in selecting and designing learning

materials to maximize student achievement".

However, Cools and Rayner (2001, p.302) stated that considering learning styles should be integrated with the context of the learners' environment. They believed how people behave in the educational environment not only depends on their preferred styles, but the context in which learning takes place should also be taken into account. They added that enhanced contextualization of the studies on learning styles can also imply the results of the research done on learning improvements.

**2.3. Mental Process in Writing**

Writing is the ability through which learners activate their mental process to convert their thoughts into verbal products. Dvorak (1986, p.155) believed that "many writers have a 'task overload' that is, inference between what they are trying to say, how to say it, and accuracy of the form". In addition, when someone starts writing, he/she tries to form words somewhere within his/her mind. Sharples (2002, p.4) stated that "the mental activities that cause particular words to appear in the mind, that allow words to flow smoothly on to paper one moment and then dry up the next, are hidden below consciousness." Vygotsky and Cole (1978, p.115) deemed writing as "a basic discovery- namely that one can draw not only things but also speech". Following this description, it can be inferred that as learners write and think about their writing, they try to, even silently, speak their thoughts within their minds in an order which might sound and seem logical to themselves. Elsewhere, Emig (1977, p. 125) stated that "Writing involves the fullest possible functioning of the brain, which entails the active participation in the process of both the left and the right hemispheres".

Gregg et al., (2016, p.80) observed how writers experience writing and the processes they were through and proposed writers must obtain "automatization of many parts of the writing process so that they can be carried on with infrequent or slight conscious attention". They added that writers' working memory in order to improve the 'time-sharing skills' develops as they grow. Following Pascual-Leone's theory (as cited in Lee et al., 2016, p.81) "the principal limitation on the complexity of cognitive performance is the number of mental schemes that a person can keep simultaneously activated. A certain limited number can be kept active through mental effort- a number that increases with age". Lee et al., (2016, p.83) presented six knowledge system concerning writing

process learners may go through: “fluency in producing written language, fluency in generating ideas, mastery of writing conventions, social cognition, literary appreciation and discrimination, and reflective thought”. However, in younger writers, integration of the mentioned skills cannot happen immediately as it occurs in more experienced ones.

However, writing might create problems for the students specifically those who study a foreign language. Quintero (2008) pointed out some of the problematic areas of writing such as grammar, punctuation, choice of vocabulary, and the like that can affect their performances. In the same vein, Jaramillo and Medina (2011) noticed that constructing the sentences and lack of linguistic resources could influence the learners’ ability to convert their thoughts into texts.

**2.4. Process and Product Approaches to Writing**

Sun and Feng (2009, p.150) held that “process approach to teaching writing focuses on writing process rather than the final draft” which includes several stages of: a) pre-writing or invention of writer’s thoughts; b) drafting, that can be a feedback from the instructor; c) revising the entire writing which usually consists of an overall focus, reconsideration of how the written text was organized, and providing sufficient evidence; and d) final revision of what has been written so far to check its accuracy of the sentences for the publishing the final draft.

Nunan (2001) stated that product approach puts its focus on writing tasks through which students imitate, copy, and transform teacher instructed models. Pincas (1982, as cited in Badger & White, 2000) viewed product approach in writing mainly as linguistic knowledge of the learners and their attention on the proper use of vocabulary, syntax, and cohesive devices. She believed that through this approach, learners respond to their teachers and imitate what has been instructed by the teachers. She suggested free writing for the learners in a way that students receive instruction, but they are free to create their own points of view. She added, product approach aims to create an error-free coherent writing.

The focus of process approach, on the other hand, is on the steps taken by the students to create their work. This approach sees writing as a way of creation of ideas by the writers (Zamel, 1982, p. 201). It mainly focuses on the procedures taken by the writers to solve problems, discover ideas, express ideas in writing format, and revise texts. Zamel

(1982) also stated that writing is the process of discovering ideas and making meaning out of them.

Furthermore, Tribble (1996, p.37) proposed that the process approach emphasizes writing as "activities which move learners from generation of ideas and collection of data through the 'publication' of a finished text." In process approach it is believed that no text can be perfect, but writers try to approach a perfect writing. In this approach, learners try to reflect on their own writing, discuss it with their teacher, and finally edit their writing to create an acceptable draft as their final work.

McCrimmon (1994) tried to discriminate process-oriented as a way of knowing (process) from product-oriented as a way of telling (product) in writing. Likewise, Fowler (1989) claimed that process writing matches the inherent process learners have in their mother tongue and allows them to express themselves better as individuals.

**2.5. Think aloud protocol**

Gregg and Steinberg (1980, p.4) defined think aloud protocol as "a description of the activities, ordered in time, which a subject engages in while performing a task." According to their description, through verbal protocols or "thinking aloud" protocol "subjects are asked to say aloud everything they think and everything that occurs to them while performing the task, no matter how trivial it may seem" (p.4).

Comparably, Flowers and Hayes (1981, p.22) asserted that "think aloud protocol is considered as a problem-solving process by which a writer tries to speak out loud to describe thoughts as it happens; the process of planning, idea and text generation, and revision". They claimed that "thinking aloud protocols share three advantages of process-tracing methods: 1-They provide direct evidence about process; 2- They yield rich data and thus promote exploration; 3- They can detect processes that are invisible to other methods." (p.219)

The above-mentioned advantages are crucial in writing since writing itself is a complex integration of processes that requires longer time. Obviously, through thinking-aloud, the writer (learner) reveals processes that might not be pre-planned. Besides, think aloud provides a "valuable window onto one's thought processes" (Hayes & Flowers, 1981, p.219).

Van Someren et al., (1994, p.30) held that "think aloud method avoids

interpretation by the subject and only assumes a very simple verbalization process. It treats the verbal protocols that are accessible to anyone, as data thus creating an objective method." During think aloud, the writer has an ongoing talking that occurs almost automatically in their minds. It is one of the applicable strategies with which learners can have a better image and awareness about their mental process as they write. In other words, think-aloud protocol helps them to reach a higher level of writing content (Pitenoee et al., 2017). Plus, it helps them to manage their thinking and have a better control over the hierarchical use of sentences as they write about the relevant topic. Moreover, it allows them to trace their own improvement as they are moving on (Azizi et al., 2017).

## 3. Method

This study utilized a comparative study with quantitative and qualitative approaches. The aim was to trace the writing processes and improvement of students who learn to involve their visual, auditory, and tactile learning preferences in their writing within four separate ongoing assessments.

### 3.1. Design

The study was an embedded mixed-methods design in nature with the qualitative stage embedded within the quantitative stage. For the quantitative stage, a quasi-experimental design was employed to reveal the impact of learning styles-based instructions on the writing development of the learners. The dependent variable was the ability to write narrative texts and the independent variable was the learning style-based instructions. For the qualitative stage, adopting a content analysis design, think aloud protocols were utilized to assist the researchers to investigate the mental processes in writing of the learners in each learning style in order to detect if there was any distinguishable thinking pattern among them.

### 3.2. Participants

Seventy-four school girls ($8^{th}$ grade) in a secondary state school in Tehran, participated in this study. They were all 13 years old and at A2 level based on CEFER. English language was used as the medium of instruction and they all spoke Persian as their L1. Based on Learning Style Questionnaire (LSQ), they were divided into three experimental

groups of visual (N=42), auditory (N=9), and tactile (N=23). A pilot group of 30 female students with similar characteristics to the target groups from the same school was used to administer the translated version of LSQ to assure the researchers about the appropriateness as well as the applicability of its content.

### 3.3. Instruments

To fulfil the objectives of the research, the following instruments were used: first, based on the level of the participants, a Cambridge Test of Flyer (mock Flyer, 2018) was administered for ensuring homogeneity of the learners with regard to their general English proficiency including all skills. The test included the four skills: listening (25 items), reading (38 items), writing (2 sections: part 1;10 items and part 2, a picture story), and speaking. For the purpose of this study, a careful attention was paid on the second part of writing in order to be evaluated for the goal of the research. It consisted of three related picture stories that learners had to narrate. Next, participants had several writing texts in accordance with their course book items (nationality, my week, my abilities, my health, my city, my village, and my hobbies), and factors of understanding the content, choice of vocabularies, and creating logical link among the events either by sentences or connectors following IELTS band score (5 marks for each part, totally 15) were considered to evaluate their performances. Considering the proficiency level of the participants, the elementary evaluation of IELTS band scores was involved to assess their writing. In order to have an ongoing assessment, the instructor gave the learners 4 extra topics of nationality, living in another country, Mina is sick, and Nowruz by which each learning style members' writing were evaluated. Picture stories for visuals, audio tracks for the auditory learners downloaded from BBC learning English, and handcrafts like postcards and glue- and- paste activities for tactile learners. After the intervention period, the second part of writing section of another edition of Flyer (2019) test was used as the posttest to evaluate the improvement of their writings.

Second, the Learning Styles Questionnaire designed by Cohen et al. (2002) was used which included 110 items organized in 11 separate sections. For the goal of the present study only the first three parts, which detected sensory styles of visual, auditory, and tactile (10 items for each) were used to fulfill the goals of the research. The reliability of the test was estimated, r=0.769 which seemed to be acceptable. A 5-Likert scale

(0=never, 1=seldom, 2=sometimes, 3=often, & 4=always) was used in this questionnaire. Following the description of the questionnaire designers (Cohen et al., 2002), the closer their scores to the maximum of the scale, 40, the more reliance of the learner on the preferred style. The reliability of the main version appeared to be 0.839 which was considered as acceptable.

Since the present study focused on LSs of beginner learners, it was translated and simplified into Persian by the researchers so that it became comprehensible for them. Sequentially, following Tsang et al's (2017) guidelines for developing, translating, and validating a questionnaire, back translation was performed which suggested stages of: a) forward and backward translation, checked by a bilingual translator; b) expert committee, including three linguists; and c) preliminary pilot testing, using the translated version in another research resembling the intended respondents.

Third, with three to four sessions interval, students had to write about a given topic, relevant to their course book titles. Their writings were evaluated and scored based on the above-mentioned criteria by the teacher herself.

Finally, a think aloud protocol was utilized to explore the learners' mental images and processes while engaging in the narrative writing tasks (nationality, living in another country, Mina is sick, & Nowruz). To that aim, they were asked to record their voices while thinking aloud, and hand in their records to the teacher. The researchers later transcribed and analyzed their voices to find out the mental process of each learning style.

**3.4. Procedure**

At the onset of the study, a Flyer test was used to assure the researchers of the homogeneity of the students concerning the proficiency level of the participants. Then, the 74 students sat for the Persian-translated LSQ to be divided into three groups of visual, auditory, and tactile. The current study considered a similar writing model to the Gregg and Steinberg's (1978) structure of mental process of writing model, as exhibited in Figure 1, in order to analyze the participant's writing activities including their planning, translating, and reviewing. The instructor performed the first topic of the book, my nationality, herself in front of the learners, step by step, so that they became familiar with the required stages they had to go through. This means that, first she said out loud what she wanted to write prior to her writing and then expanded her sentences.

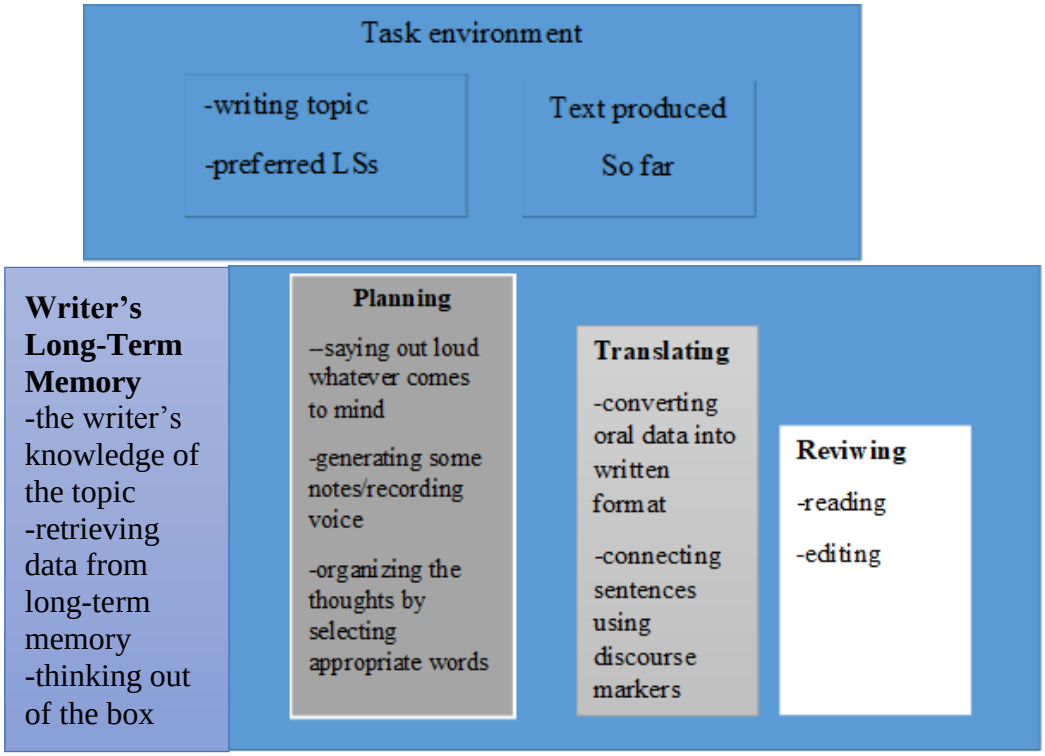


**Figure 1.** Structure of Mental Process of Writing

The implementation of the course book topics followed narrative format, presenting like a story by the teacher, so that learners become familiar with sequence of the events as well as how to involve connectors between the sentences. For instance, as for "my hobbies" topic, she told: "I usually start my day with some exercises; then I listen to my favorite music and make breakfast. After that, I read books. Finally, I sometimes watch movies". However, the indirect emphasis on discourse markers including first, next, after that, plus, and the like expose them to the correct narration of the events as they occur. In addition to the course book activities, which were common for all the participants, each learning style received its relevant extra activities as their specific treatment. For instance, considering one of their topics which was 'Mina is sick' (learning about sickness), visual learners had a series of related pictures that they had to narrate them based on their own understanding, auditory learners listened to relevant track, and tactile learners had to sort and match pieces of similar topic information (unscrambling sentences) and then write about it. Obviously, prior to each writing, every student was asked to think out loudly (and record her voice) about how she was going to convert her thoughts into words. This means that she had to clarify whether she would have a plan or not. They were all

monitored during this stage to make sure that they were writing what they were saying.

The course of instruction included 25 sessions, 90 minutes each. The first session included the implementation of the practices learners were required to perform for the entire course of instruction. Each four sessions, one of the previously mentioned topics was given to the learners (1st task=nationality, 2nd=living abroad, 3rd=Mina is sick, & 4th=Nowruz). To provide the treatment, the teacher spent one-third of each session or more, depending on the difficulty level of the topic on the performance of the learners. She gave each group their related activity. They were exposed to an instruction type including activities corresponding to their learning style and similar to their daily life which incorporated narrative writing. The teacher explained the topics of the course book (including: my nationality, my week, my abilities, my health, my city, my village, &, my hobbies) as if she was narrating an event to expose them to logical sequencing of the happenings in addition to using connectors of (first, plus, next, after that, etc.). Considering “my week” topic for instance, the visual learners had series of related pictures by which they had to write about the events as they appeared orderly using discourse markers. Likewise, for the auditory learners, topic-related short story tracks in accordance to the topics like nationality or sickness which were downloaded from British council English learning, were played and they had to narrate them based on their own understanding. Then, in each of the 24 sessions, they had one track (24 tracks in the entire term of instruction) for their activity. Similarly, the tactile learners had to unscramble picture stories, sorting pieces of topic-related stories, or matching pictures and then narrating them based on their own perspectives. This means the teacher selected a topic-relevant story and cut its paragraphs into several sections; sequentially, she handed them over to the students and they had to read and sort the sections to make the story. The instruction spanned over 24 sessions, October to April, 2023, and each 4 sessions the teacher gave the students an extra topic, which was similar to the course book titles, and they had to narrate it. Throughout the treatment sessions, she utilized a variety of materials in the class to create a context by which the topics became more comprehensive; for example, to teach “nationality” to visual learners, she used several posters of different countries flags and famous places in addition to displaying slides. For auditory learners, she played an audio track of a conversation among people of different

countries. And for tactile learners, she used the glob to involve learners finding various countries and then gluing and pasting the relevant unscrambled short picture stories. It is worth mentioning that, for the fulfilment of the four required tasks, and in order to prevent voice intervention, they were taken to language lab in those sessions when they had to hand over the four tasks. Subsequently, they recorded their voices with a voice recorder or their mobiles and gave it to their teachers to be saved in a file for further analyses.

## 4. Results

### 4.1. Quantitative Phase: Among Group Analyses

Initially, the researcher opted for checking the homogeneity of the learners in the three groups with respect to their writing ability at the outset. To that end, a one-way ANOVA was utilized. Normality of the distributions of the pre-test scores was checked to be met statistically.

Table 1 shows the Levene's test of homogeneity of variances. It displays that there was no significant difference among the three groups' variances (p=.425>.05). Hence, the condition was met.

**Table 1.** Test of Homogeneity of Variances for the Pretest Scores

| Pretest | | | |
|---|---|---|---|
| Levene Statistic | df1 | df2 | Sig. |
| .866 | 2 | 71 | .425 |

Table 2 shows the result of one-way ANOVA on the pretest scores of the three groups. As it shows, the difference between the three groups' pretest mean scores turned out to be non-significant (F=.557, p=.575>.05). As such, the researcher rested assured about homogeneity of the three groups of learners regarding their writing ability prior to the intervention.

**Table 2.** ANOVA on the Groups' Pretest Scores

| Pretest | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 21.364 | 2 | 10.682 | .557 | .575 |
| Within Groups | 1360.595 | 71 | 19.163 | | |
| Total | 1381.959 | 73 | | | |

### 4.1.1. Research Question One

In order to show if there were significant changes in the writing scores of the visual learners across four times of writing performance, a Repeated Measures ANOVA had to be used. Firstly, the normality of distributions condition was checked. As one set of scores showed to be skewed, the non-parametric Friedman Test was applied to show any significant differences among the four mean scores:

**Table 3.** Ranks of Visual Learners' Four Writings

| | Mean Rank |
|---|---|
| Vis1 | 1.24 |
| Vis2 | 1.88 |
| Vis3 | 3.23 |
| Vis4 | 3.65 |

Table 4 shows that the mean ranks have increased incrementally from test one to test four. The following chi-square table shows if the difference among the scores was significant:

**Table 4.** Test Statisticsa on Visual Learners' Writings

| | |
|---|---|
| N | 37 |
| Chi-Square | 87.840 |
| df | 3 |
| Asymp. Sig. | .000 |

a. Friedman Test

Table 4 reveals that there was a significant difference among the four mean scores ($X^2$=87.84, p=.000<.05). As such, the corresponding null hypothesis, 'visual-based instruction does not have any significant impact on visual-oriented EFL learners' narrative writing ability across time', is rejected. Table 5 shows that the effect size was very large (.924) according to Cohen's (1988, pp.284-7) guidelines (.01= small, .06=moderate, .14=large effect).

**Table 5.** Multivariate Tests on Visual Learners' Writings

| | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Pillai's trace | .924 | 138.583[a] | 3.000 | 34.000 | .000 | .924 |
| Wilks' lambda | .076 | 138.583[a] | 3.000 | 34.000 | .000 | .924 |
| Hotelling's trace | 12.228 | 138.583[a] | 3.000 | 34.000 | .000 | .924 |
| Roy's largest root | 12.228 | 138.583[a] | 3.000 | 34.000 | .000 | .924 |

Table 6 shows where the differences lie.

**Table 6.** Pairwise Comparisons among Visual Learners' Four Writings

| Measure: MEASURE_1 | | | | | | |
|---|---|---|---|---|---|---|
| (I) Visual | (J) Visual | Mean Difference (I-J) | Std. Error | Sig.[b] | 95% Confidence Interval for Difference[b] | |
| | | | | | Lower Bound | Upper Bound |
| 1 | 2 | -1.811* | .450 | .000 | -2.723 | -.898 |
| | 3 | -6.297* | .365 | .000 | -7.038 | -5.556 |
| | 4 | -7.297* | .435 | .000 | -8.179 | -6.416 |
| 2 | 1 | 1.811* | .450 | .000 | .898 | 2.723 |
| | 3 | -4.486* | .441 | .000 | -5.381 | -3.592 |
| | 4 | -5.486* | .550 | .000 | -6.602 | -4.371 |
| 3 | 1 | 6.297* | .365 | .000 | 5.556 | 7.038 |
| | 2 | 4.486* | .441 | .000 | 3.592 | 5.381 |
| | 4 | -1.000* | .449 | .032 | -1.910 | -.090 |
| 4 | 1 | 7.297* | .435 | .000 | 6.416 | 8.179 |
| | 2 | 5.486* | .550 | .000 | 4.371 | 6.602 |
| | 3 | 1.000* | .449 | .032 | .090 | 1.910 |

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

As revealed in Table 6, all sig values turned out to be less than .05 indicating that each mean score was significantly higher than the mean in the previous test. The following bar graph visually illustrates the mean differences:

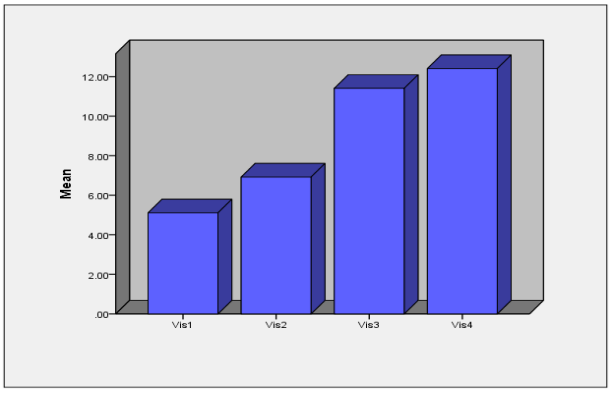


**Figure 2.** Bar Graph of Visual Learners' Four Mean Scores

### 4.1.2. Research Question Two

In order to show if there were significant changes in the writing scores of the auditory learners across four times of writing performance through the parametric test of Repeated Measures ANOVA, the normality condition was verified first. Table 7 shows whether the differences were statistically significant:

**Table 7.** Multivariate Testsa on Auditory Learners' Four Writings

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Auditory | Pillai's Trace | .942 | 32.689[b] | 3.000 | 6.000 | .000 | .942 |
| | Wilks' Lambda | .058 | 32.689[b] | 3.000 | 6.000 | .000 | .942 |
| | Hotelling's Trace | 16.345 | 32.689[b] | 3.000 | 6.000 | .000 | .942 |
| | Roy's Largest Root | 16.345 | 32.689[b] | 3.000 | 6.000 | .000 | .942 |

As shown in Table 7, the p value corresponding to Wilks' Lambda turned out to be.000, less than .05, which indicates that there was a significant effect for time. Therefore, the corresponding null hypothesis, 'auditory-based instruction does not have any significant impact on auditory-oriented EFL learners' narrative writing ability across time', is rejected implying that there was a significant change in scores across four different time periods. The effect size of this result turned out to be very large (.942) according to Cohen's (1988) guidelines. Table 8 locates the differences among the four sets of scores:

**Table 8.** Pairwise Comparisons of Auditory Learners' Four Writings

| Measure: MEASURE_1 | | | | | | |
|---|---|---|---|---|---|---|
| (I) Auditory | (J) Auditory | Mean Difference (I-J) | Std. Error | Sig.[b] | 95% Confidence Interval for Difference[b] | |
| | | | | | Lower Bound | Upper Bound |
| 1 | 2 | -.889 | .735 | .261 | -2.584 | .806 |
| | 3 | -6.000* | .624 | .000 | -7.438 | -4.562 |
| | 4 | -6.778* | .813 | .000 | -8.652 | -4.904 |
| 2 | 1 | .889 | .735 | .261 | -.806 | 2.584 |
| | 3 | -5.111* | .873 | .000 | -7.125 | -3.098 |
| | 4 | -5.889* | 1.073 | .001 | -8.363 | -3.415 |
| 3 | 1 | 6.000* | .624 | .000 | 4.562 | 7.438 |
| | 2 | 5.111* | .873 | .000 | 3.098 | 7.125 |
| | 4 | -.778 | .894 | .410 | -2.840 | 1.284 |
| 4 | 1 | 6.778* | .813 | .000 | 4.904 | 8.652 |
| | 2 | 5.889* | 1.073 | .001 | 3.415 | 8.363 |
| | 3 | .778 | .894 | .410 | -1.284 | 2.840 |

As displayed in Table 8, the difference between the first and the second means was not significant (p=.261>.05). However, the difference between the second and the third means turned out to be significant (p=.000<.05). The difference between the third and the fourth means also came out to be non-significant (p=.41>.05). Figure 3 illustrates the auditory learners' four mean scores graphically:

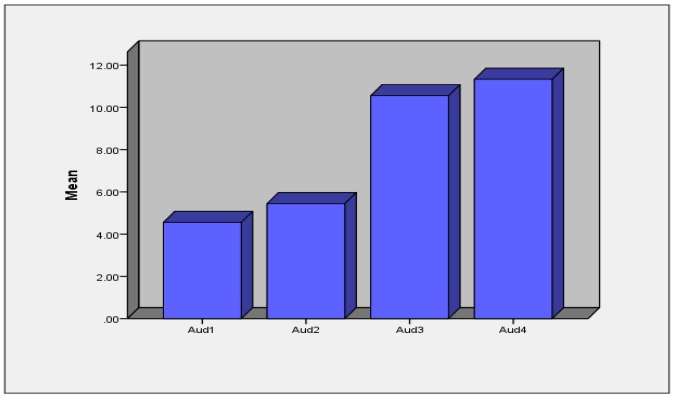


**Figure 3.** Bar Graph Auditory Learners' Four Mean Scores

### 4.1.3. Research Question Three

In order to show if there were significant changes in the writing scores of the tactile learners across four times of writing performance the parametric RM ANOVA was used. The normality condition was primarily checked, and it was shown that all distributions were normal. Table 9 shows if there was any significant difference in the four sets of scores.

**Table 9.** Multivariate Tests[a] on Tactile Learners' Four Writings

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Tactile | Pillai's Trace | .956 | 101.073[b] | 3.000 | 14.000 | .000 | .956 |
| | Wilks' Lambda | .044 | 101.073[b] | 3.000 | 14.000 | .000 | .956 |
| | Hotelling's Trace | 21.658 | 101.073[b] | 3.000 | 14.000 | .000 | .956 |
| | Roy's Largest Root | 21.658 | 101.073[b] | 3.000 | 14.000 | .000 | .956 |

a. Design: Intercept
Within Subjects Design: Tactile

b. Exact statistic

As depicted in Table 9, the Wilks' Lambda value turned out to be significant (.000>.05) which implies that there was a significant time effect. Therefore, the corresponding null hypothesis, 'tactile-based instruction does not have any significant impact on tactile-oriented EFL learners' narrative writing ability across time' is rejected. The effect size also came out to be very large (.956). Table 14 shows the pairwise comparisons locating the differences:

**Table 10.** Pairwise Comparisons of Tactile Learners' Four Writings

| Measure: MEASURE_1 | | | | | | |
|---|---|---|---|---|---|---|
| (I) Tactile | (J) Tactile | Mean Difference (I-J) | Std. Error | Sig.[b] | 95% Confidence Interval for Difference[b] | |
| | | | | | Lower Bound | Upper Bound |
| 1 | 2 | -2.647* | .717 | .002 | -4.167 | -1.127 |
| | 3 | -6.176* | .682 | .000 | -7.622 | -4.731 |
| | 4 | -7.588* | .601 | .000 | -8.861 | -6.315 |
| 2 | 1 | 2.647* | .717 | .002 | 1.127 | 4.167 |
| | 3 | -3.529* | .529 | .000 | -4.652 | -2.407 |
| | 4 | -4.941* | .433 | .000 | -5.859 | -4.024 |
| 3 | 1 | 6.176* | .682 | .000 | 4.731 | 7.622 |
| | 2 | 3.529* | .529 | .000 | 2.407 | 4.652 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 4 | -1.412* | .588 | .029 | -2.659 | -.165 |
| 4 | 1 | 7.588* | .601 | .000 | 6.315 | 8.861 |
| | 2 | 4.941* | .433 | .000 | 4.024 | 5.859 |
| | 3 | 1.412* | .588 | .029 | .165 | 2.659 |

As evinced in Table 10, all sig values turned out to be less than .05 implying that there was a significant increase in the mean scores over time.

Figure 4 presents the differences in the mean scores visually:

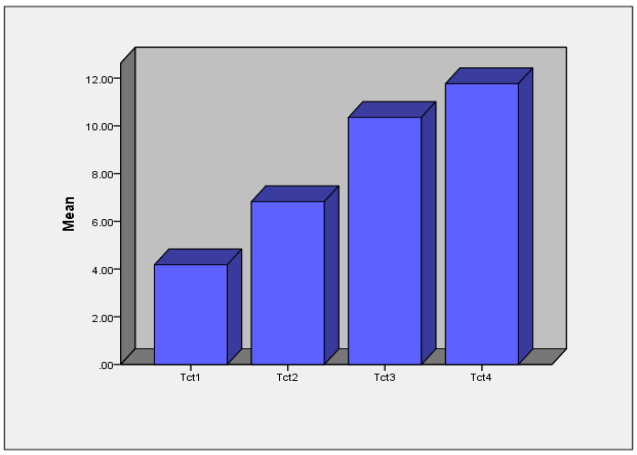


**Figure 4.** Bar Graph of Tactile Learners' Four Mean Scores

### 4.2. Qualitative Phase (tracing mental processes in writing)

#### 4.2.1. Research Question Four

The fourth research question aimed at exploring the mental processes of developing a narrative writing activity among EFL learners with visual learning style. To that end, every student was asked to think loudly about the steps she wanted to take to narrate the required topics (1st: nationality, 2nd: living in another country, 3rd: sickness, & 4th: new year/Nowruz) based on their understandings. Their teacher provided them with related picture stories, posters, story cards. They had to narrate what they had comprehended from the pictures; however, how they wrote was totally optional. This means that, some narrated their writing in a dialogue and some as a story.

As their thoughts revealed in the first writing, from the 41 students present at the session, the majority of the visual students (N=25, 60.97%) tried to imagine the whole story prior to its details either by referring to their background life experience or fantasizing

an imaginary event. Subsequently, those who considered the whole plot in advance to the details showed a top-down look towards the given topic. This means that they considered the characters, the place, the dialogues, and the required events to extend their writings. However, other students (N=16, 39%) preferred to consider the details of the story prior to expanding their ideas. This means that they had a 'bottom-up' consideration of the story beginning with selecting the words, then making sentences, and finally creating the story. Similarly, they also used either their life experiences or an imaginary event. Interestingly, they had a variety of narration from creating a conversation between two people to writing a letter to a person abroad. This revealed that they had the chance of thinking freely and developing the content in accordance to their own tastes of expanding the plot.

In their second writing (living in another country), the students' writings' patterns were different since some had no idea of how living in another country would be like; therefore, they could not even visualize it. From the 39 learners present at this session, 5 students (12.85%) expressed that they had the first sentence and then let the others come to their minds with no prior plans. Some of the students, as in writing one, revealed either a top-down (N=24, 61.53%) or bottom-up approach (N=10, 25.6%), three students did not mention anything.

As for the third writing (sickness), from the 37 students present at the session, the majority of the visual learners (N=26, 70.2%) had a plan of how to narrate a sickness occasion with diverse topics including: a conversation between a mother and her daughter about how she got cold from her classmates, catching cold after a volleyball match, not wearing enough warm clothes, and the like. The rest, (N=9, 24.3%), considered details of words and sentences and then created the entire story. The remaining students (N=2, 5.4%) had no plan and just let their ideas move on. These patterns were displayed in their fourth writing as top-down approach users (N=31, 79.5%), bottom-up (N=6, 15.4%), and those who had no special approach (N=2, 5.1%). Figure 5 illustrates the approaches taken by the visual learners in the four writings.

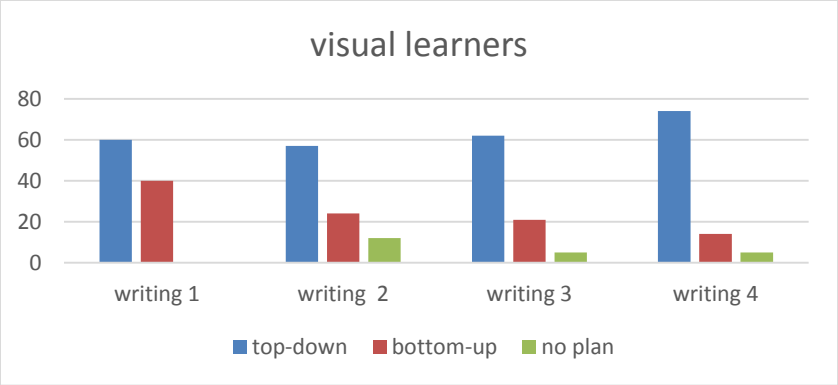


**Figure 5.** Writing Approaches of Visual Learners

### 4.2.2. Research Question Five

The fifth research question intended to explore the mental processes of developing a narrative writing activity among EFL learners with auditory learning style. The detected data from the analysis of the auditory learners' mind patterns was as follows:

In the 1st writing, surprisingly, the majority of the students (N=5, 55%) had no special plan for creating their narration. Their thinking aloud transcriptions revealed that they decided to write the first sentence and sequentially kept going on their story as it appeared to them either by referring to their daily life experiences or imagining the content. Some other students utilized either top-down (N=2, 22%), considering the entire story prior to writing, or bottom-up (N=2, 22%) approach, recalling the required relevant words, making sentences and finally generating the final draft.

Their second writing showed an improvement at least in the approach they used since their mental patterns were categorized into two forms of top-down (N=6, 66%) and bottom-up (N=3, 33%). Accordingly, the same happened in their third writing as top-down (N=5, 55.5%) and bottom-up (N=4, 44.5%) approach users. In the 4th writing, top-down (N=3, 33%) and bottom-up (N=6, 66%) approaches were revealed. Nevertheless, in the fourth writing, the majority of the students showed to choose the required vocabularies and making sentences in advance to create the whole plot. Figure 6 displays the auditory learners' adopted approach in their four writings.

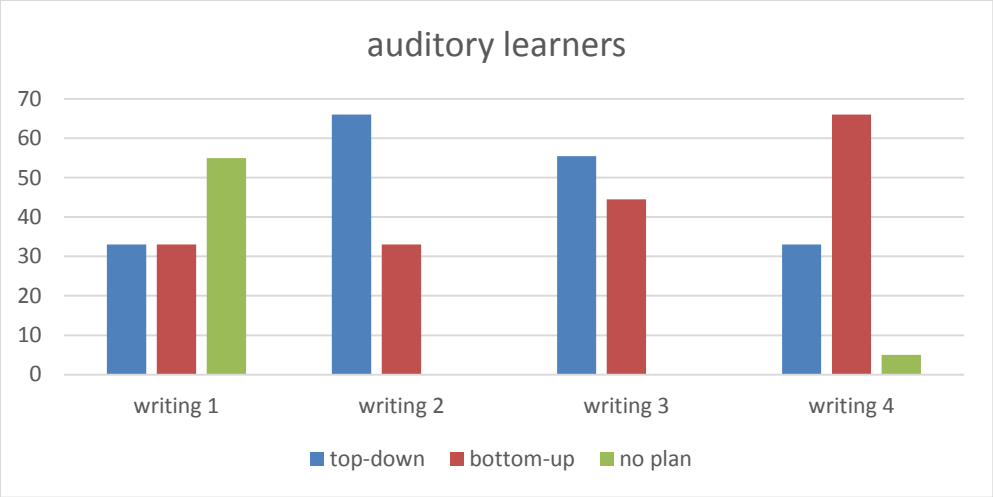


**Figure 6.** Writing Approaches of Auditory Learners

### 4.2.3. Research Question Six

The Sixth question tapped on the mental processes of developing a narrative writing activity among EFL learners with tactile learning style. Comparably, description of the tactile learners' think-aloud transcriptions displayed similar patterns to visual and auditory learners involved approaches. The first writing revealed that from the 22 learners present at the session, some (N=8, 36.36%) had a pre-planned story before they initiated their writing. This means that top-down users produced the entire event in their mind, considering items of the place, characters, objects, and the like to expand the whole event. Bottom-up approach utilizers (N=9, 45.4%), began by choosing words and then completing required sentences to create the story. However, some (N=5, 22.7%) had no specific plans and proceeded the story as it appeared in their mind

In the second writing, from the 22 present students, top-down users (N=14, 63.6%) outnumbered bottom-up users (N=8, 36.36%). Similarly, in their third writing, from the 21 students present at the session, we observed top-down (N=11, 52.4%), bottom-up (N=9, 43%), and one person who showed to have no any specific plan for her writing (N=1, 4.76%). In the fourth writing, from the 18 present students, 1 learner (5.55%) showed to have no prior plan to generate the story and preferred to keep writing as it occurred in her mind, 12 learners (66.66%) used bottom-up and 5 learners (27.27%) followed top-down approach. It is worth mentioning that those who mentioned that they read more books,

watched more movies, or communicated with families and friends had better commands of narrating the story. Figure 7 evinces the mental pattern of the tactile learners in their writings.

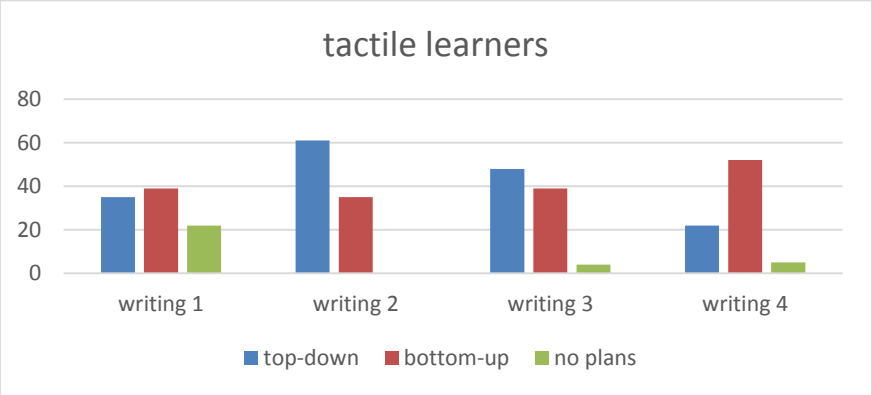


**Figure 7.** Writing Approaches of Tactile Learners

### 4.2.4. Research Question Seven

The seventh question intended to unravel any possible differences among the three groups of learners in terms of their mental processes in doing the writing tasks as a result of exposure to LS-related instructions. The following differences were observed:

Provision of the LS-related instructions revealed some characteristics of the mental processes in writing among three groups of the visual, auditory, and tactile learners as follows: first, visual learners tended to be more imaginative since they prioritized the orders of the events in their mind. Accordingly, due to their style of learning, visuals had better capacity to fantasize a story even if they had no exposure to that context. Moreover, generating a plot prior to their writing assisted them not to miss the entire story as they went through. Comparably, in the other two styles of auditory and tactile, they displayed two main mental patterns of top-down and bottom-up to prioritize their narration. Furthermore, the ongoing comparison of the two approaches uncovered the fact that the number of visual learners who used top-down approach increased from the first task to the last one whereas bottom-up users displayed a decrease. As for the auditory learners, the utilization of the two approaches fluctuated. This means in the first writing, both approaches were used by equal number of learners; in the second task, top-down outnumbered the bottom-up which was in contrary to the third writing. And finally, in the

fourth writing, again bottom-up users were more. As for the tactiles, the first to third writing, top-down approach users showed to be the majority while in the fourth writing bottom-up utilizers outnumbered in their usage.

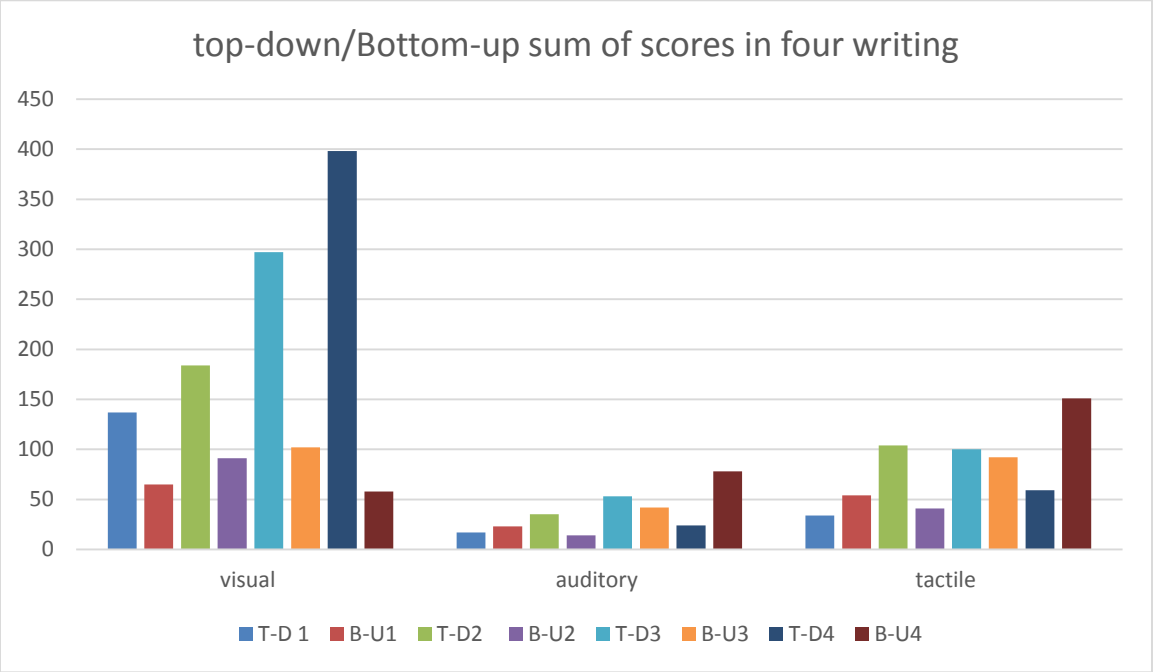


**Figure 8.** Writing scores of the two approaches among visual, auditory, and tactile

As Figure 8 displays, within this process two mind patterns were revealed: a) the learners considered the whole plot (the entire story, its characters, order of events, the required words or sentences) and then started to write. This means that they had a top-down plan for their writing, and b) the learners initially thought about the relevant words and sentences and after that began to expand the story. They displayed to follow a bottom-up approach of writing. Nevertheless, a minority of the learners mentioned that they had no special plan for their writing and they just wrote the beginning sentence and let go as events came to their minds.

## 5. Discussion

The researchers of the current study attempted to investigate whether adopting learning style-oriented instructions could have any impact on the development of narrative writing performance of the learners considering their preferred sensory styles of visual, auditory,

and tactile. Moreover, aimed at revealing the mind patterns of the learners, the researchers exposed the participants to think aloud protocol, as they were writing, to reveal how they initiated, organized, and expanded their thoughts. The obtained results revealed that visual-based instruction could improve visual-oriented learners' writing in an ongoing process. In the same vein, tactile-based instructions improved narrative writing of the tactile-oriented learners. It was further revealed that auditory learners' performances across time bore fluctuation in that the difference between the first and second performances was not significant, the difference between the second and third means turned out to be significant, and the third and fourth means were non-significantly different. However, their overall development was noticeable attested by the significant difference between the first and fourth writing performances, which implies that exposure of auditory learners to auditory-based teaching assisted their gradual development across time. The fluctuation may be explained by the observation that the auditory learners manifested slim imagination power when asked to talk about their feelings and experiences. Compared with the other two groups, they kept showing much more mix-up and lack of idea as to what to write. In their third writing (about sickness) however, they showed considerable improvement as they had personally experienced the subject, hence their better narration.

Moreover, the data displayed two main mental approaches of top-down and bottom-up among the three groups by which by learners narrated the events of the given topics. Besides, the detected result showed that top-down approach users outnumbered in all four narrations in addition to obtaining higher scores comparing to bottom-up users. As for auditory and tactile oriented learners, the two writing approaches had fluctuation in the four writing tasks. This means in both groups, using top-down or bottom-up approaches were not fixed in increase or decrease of their usage. Plus, in all three groups, top-down revealed to gain higher scores comparing to bottom-up users. Nonetheless, some of them in all the three groups showed to have no specific approach as they write and they just let their thoughts go.

Based on a vast number of studies on the usefulness of involving learning styles in the process of teaching such as Mirshekaran and Namaziandost (2018), Cools and

Rayners (2011), Oxford (2001), Pitenoee et al., (2017), learners' preferred styles of learning can assist them to organize their mind, recall required data from their memory, and convert their thoughts into performances better. Wherefore, the evaluation of the scores of the four writings of all groups revealed a significant improvement from writing one to writing four. Learners' styles of learning combine absorbing input simpler; then, organize, and process that information (DePorter & Hernacki, 2015 as cited in Albeta et., al, 2021). Therefore, involving learning styles in teaching the material and designing relevant activities can maximize the achievement of the language learners. Furthermore, as several researchers (Akpan, 2022; Imuta et al., 2018; Berns & Erickson,2001) mentioned, contextualizing the input can create a feasible learning environment in addition to the fact that it can make the content real for the learners.

The present research also is congruent with several studies including Lan and Anh (2022), Alabere and Shapii (2019), Pincas (1982) which claimed that exposing learners to process and product approaches of writing can foster their thinking ability to organize their thoughts and produce a final draft following logical steps of writing process.

## 6. Conclusions

As mentioned earlier, the researchers of the present study attempted to investigate whether exposure of the learners to instructions geared with their preferred learning styles could increase their narrative writing performances. It also tried to probe the mental patterns of the visual, auditory, and tactile groups when integrated with their preferred styles. To fulfill the goal, learners were asked to think aloud while involved in writings. With the rejection of first three hypotheses, it can be concluded that the involvement of learning styles could have a significant effect on the writing ability of the three styles. Furthermore, the content analyses of the learners' voices revealed the existence of two particular mental pattern of top-down and bottom-up approaches among the three groups. Finally, there was a difference among the three groups of learners regarding the order and amount of the use of top-down and bottom up approaches as discussed above.

The findings of the present study were in line with Albeta et al., (2021), Brown and Kelsey (2013), and Oxford (2011) who concluded the effective role of learning styles on

the improvement of the learners' achievement. Accordingly, Howard-Jones (2014) discovered that 95% of teachers in Great Britain, The Netherlands, Turkey, Greece, and China believed that students had better understanding if their preferred learning styles were incorporated and integrated with their instruction of the materials.

Based on the conclusions and implications described in this study, the researchers recommend other researchers to involve learning styles in their studies to obtain higher performances of narrative writing skills of young EFL learners. Accordingly, teachers can scaffold the students' minds and let them pass through the process of writing based on their detected learning styles.

However, since the participants of the current study were the only accessible group, replicating another research with other groups of: a) higher proficiency level; b) older age; c) males; and d) other learning styles-oriented learners with equal numbers could lead to different results. Moreover, the focus of the present study was on narrative genre of writing skill; therefore, utilizing other genres could yield other findings.

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