Exploring the Effectiveness of Graphic Organizers on EFL Learners' Writing Performance Across Different Learning Style Preference and Gender at Higher Education

Sabarun
Universitas Negeri Malang
Institut Agama Islam Negeri Palangka Raya

Utami Widiati
Universitas Negeri Malang

Nunung Suryati
Universitas Negeri Malang

Hafizah Hajimia
Universiti Teknologi MARA

The research investigated the interaction effect amongst types of writing strategy (x1), learning styles (x2), and gender (x3) on writing accuracy (y) at Islamic University Students. The 70 participants consisted of three groups based on types of writing strategy: free writing (n= 34) versus graphic organizers (n=36); types of learning styles : visual (n=22) versus auditory (n=26) versus kinesthetic (n=22); and gender (x3): male (32), female (38). A three-way ANOVA test was applied in the investigation. The study revealed that an interaction effect occurred amongst three variables on average of writing accuracy at F (2, 69) =3.34, p=0.02, eta 0.10. Then, the interaction effect also occurred between writing strategy and learning styles at F (2, 69) =7.40, p=0.01; and between learning styles and gender at F (2, 69) =6.56, p=0.03. On the contrary, the interaction effect did not occur between writing strategy and gender at F (1, 69) =1.79, p=0.19. Further investigation is needed to validate the finding.

Keywords: writing strategy, gender, learning style, writing accuracy

INTRODUCTION

Composing argumentative essay is regarded to be the most difficult skills to learn (Suhartoyo et.al. 2015; Pablo & Lasaten, 2018; Liunokas, 2020; Rubiaee et al. 2020; Zarrabi & Bozorgian, 2020; Vahid, et.al. 2021). It is a complex matter that needs generating ideas and reviewing texts (Rethinasamy, 2021; Teng et al., 2022), since writing such an essay needs critical thinking skills (Vögelinet al., 2019; Teng & Zhang, 2020; Khairuddin, et.al. 2021). An argumentative essay is an essential genre learnt at higher education. It covers, claim, counterclaim, refutable and conclusion (Boykin et al., 2019; Setyowati,

Sukmawan, El-Sulukiyyah, 2020). In higher academic setting, argumentative skills are useful instruments for learners to argue their stance. Therefore, it is clear that the skill to write argumentative essay is strongly needed for college students. However, learners still face many difficulties in composing argumentative essay. This is agreed upon by some scholars who have been investigating the learners' difficulties in composing argumentative essay such as Shahriari and Shadloo, 2019; Beckett & Kobayashi, 2020; Nindya & Widiati 2020; Ozfidan & Mitchell, 2020. Dang, et al., (2020) who confirmed that learners face problems with linguistic competence and critical thinking skills. Additionally, learners also have anxiety while facing the written tests.

Prior investigations (Styati & Latief, 2018; Zakrajsek, 2018) recommended that more attention on the thinking process should be given in teaching second language (L2) writing. To cope with such difficulties in writing, some scholars suggest to use a writing strategy in L2 writing (Bailey, 2019; Cer, 2019; Dewi, Nurkamto, & Drajati, 2019; Fauziati, & Marmanto, 2019; Rahmawati; Zhang, Chen, & Yu, 2019; Khongput, 2020). Therefore, the study proposes graphic organizers (GOs) as a strategy to cope with the difficulties in L2 argumentative writing class. Relevant studies were conducted by some scholars such as (Anggraeni & Pentury, 2018; Lasaka et al., 2018; Maharani, et.al. 2018; Rahmat, 2020; Hafidz, 2021). In general, they believe that GOs help learners select, organize, and develop ideas.

Another factor that contributes to successful learning is learning style. Learning style is the way to learn and process knowledge. Fleming (2001) states that it is a learner's way of gathering knowledge. Learners may use one of the following: visual, auditory and kinesthetic one. Some scholars have been investigating learning styles in L2 writing such as (Şener & Çokçalışkan, 2018; Siregar, 2018). This study applies VAK model of learning style: visual (see), auditory (hear) and kinesthetic (move) learners (VAK). Learning style plays a vital role in learners' life. When they have awareness of it, they can choose the best way to learn. Previous investigations found a strong positive relationship between learners' learning style and writing achievement (Kusumawarti, Subiyantoro, & Rukayah, 2018; Rezeki, Sagala, & Damanik, 2018; Siregar, 2018; Alnujaidi, 2018).

Another variable assumed to affect successful writing is gender difference (Coskun, 2014; Feery, 2008). Gender refers to the roles in society as performed by male and female (Anyanwu, 2015). An earlier investigation on gender differences was performed by Lakoff (1975). He found that girls and boys were not the same in language use. More specific focus of the present investigation, gender, is assumed to influence writing accuracy. In the context of EFL/ESL, males are regarded to have lower competence than females (Cornett, 2014). Then, Ng (2010) confirms that males do more grammatical errors than females. Similar studies are also performed by (Castro & Limpo, 2018; Zhang et al., 2019). They believed that girls gained better achievement in writing.

Despite the fact that there are many worthwhile investigations on the use of writing strategy, especially GOs, less attention has been given to the significance of GOs, learning style preference, and gender simultaneously in writing. Therefore, to fill the gap, this investigation is conducted. The purpose is to elaborate on the effect of writing strategy, learning style, and gender difference simultaneously in writing accuracy.

METHOD

The design of the investigation is a quasi-experiment using a 2x3x2 analysis of variance with participant's gender: male versus female (x1), learning styles: visual versus auditory versus kinesthetic (x2); and types of writing strategy: free writing versus graphic organizers (x3): as between-participants factors. The study involved 70 EFL participants. The three categorical independent variables were writing strategy (x1) and learning styles (x2) and gender (x3). Meanwhile, the outcome variable was argumentative writing accuracy (y).

A 2x3x2 interaction was applied to analyze data. It was a way of analyzing the three-way interaction between variables and simple main effects. In the present study, it was applied to determine if the interaction amongst writing strategy (x1), learning styles (x2), and gender (x3) differed significantly in the learners'

argumentative writing accuracy (y). Here, writing strategy, learning styles, and gender affected how well learners' writing accuracy. The criteria of participants are as follows:

TABLE 1
THE PARTICIPANTS

Writing Strategy	**Learning Styles**						**Total**
	Visual		**Auditory**		**Kinesthetic**		
	male	female	male	female	male	female	
Free writing	5	3	5	3	8	10	34
Graphic organizers	6	8	6	12	2	2	36
	11	11	11	15	10	12	70

Design of the Study

This investigation used two groups pre-posttest experiment design. The pre-posttest design was performed to collect data on the learners' writing accuracy.

Data Analysis

The 2x3x2 three-way variance analysis meant that three categorical independent variables were invloved in the study. There were a total of 12 conditions, 2x3x2 = 12.The three-way interaction examined for main effects, and interaction effects amongst all combinations of two factors and three factor on an outcome variable. In the present study, a significance level of 0.05 worked well. It indicated a 5% risk of concluding that a difference existed. The differences amongst the averages were considered to have an effect significantly if the p-value is lower than 0.05. This meant that the levels in the corresponding factor differed significantly and conversely. In this investigation, the three factors contributing the learners' writing accuracy were factor A (writing strategy), factor B (learning styles), and factor C (gender), factor two interaction (AB), (AC), and (BC); and factor three (ABC). The null hypothesis was that there is no statistical significant difference in average on writing accuracy yielded by writing strategy, learning styles, and gender simultaneously on average of writing accuracy. Answering the questions of research, a three-way interaction of ANOVA was conducted to analyze the interaction effect amongst writing strategy, learning styles, and gender on writing accuracy. The analysis also measured whether there was an effect partially of each writing strategy, learning style, and gender.

RESULT

Data Presentation

The average score for each variable is shown in Table 2. This table shows the outcome of the average score for each variable. The data shows that the average score for the free writing group of male visual learners is 64.80 and female is 90.66; male auditory learners is 64.80 and female is 65.33; for male kinesthetic learners, is 50.38 and for female is 54.10. Meanwhile, the average score for the graphic organizer group of male visual learners is 76.17 and female is 84.25; of male auditory learners is 78.67 and female is 83.67; of male kinesthetic learners is 51.00 and female is 52.50. This indicated that the average score for graphic organizers is higher than free writing.

TABLE 2
MEAN SCORE

Writing strategy	Learning styles	gender	Mean	N
Free writing (FW)	Visual	male	64.80	5
		Female	90.67	3
		total	74.50	8
	Auditory	male	64.80	5
		Female	65.33	3
		total	65.00	8
	Kinesthetic	male	50.38	8
		Female	54.10	10
		total	52.44	18
	total	male	58.39	18
		Female	63.06	16
		Total	60.59	34
Graphic Organizers (GOs)	Visual	male	76.17	6
		Female	84.25	8
		total	80.79	14
	Auditory	male	78.67	6
		Female	83.67	12
		total	82.00	18
	Kinesthetic	male	51.00	2
		Female	52.50	2
		total	51.75	4
	total	male	73.64	14
		Female	81.05	22
		Total	78.17	36
Total	Visual	male	71.00	11
		Female	86.00	11
		total	78.50	22
	Auditory	male	72.36	11
		Female	80.00	15
		total	76.77	26
	Kinesthetic	male	50.50	10
		Female	53.83	12
		total	52.32	22
	total	male	65.06	32
		Female	73.47	38
		Total	69.63	70

No Statistical Significant Difference in Average on Writing Accuracy Yield by Writing Strategy

The main effect of writing strategy is shown below.

TABLE 3
TESTS OF BETWEEN-SUBJECTS EFFECTS

Sources	df	Mean square	F value	P value	Partial Eta Squared
Corrected Model	11	1190.53	24.99	0.00	0.826
Intercept	1	235195.24	4.94	0.00	0.988
writing strategy	1	461.87	9.70	0.01	0.143
learning styles	2	2996.91	62.92	0.00	0.685
gender	1	705.47	14.81	0.00	0.203
Writing strategy * learning styles	2	352.60	7.40	0.00	0.203
Writing strategy * gender	1	85.25	1.79	0.19	0.030
learning styles * gender	2	312.56	6.56	0.01	0.185
Writing strategy * learning styles* gender	2	159.19	3.34	0.04	0.103
error	68	47.63			
total	70				
Corrected Total	69				

a. R Squared = ,826 (Adjusted R Squared = ,793)

The table above shows that the average square (MS) of writing strategy is 461.87, F (1, 69) = 9.70, p=0.03, eta 0.14. As α is smaller than 0.05, this means that different writing strategies gave a facilitative effect on writing accuracy. It means that writing strategy differed significantly in writing argumentative essays. Data shows that the average score for free writing (M= 65.01) is lower than for graphic organizers (M= 71.04). This indicates that there is a statistical significance difference in writing accuracy yield by writing strategy. The average score of FW is 65.01. Meanwhile, the average score for GOs is 71.04. As a result, it is evidenced that the average score for graphic organizers (M= 71.04) is higher than the average score for free writing (M= 65.01).

There was No Statistical Significance Difference in Average on Writing Accuracy Yield by Learning Style Preference

The main effect of learning style preference is shown in Table 3. The average square (MS) of learning style preference was 2996.91, F (2, 69) = 62.92, p=0.00, eta 0.69. As α was smaller than 0.05, the different learning style preferences had a facilitative effect on writing accuracy. It showed that learning style preferences differed significantly in writing argumentative essays. It is noticed that the average score for visual is 78.97; auditory is 73.11, and kinesthetic is 51. 99, This indicates that visual learners achieved better than auditory and kinesthetic learners. The post hoc tests of multiple comparison tables below described the average difference amongst the three learning styles.

TABLE 4
MULTIPLE COMPARISONS TUKEY HSD

I) learning styles	(J) learning styles	Mean Difference (I-J)	Std. Error	Sig.
Visual	Auditory	1.73	1.99	0.66
	Kinesthetic	26.18*	2.08	0.00
Auditory	Visual	-1.73	1.99	0.66
	Kinesthetic	24.45*	1.99	0.00
Kinesthetic	Visual	-26.18*	2.08	0.00
	Auditory	-24.45*	1.99	0.00

The output indicates pairwise differences between (1) visual and auditory; (2) visual and kinesthetic; (3) auditory and kinesthetic. It shows the average differences among the three types of learning styles. The average difference (MD) between visual and auditory learners is 1.73 (SE 1. 99, p= 0.66), indicating no significance between visual and auditory. It meant that both types of learning styles were equal. Then, the MD between visual and kinesthetic learners is 26.18 (SE 2.08, p= 0.00), indicating a significant difference between visual and kinesthetic learners. Here, visual is higher than kinesthetic learners. Next, the MD between auditory and kinesthetic learners is 24.45 (SE 1. 99, p= 0.00), showing a significant difference between auditory and kinaesthetic learners.

To conclude, there is a significance difference between visual and kinaesthetic learners; and between auditory and kinaesthetic learners. However, visual and auditory learners did not differ. Therefore, the hypothesis that there is no statistical significance difference in writing accuracy yield by learning style preference is rejected.

There is No Statistical Significance Difference in Average on Writing Accuracy Yield by Gender Difference

The main effect of learning style preference is shown in Table 3. It indicates that the average square (MS) of gender difference was 705.47, F (1, 69) = 14.81, p=0.00, eta 0.20. As α is lower than 0.05, it means that gender differences differed significantly in writing argumentative essays. The mean score for males is 64.30; and for females is 71.75, It indicates that there is a statistical significance difference in writing accuracy yield by gender difference. The null hypothesis is rejected.

There is No Interaction Effect Between Writing Strategy and Learning Styles on Average of Writing Accuracy

Table 3 states the average square (MS) of interaction effect between writing strategy and learning styles preference was 352.60, F (2, 69) =7.40, p=0.01, eta 0.20. As α is lower than 0.05, it means that there is an interactive effect between both variables, as described below.

TABLE 5
WRITING STRATEGY * LEARNING STYLES

Writing Strategy	Learning Styles	Mean	Std. Error
Free Writing (FW)	Visual	77.73	2.52
	Auditory	65.07	2.52
	Kinesthetic	52.24	1.64
Graphic Organizers (GOs)	Visual	80.21	1.86
	Auditory	81.17	1.73
	Kinesthetic	51.75	3.45

The average score of a free writing group for visual is 77.73, auditory is 65.07, and kinesthetic is 52,24. While the average score of the graphic organizer group for visual is 80.21, auditory is 81.17, and kinesthetic is 51.75. This indicates that GOs of all types of learners' learning styles got higher achievement than the free writing group of all types of learners' learning styles. The interaction effect between both variables is shown below.

FIGURE 1
THE INTERACTION EFFECT BETWEEN WRITING STRATEGY AND LEARNING STYLES

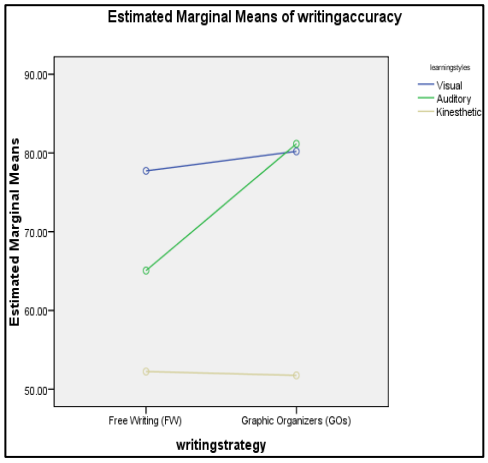
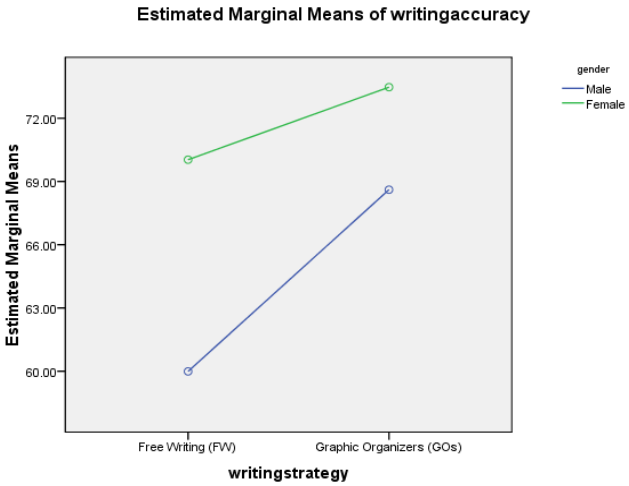


Figure above describes the interaction effect occurs between writing strategy and learning styles on average of writing accuracy. Therefore, the fourth null hypothesis was rejected.

There Is No Interaction Effect Between Writing Strategy and Gender Difference on Average of Writing Accuracy

The two interaction effect between writing strategy and gender difference on average writing accuracy is shown in Table 3. The average square (MS) of interaction effect between writing strategy and gender difference is 85.25, F (1, 69) =1.79, p=0.19, eta 0.03. As α is higher than 0.05, writing strategy and gender difference did not affect writing accuracy, The average score of the free writing group for boys is 59.99, and for girls is 70.03. Meanwhile, the graphic organizer group for male is 68.61, and female is 73.42. The interaction effect between both variables is shown below.

FIGURE 2
THE INTERACTION EFFECT BETWEEN WRITING STRATEGY AND GENDER



The figure above indicates that there is no interaction effect on the average of writing accuracy between writing strategy and gender. Therefore, the fifth null hypothesis is accepted.

There Is No Interaction Effect Between Learning Styles and Gender Difference on Average of Writing Accuracy

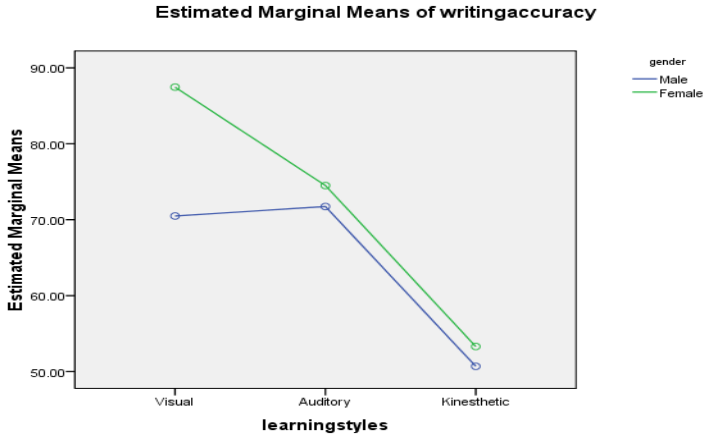
The two interaction effect between learning styles and gender difference on average of writing accuracy is shown in Table 3. The average square (MS) of interaction effect between both variables is 312.56, F (2, 69) =6.56, p=0.03, eta 0.19. As α is smaller than 0.05, it indicates an interaction effect between both in writing argumentative essays. It indicates that both learning styles and gender differences simultaneously affected writing accuracy, as described below.

TABLE 5
LEARNING STYLES * GENDER

Learning Styles	Gender	Mean	Std. Error
Visual	Male	70.48	2.09
	Female	87.46	2.34
Auditory	Male	71.73	2.09
	Female	74.50	2.23
Kinesthetic	Male	50.69	2.73
	Female	53.30	2.67

The table shows the mean score of visual for males was 70.48, and for female was 87.46. Meanwhile, the male auditory is 71.73, and the female is 74.50. Then, the male kinesthetic is 50.69, and the female is 53.30. The interaction effect between both variables is seen below.

FIGURE 3
THE INTERACTION EFFECT BETWEEN LEARNING STYLES AND GENDER DIFFERENCE



This indicates the interaction effect between learning styles and gender occurred a difference on average of writing accuracy. Therefore, the sixth null hypothesis is rejected.

There Is No Interaction Effect Amongst Writing Strategy, Learning Styles and Gender Difference on Average of Writing Accuracy

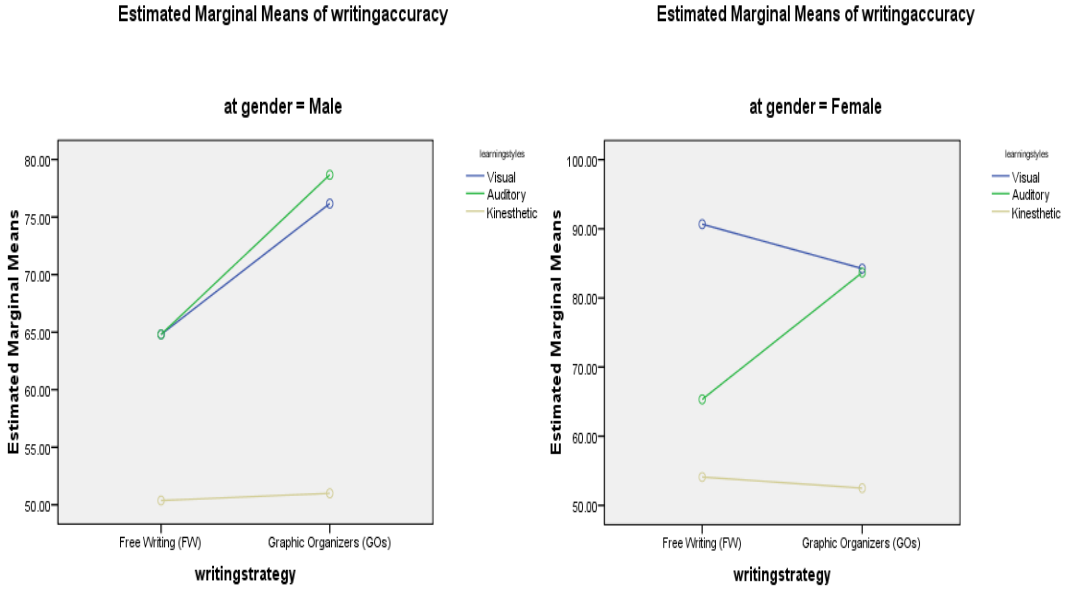
The third interaction effect amongst writing strategy, learning styles, and gender difference on average writing accuracy is shown in Table 3. The average square (MS) of interaction effect amongst all variables is 159.186, F (2, 69) =3.342, p=0.042, eta 0.103. As α was smaller than 0.05, it showed an interaction effect between writing strategy, learning styles, and gender difference in writing argumentative essays. This indicates that all predictor variables simultaneously affected writing accuracy, as described below.

TABLE 6
WRITINGSTRATEGY * LEARNINGSTYLES * GENDER

Writing strategy	Learning styles	gender	Mean	Std. Error
Free writing (FW)	Visual	male	64.80	3.09
		Female	90.67	3.99
	Auditory	male	64.80	3.09
		Female	65.33	3.99
	Kinesthetic	male	50.38	2.44
		Female	54.10	2.18
Graphic Organizers (GOs)	Visual	male	76.17	2.82
		Female	84.25	2.44
	Auditory	male	78.67	2.82
		Female	83.67	1.99
	Kinesthetic	male	51.00	4.88
		Female	52.50	4.88

Table above indicates that the average score for free writing group of male visual learners is 64.80 and female is 90.67; of male auditory learners is 64.80 and female is 65.33; of male kinesthetic learners learners is 50.38 and female is 54.10. In contrast, the average score for graphic organizer group of male visual learners is 76.17 and female is 84.25; for male auditory learners is 78.67 and for female is 83.67; of male kinesthetic learners is 51.00 and female is 52.50. This indicates that the graphic organizer is bigger than the average score of writing score as a whole. The interaction effect amongst three variables is seen below.

FIGURE 4
THE INTERACTION EFFECT AMONGST THREE VARIABLES



This indicates that there is an interaction effect amongst writing strategy, learning styles and gender difference on average of writing accuracy.

Discussion

To sum up, the three way interaction is used to see the interaction effect amongst writing strategy, learning styles and gender difference on average of writing accuracy. The table can be summarized as follows:

1. The main effect of writing strategy on learners' writing accuracy was F (1, 69) = 9.70, p= 0.03; ηp2 = 0.14. It showed that writing strategy differed significantly in writing argumentative essay. The average score for free writing (M= 65.01) was lower than graphic organizers (M= 71.04).
2. The main effect of learning styles on learners' writing accuracy was F (2, 69) = 62.92, p=0.00; ηp2 = 0.69. It showed that learning style preference differed significantly in writing argumentative essays. The mean score for visual was 78.97; auditory was 73.11, and kinesthetic was 51. 99. Pos hoc analysis indicates that there were no significant difference between visual and auditory learners (p= 0.66) It meant that both types of learning styles were equal. Then, a significant difference occurred between visual and kinesthetic learners (p= 0.00), indicating visual was higher than kinesthetic learners. Next, there was a significant difference between auditory and kinaesthetic learners (p= 0.000), showing that auditory was higher than kinaesthetic learners.
3. The main effect of gender difference on learners' writing accuracy was F (1, 69) = 14.81, p=0.00. ηp2 = 0.20. It showed that gender differed significantly in writing argumentative essays. Here, the average score for males was 64.30; and females was 71.75 indicating that females outperformed better than males.
4. The two interaction effect between writing strategy and learning styles was F (2, 69) =7.40, p=0.01, ηp2 = 0.20. It meant there was an interaction effect between writing strategy and learning styles. It indicated that both writing strategy and learning styles preference simultaneously gave facilitative effect to writing accuracy.
5. The two interaction effect did not occur between writing strategy and gender at F (1, 69) =1.79, p=0.19, ηp2 = 0.03. Both writing strategy and gender simultaneously did not give facilitative effect to writing accuracy.
6. The two interaction effect occurred between between learning styles and gender at F (2, 69) =6.56, p=0.03, ηp2 = 0.19. It indicated that both learning styles and gender simultaneously gave facilitative effect to writing accuracy.
7. The three interaction effect amongst writing strategy, learning styles and gender difference on average of writing accuracy was F (2, 69) =3.34, p=0.04, ηp2= 0.10. It revealed that there was an interaction effect amongst them. It showed that writing strategy (x1), learning style preference (x2) and gender (x3) simultaneously gave facilitative effect to writing accuracy (y). Here, GOs were better than free writing; visual learners outperformed better than auditory and kinesthetic, and females had higher achievement than males on the learners' writing accuracy.

The finding reveals that there is an interaction effect amongst writing strategy, learning styles and gender difference on average writing accuracy at F (2, 69) =3.34, p=0.04, eta 0.10. It indicates that writing strategy, learning styles, and gender difference have a facilitative effect simultaneously on learners' writing accuracy. Dealing with the finding that writing strategy (here, GOs) has an effect on writing accuracy, the study was supported by Lasaka et al., 2018; Hafidz, 2021. They find that GOs are powerful tools to teach writing. In addition, the finding reveals that the members of GOs class can interact and share their ideas. Additionally, in GOs class, learners learn with various activities during the class, such as searching related texts on argument essay, making argumentative organizers, and composing argument essays based on the graphic organizers they made. This finding is consistent with Rahmat (2020) stating that GOs help learners in the process of writing. Learners can write more efficiently. To conclude, GOs are effective in argumentative writing class. The implementation of GOs in L2 writing class also creates social community in the classroom setting. They can share ideas amongst others. As the result has positive impact, it is recommended that GOs are applied in writing argumentative class, included as part in curriculum design.

Dealing with the finding that learning style preference, (here, visual learners) gives effect on writing accuracy, the study was in accordance with Alnujaidi, 2018; Kusumawarti, Subiyantoro, & Rukayah, 2018; Rezeki, Sagala, & Damanik, 2018; Şener & Çokçalışkan, 2018; Siregar, 2018; Sabarun, 2021. Therefore, it is recommended that teachers should introduce and classify learners about their learning styles and preference. By knowing the learning styles preference for each individual, teachers can provide precisely the teaching style addressed to learners.

Dealing with the finding that gender difference gives effect on writing accuracy, in this case, girls are better than boys. Female learners gain higher achievement than male learners. The finding is in accordance with (Cornett, 2014). Another investigation performed by Reynolds et al. (2015) stated that females outperformed the males. The finding is also persistent with other scholars, such as (Castro & Limpo, 2018; Zhang et al., 2019). They found that females gain better achievement.

Recommendation

The highest implication of the current study is that there is a gender difference in writing accuracy. As a result, the study recommends that writing teachers reduce the gender gap by strengthening writing instruction for male students. Here, language instructors need to increase males' writing performance. The result of this investigation is very important since some teachers do not consider the gender difference in writing instruction. It is, therefore, language instructors should give more attention to the gender gap in L2 writing classes.

Additionally, language instructors should provide more conducive and constructive feedback to male learners to enhance their writing skills. Here, teachers need to throw far away an image that writing act is a female act in L2 writing class. There are some recommendations to arouse male's motivation to write better. Another technique to strengthen writing skills is reading. Learners need a lot of readings to enhance writing, since reading utilizes good examples for writing texts. It is, therefore, teachers need to provide learners with a variety of reading texts serving a good example for writing activity. It is advisable that the teachers provide chance the learners to read not only inside but also outside the class. The study also recommends that future researchers perform a bigger sample size to generalize the result.

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