



High and Low Achieving Online Graduate Students' Learning Styles and Strategies

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Abstract

This study explored the styles and strategies used by online MA students of TEFL and investigated the relationship among their learning styles, learning strategies, and learning achievement. The participants were 87 online graduate students of TEFL at Iran University of Science and Technology (IUST). The instruments consisted of questionnaires on learning styles and strategies and average scores of online students. The results showed that the most learning style preferences were obtained by synthesizing, field-independent, closure-oriented, random-intuitive, and visual, while the lowest ones were related to field-dependent, auditory, tactile / kinesthetic, and open styles. Online students' highest tendency was related to handling possibilities, while their lowest tendency was concerned with using physical senses. With regard to learning strategies, goal setting strategies received the highest mean, whereas task-strategies received the lowest mean. The results of binary logistic regression also revealed that high achievers were mostly grouped into visual, tactile, inclusive, closure, and open learning styles. However, there was no difference between high and low achieving students in learning strategy use. Online instructors are recommended to consider styles and strategies of online students and choose appropriate materials and methods based on their styles and strategies.

Keywords: learning strategies, learning styles, learning achievement, online learning, MA students of TEFL

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Introduction

Over the last two decades, online instruction has become more prevalent in higher education at universities and colleges (Allen & Seaman, 2017), and learning has experienced a remarkable change from traditional classroom to online learning environment (George & Lal, 2018). Learners' styles and individual attributes are considered one of the most significant factors, influencing online learning and academic competence (Gökçearsan & Alper, 2015). In online learning environments, learners' performance can be influenced by their learning styles (Ford & Chen, 2000; Kolb, 1984), because different learning styles require different ways of instruction and study (Pashler et al., 2009; Popescu, 2010). It is also argued that although learning styles help make clear distinction in individuals' learning preferences and processing information, they can be an indicator of possible learning success.

It is stated that familiarity with different styles can help educational system to provide valuable instruction to learners to optimize their learning procedure (Truong, 2016). In addition, for learners, perceptions of their own styles would enable them to be more self-assured of their learning process (Truong, 2016). Felder and Silverman (1988) state that if teaching style does not correspond learners' learning style, those with particular learning styles may confront difficulties in learning, because there are various preferred ways of learning for different learners. For instance, some may learn immediately through pictures, while others prefer passages and reading; some may learn through theories, whereas others may acquire through examination and examples (Truong, 2016). However, a blend of distinct techniques can provide a situation for learners in which all types of learning styles can be successful in an online learning course (Zapalska & Brozik, 2006). It is also essential to integrate learners' cognitive and physiological features into teaching requirements to offer an effective online teaching and to adjust teaching to these features (Gökçearsan & Alper, 2015).

According to Ehrman et al. (2003), learning styles and strategies are commonly considered interrelated, and styles are made apparent by learning strategies. Lin et al. (2017) argue that fostering motivation and a diversity of cognitive and metacognitive strategies for active regulation of students' learning is essential for online learning success. Uysal and Yalın (2012) state that for effective teaching, the integration of learners' cognitive, emotive, and physiological characteristics into pedagogical requirement is essential, and that teaching should be adjusted to such features. It is stated that to grow the effectiveness of learning and teaching activities, concentration on learner's learning features is efficient (Kurilovas & Juskeviciene, 2015; Truong, 2016).

It is also argued that there is a positive association between strategy use and L2 learners' learning achievement (Barcroft, 2009; Lai, 2009; Mezei, 2008). In other words, learning strategies are found to mediate the relationship between styles and academic achievement; however, few studies have dealt with this issue in either L2 learning or e-learning conditions. Some researchers (e.g., Doulik et al., 2017; Goda et al., 2015; Huang et al., 2012; Işık, 2019; Ryan & Poole, 2019) have investigated the relationship between learning styles and learner achievement. The association

between learning style and learning performance has been verified; learning style causes better learning performance needs to be confirmed (Huang et al., 2012). In other words, despite some research on learner characteristics for successful online learning (e.g., Kauffman, 2015; Kerr et al., 2006; Zhao et al., 2005), little systematic research has been conducted on this issue. Given the fact that learners with various learning styles and strategy use enrolled in the e-learning campus of IUST and to explore whether there was a difference between high and low achieving online graduate students' learning styles and strategies, this study investigated learning strategies and styles they used in online learning. Moreover, the study explored the relationship among learning styles, learning strategies, and learning achievement of online graduate students of TEFL. The following research questions were addressed:

1. What are the learning styles of online MA students of TEFL?
2. What learning strategies are used by online MA students of TEFL?
3. Is there any relationship among learning styles, learning strategies, and learning achievement of MA students of TEFL?

Literature Review

Online instruction requires learners to exercise more independent control over their online learning trait (Barnard et al., 2009). It has also been established to enhance learning motivation and outcome (Shih et al., 2001). In addition, student involvement is increased in online participation, enhancing learning effectiveness (Zhang et al., 2006). Laying the groundwork for comprehending learners' learning performance, learning style is significantly important (Furnham et al., 2009; Gadzella et al., 1997; Jackson et al., 2009; Liu et al., 2008; Phoha, 1999; Tucker, 2000). Some researchers (e.g., Felix, 2001; Kim, 2001; O'Donnell & Kelly, 2001) have found that individual differences can have significant impact on online learning performance. Learning styles are classified as personality centered, cognition centered, or activity centered and is considered a subcategory of cognitive styles (Curry, 1983; Ehrman & Leaver, 2003; Riding & Rayner, 1998). According to Goldstein (1998), it is crucial to assess students' learning styles to evaluate their online learning performance.

Obtaining insights into various learning styles, teachers can have means to design interpositions appropriate for individual requirements (Goda et al., 2015). According to Felder and Silverman (1988), the dropout level is lower and the rate of performance is higher when there is congruity among method of teaching, subject matter, and the preferred learning style. As also argued by Lumsdaine and Lumsdaine (1993), the deficiency of congruity between the features of content and the way of teaching and preferred learning style is related to relatively poorer functioning and lower motivation, and consequently resulting in possible nonfulfillment of a course. Several researchers (e.g., Felder & Soloman, 1997; García et al., 2007; Graf & Kinshuk, 2006) have argued that learning style is an important indicator of performance. For instance, Graf and Kinshuk (2006) evaluated learning styles regardless of students' behaviors in an online course and found that learners with various learning styles revealed different functions in online

courses and showed different willingness to become online or stay online to observe materials.

The learning cycle, based on Kolb's model (1984), is classified into four stages: reflective observation, active experimentation, concrete experience, and abstract conceptualization. Honey and Mumford (1992) further suggest four styles (i.e., reflectors, activists, pragmatists, and theorists) in the Learning Style Questionnaire (LSQ) developed based on Kolb's learning cycle model. The LSQ evaluates learners' preferred way of learning and the amount of learning they are expected to (Huang et al., 2012). According to Huang et al. (2012) the Index of Learning Styles (ILS) containing 44 items with four pivotal scales relevant to learning style preferences was developed by Felder and Soloman (1997) considering Felder and Silverman Model. Huang et al. also note that the ILS evaluates dimensions related to other learning style measurements suggested earlier in the literature. For instance, the Riding cognitive style model proposed by Riding (1991) is a two-dimensional model comprising of Wholist / Analytical and Verbal / Imagery dimensions. Gregorc (1982) also suggests the mind style model, which is of two dimensions, i.e. perception dimension (Abstract / Concrete) and ordering dimension (Random / Sequential). Other considerable theories are VARK, including Visual, Auditory, Read, and Kinesthetic and Honey and Mumford's learning styles (Honey & Mumford, 1986); and Kolb's learning styles inventory (1984).

Graf et al. (2007) argue that a comprehensive evaluation of learning styles is important to determine the relationship between learning styles and learner's performance in an online course. Having compared several models of learning style, Kuljis and Liu (2005) state that Felder-Silverman Learning Style Model (FSLSM) suggested by Felder and Silverman (1988) is the most efficient model in terms of its application in e-learning systems. Soflano et al. (2015) similarly highlight that the FSLSM has been one of the most common applied models in Computer-Assisted Language Learning (CALL) with its validity and reliability being confirmed. Huang et al. (2012) also pinpoint that the FSLSM is more comprehensive compared to other models of learning style, such as the LSQ (Honey & Mumford, 1992) and LSI (Kolb, 1984). It is also argued that FSLSM is commonly applied due to its combination of diverse main learning style models, accounting for various aspects of learning process (Dorça et al., 2013). Moreover, unlike other learning style models categorizing individuals into some groups, the FSLSM classifies the preferences of a learner into four main aspects, including perception, information input, information process, and understanding along with their related accounts of characteristics (Huang et al., 2012). In addition, the FSLSM has by far been considered the most applicable theory to adaptive learning system (Truong, 2016).

The FSLSM differentiates the learning styles in terms of four dimensions, each of which further followed by two sub-elements (Felder & Silverman, 1988). These dimensions and their sub-elements include (a) perception dimension (intuitive / sensing) based on Jung's (1990) personality type theory, (b) information input dimension (visual / verbal) derived from the experiential learning theory of Kolb (1984), (c) information process dimension (active / reflective) based on the cognitive theory, and (d) understanding dimension (global / sequential) derived from the

learning style system of Pask. The FSLSM, according to Huang et al. (2012), indicates that intuitive style is integrated into imagination and creativity, and that individuals prefer theories and principles in addition to being capable of finding relationships and possibilities, while the sensory types are patient with details, preferring concrete contents, tangible procedures, and realistic outlook. Visual individuals are keen on acquiring information via diagrams and images; verbal ones tend to obtain information via spoken and written demonstrations; active individuals' best way of obtaining knowledge is by experimenting things and working with other members of group; and reflective ones obtain information best by thinking about things, introspective processing, and contemplating on the learning materials along with tending to work independently or with one reliable person (Huang et al., 2012). Huang et al. further state that sequential individuals obtain knowledge in small gradual and linear steps, are keen on details, tend to evaluate, and have convergent thinking; while global individuals benefit from holistic thinking, comprehend in intuitive leaps, and are interested in applying holistic thinking.

As stated by Liu and Reed (1994), learners devoting more time to online courses are considered field-dependent. Academic work on this topic is related to the prediction that learners with various learning styles and levels take part in online courses (Huang et al., 2012). Online courses, which are not simultaneous, self-paced, and need not much group work are more useful for introverts who seem to be more reflective, whereas extraverts should take mix of online discussion and face-to-face (F2F) class to prevent socially isolated feeling (Friedman, 2016; Fuster, 2017). According to Huang et al. (2012), sensory learning style was found to be so compatible with online learning environment. Shaw (2012) examined the relationship among learning styles, type of participation, and learning performance and found that the accommodator style was related to higher learning score.

Hsu (2015) explored the relationships among EFL learners' learning styles and technology acceptance model. Hsu found that most learners were visual and that no significant relationship was found between the type of learning style and perceived usefulness. Exploring participation styles of students in online discussions, Pala and Erdem (2020) found four patterns of to get information / analytical, to discuss / innovative, to socialize / connective, and to fulfill requirements / practical. These four styles were considered contributing to instructors and researchers to determine learners' participation styles before organizing discussion environments, and learners to help them gain awareness about their own participation styles for effective online discussion and learning processes. Designing an adaptive online learning environment based on learners' learning styles and investigating the impact of such environment on learners' engagement, El-Sabagh (2021) found that adaptive e-learning based on learning styles could significantly increase student engagement and motivation, activate their active learning, and facilitate their knowledge construction. El-Sabagh further emphasized adjusting the learning environment and instructional materials and activities based on students' preferences and learning styles.

Since learning strategies and styles are commonly viewed as being interrelated (Ehrman et al., 2003), studies on online learning (e.g., Barnard et al., 2008; Barnard-

Brak et al., 2010; Kuo et al., 2014; Lee, 2006) have concentrated on general domain strategies and reported that students' self-regulated learning strategy use is influential for their success. Ehrman et al. (2003) argue that a learning strategy should be considered neither good nor bad, as it can be essentially neutral as long as it is examined in context. A number of researchers (e.g., Lin et al., 2017; Mezei, 2008; Tsuda & Nakata, 2013) have argued that high-educated L2 learners seem to be more informed of the procedure of their learning and are able to organize their own learning processes compared to low-level counterparts. Having explored the relationship between learning styles and instructional strategies in an online graduate course, Akdemir and Koszalkab (2008) found that using discovery type as well as collaborative and expository types of instructional strategies for low field-dependent and high field-dependent learners resulted in equal benefits in terms of their learning outcome in online courses. It is also stated that how learning strategies are used can anticipate L2 outcomes (Barcroft, 2009; Mezei, 2008; Schunk & Zimmerman, 2012).

Learners who perform satisfactorily in courses have agreed that there can be a positive relationship among learning achievement, learning strategy use, and motivation; that highly motivated learners prefer to use different learning strategies in second language learning; and that higher learning achievement correlates with a higher rate of strategy use (Mezei, 2008; Vandergrift, 2005). Moreover, learners' satisfaction is considered a critical factor for online learning success (Kuo et al., 2014). According to Lin et al. (2017), a high level of online satisfaction is the indicator of learners' achievement. Lin et al. also examined the role of online learning strategies in the performance of 466 K-12 online language learners. They found that online language strategies had a considerable role in online learning, and that learners were aware of their learning process and their active strategy use. Given their findings, Lin et al. further concluded that online learning strategy use positively brought about learners' better perceived progress, final grades, and satisfaction. Sahragard et al. (2016) investigated the relationships between, learning style preferences, language learning strategies and field of study of university students majoring in the fields of science, engineering, social sciences, arts and humanities, and EFL. The findings revealed no significant relationships between the learning styles of students and their fields of study. However, significant relationship was found between the learning strategy use and fields of study. For example, EFL students used metacognitive strategies significantly more than students of other fields.

Method

Participants

The study was conducted with 87 Iranian MA students at IUST. All participants were students of TEFL, who were passing related courses at the e-learning campus of IUST. They had received three semesters of instruction and passed 28 credits. Availability sampling was used to choose them; in other words, 72 females (63%) and 15 males (13%) with their age ranged from 24 to 39 were asked to respond to the instruments of the study.

Instruments

Three instruments were used in this study. The first one was the learning style survey to determine each individual's preference for learning. This questionnaire was developed by Cohen et al. (2009), consisting of 100 items with 11 categories: auditory, visual, and tactile / kinesthetic (30 items); introverted and extroverted (12 items); random-intuitive and concrete-sequential (12 items); open and closure-oriented (8 items); global and particular (10 items); analytic and synthesizing (10 items); leveler and sharpener (6 items); inductive and deductive (6 items); field-independent and field-dependent (6 items); reflective and impulsive (6 items); and literal and metaphoric (4 items). The second instrument was a questionnaire on online learning strategies developed by Barnard-Bark et al. (2010). This questionnaire was used to determine MA students' learning strategies in online classes. The scale consisted of four categories of goal setting (5 items), help-seeking (4 items), task strategies (4 items), and self-evaluation (3 items). The average scores of online graduate students were also used to compare their achievement with their learning styles and strategies and were classified into four categories of A = 18-20, B = 16-18, C = 14-16, and D = 12-14.

Procedure

This study was carried out at the end of academic year 2019-2020. The questionnaires on learning styles and strategies: learning styles survey by Cohen et al. (2009) and online learning strategies by Barnard-Bark et al. (2010) were selected. The questionnaire on learning styles survey was aimed to determine online graduate students' learning styles, while the survey on learning strategies was used to determine their strategy use in online courses of TEFL. The items of the questionnaires were based on five-point Likert scale with the values ranged from 1 = Never to 5 = Always.

Before conducting the survey, online students were informed about the significance of knowing their learning styles and its effects on their achievements. To further motivate students to answer the scales, they were informed that the researchers would send them the results of their styles via social networking sites such as, among other services, WhatsApp and Telegram they mentioned at the beginning of the scales. Before administering the questionnaires, the researchers identified students willing to participate in the study and made them aware of the procedures of the research. The students were then asked to answer some questions about demographic variables, such as name, gender, age, and the way they preferred to be informed about the result of their learning style. The questionnaires were administered through an online survey tool (Google doc form.com) and for completing the survey, its link was sent to participants through e-mail or WhatsApp. Accompanied with the link, a voice message was also sent to students to familiarize them with the purpose and methods of completing the survey. The researchers also ensured that the responses would be used only for research purposes.

Data Analysis

Descriptive statistics were conducted to explore graduate students' learning style preferences. Descriptive statistics of major activities related to their learning

styles were also calculated to determine students' online learning preferences. In addition, the average scores of online graduate students of IUST were classified into four categories, and the frequencies and percentages of their average scores in terms of four categories were calculated. Descriptive statistics were also run to explore their learning strategy use. Moreover, binary logistic regression was performed to investigate the relationship among learning styles, learning strategies, and four categories of learning achievement.

Results

Online Graduate Students' Learning Style Preferences

The learning style survey was administered to determine the online students' general approach to learning. This survey included 23 major learning style preferences. To determine their learning tendencies, descriptive statistics were run. Table 1 highlights the results of this analysis.

Table 1

Online MA Students' Learning Styles

Learning Styles	Min	Max	M	SD
1. Visual	1.70	12.60	3.65	1.19
2. Auditory	1.00	4.30	3.00	.58
3. Tactile / Kinesthetic	1.60	4.50	3.01	.72
4. Extroverted	1.67	4.83	3.27	.73
5. Introverted	1.50	4.50	3.30	.56
6. Random-Intuitive	1.00	5.00	3.72	.77
7. Concrete-Sequential	1.67	4.83	3.46	.61
8. Closure-Oriented	1.00	5.00	3.72	.88
9. Global	1.40	5.00	3.58	.70
10. Open	1.5	5.00	3.09	.71
11. Particular	2.00	5.00	3.34	.55
12. Analytic	1.8	5.20	3.12	.58
13. Synthesizing	1.60	5.00	3.82	.80
14. Sharpener	1.67	5.00	3.45	.64
15. Deductive	1.67	5.00	3.52	.72
16. Leveler	1.67	5.00	3.26	.61
17. Inductive	1.33	5.00	3.26	.72
18. Field-Dependent	1.00	5.00	2.92	.86
19. Field-Independent	1.00	5.00	3.73	.86
20. Reflective	1.33	5.00	3.48	.76
21. Impulsive	1.00	5.00	3.44	.80
22. Literal	1.50	5.00	3.19	.64
23. Metaphoric	1.50	5.00	3.55	.80

As shown in Table 1, the most learning style preferences were obtained by synthesizing, field-independent, closure-oriented, random-intuitive, and visual, while the lowest style preferences were related to field-dependent, auditory, tactile / kinesthetic, and open. Table 1 also shows that the most homogeneous responses were received by particular, introverted, analytic, and auditory learning styles, whereas the most heterogeneous ones were obtained by visual, closure-oriented, field-dependent, and field-independent approaches, respectively. In learning style survey, the items of the survey were also classified into 11 major activities. The descriptive statistics of this classification are provided in Table 2.

Table 2

Descriptive Statistics of Eleven Major Activities Related to Online Students' Learning Styles

Activities	Min	Max	M	SD
1. How I use my physical senses	2.00	6.60	3.22	.59
2. How I handle possibilities	1.67	4.92	3.59	.61
3. How I expose myself to learning situations	2.00	4.42	3.28	.46
4. How I receive information	2.10	5.00	3.46	.50
5. How I deal with ambiguity and deadlines	1.50	5.00	3.41	.62
6. How I further process information	2.20	5.10	3.47	.54
7. How I deal with language rules	2.33	5.00	3.39	.51
8. How I commit material to memory	1.67	5.00	3.36	.53
9. How I deal with multiple inputs	2.33	5.00	3.33	.55
10. How literally I take reality	2.25	5.00	3.37	.51
11. How I deal with response time	2.00	5.00	3.46	.62

As indicated in Table 2, online students' highest tendency was related to the activity of "handling possibilities" ($M = 3.59$), while their lowest tendency was concerned with "using physical senses" ($M = 3.22$). Table 2 also shows that the two activities of "receiving information" and "dealing with response time" received the similar preference ($M = 3.46$). Considering the standard deviation of the activities, "dealing with ambiguity and deadlines" and "dealing with response time" received the most heterogeneous responses ($SD = .62$), whereas "exposing oneself to learning situations" received the most homogeneous responses ($SD = .46$).

Online Graduate Students' Learning Strategy Use

The questionnaire on online learning strategies administered to online students of TEFL included 16 items and was classified into four categories. The percentages of their responses to the options of each item of this questionnaire are provided in Table 3.

Table 3

Percentages of Learning Strategies Used by Online Graduate Students of TEFL

Statements	Never	Rarely	Sometimes	Often	Always
1. I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester).	3.4	14.9	25.3	42.5	13.8
2. I set standards for my assignments in online courses.	3.4	5.7	27.6	48.3	14.9
3. I keep a high standard for my learning in my online courses.	4.6	5.7	37.9	34.5	17.2
4. I don't compromise the quality of my work because it is online.	10.3	23.0	33.3	18.4	14.9
5. I set goals to help me manage study time for my online courses.	2.3	8.0	28.7	37.9	23.0
6. I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom.	3.4	5.7	37.9	26.4	26.4
7. I read aloud instructional materials posted online to fight against distractions.	10.3	21.8	31.0	28.7	8.0
8. I prepare my questions before joining discussion forum.	5.7	23.0	34.5	31.0	5.7
9. I work extra problems in my online courses in addition to the assigned ones to master the course content.	2.3	20.7	54.0	20.7	2.3
10. I share my problems with my classmates online, so we know what we are struggling with and how to solve our problems.	6.9	20.7	14.9	46.0	11.5
11. I find someone who is knowledgeable in course content so that I can consult with him or her when I need help.	8.0	16.1	27.6	32.2	16.1
12. I am persistent in getting help from the instructor through e-mail.	4.6	25.3	35.6	27.6	6.9
13. I ask myself a lot of questions about the course material when studying for an online course.	3.4	13.8	41.4	26.4	14.9
14. I summarize my learning in online courses to examine my understanding of what I have learned.	5.7	13.8	31.0	34.5	14.9
15. I communicate with my classmates to find out what I am learning that is different from what they are learning.	10.3	18.4	27.6	32.2	11.5
16. I communicate with my classmates to find out how I am doing in my online classes.	10.3	20.7	26.4	26.4	16.1

As indicated in Table 3, the most frequent strategies used by online graduate students of TEFL were as follows: “setting standards for assignments” (63.2%); “setting goals to manage study time” (60.9%); “sharing problems with other students

online to know struggles and how to solve them” (57.5%); “setting long-term and short-term goals” (56.3%); “trying to take more thorough notes” (52.8%); and “keeping a high standard for online learning” (51.7%). The items of the learning strategies questionnaire were grouped into four categories. The descriptive statistics of these categories are presented in Table 4.

Table 4

Descriptive Statistics of Categories of Learning Strategies

Categories of Strategies	Min	Max	M	SD
1. Goal Setting	1.60	5.00	3.48	.672
2. Task-Strategies	1.75	5.00	3.19	.65
3. Help Seeking	1.00	5.00	3.24	.91
4. Self-Evaluation	1.00	5.00	3.27	.89

As shown in Table 4, the highest mean ($M = 3.48$) was gained by “goal setting” category, while the lowest one ($M = 3.19$) was obtained by “task-strategies” category. Table 4 also indicates that the most homogeneous responses ($SD = .65$) were given to task strategies, whereas the most heterogeneous ones ($SD = .91$) were related to help seeking strategies.

Online Graduate Students’ Learning Achievement

The average scores of online students were classified into four categories of A = 18-20, B = 16-18, C = 14-16, and D = 12-14. The frequencies and percentages of students’ average scores in terms of the four categories are provided in Table 5.

Table 5

Descriptive Statistics of Online Graduate Students’ Average Scores in Terms of Four Classifications

Categories of Average Scores	<i>f</i>	%
A	29	33.3
B	35	40.2
C	19	21.8
D	4	4.6
Total	87	100.0

As indicated in Table 5, with regard to students’ average scores, most online students (40.2%) were grouped into the second category of average scores = 16-18, while fewest students (4.6%) were classified into the fourth category of learning achievement = 12-14.

Relationship among Learning Styles, Learning Strategies, and Learning Achievement

Binary logistic regression was performed to investigate whether there was any relationship among the four categories of average scores, twenty-three categories of learning styles, and four categories of learning strategies. In this statistical technique, categories of learning achievement were considered the dependent variables, while those of learning styles and strategies were the independent variables. Table 6 indicates the relationship between the first level of learning achievement (18-20) and the classifications of learning styles.

Table 6

Relationship Between First Category of Learning Achievement and Learning Styles

Styles	Estimation	Standard Error	Z	P
(Intercept)	3.137	2.977	1.053	0.292
Visual	1.409	0.620	2.271	0.023*
Auditory	0.197	0.523	0.377	0.706
Tactile	1.147	0.488	2.35	0.018*
Extroverted	-0.563	0.499	-1.128	0.259
Introverted	-0.305	0.639	-0.478	0.632
Random	-0.253	0.523	-0.485	0.627
Concrete	0.079	0.678	0.117	0.906
Closure	1.251	0.576	2.173	0.029*
Open	1.051	0.507	2.074	0.038*
Global	0.241	0.552	0.438	0.661
Particular	0.497	0.827	0.601	0.547
Synthesizing	-0.253	0.553	-0.459	0.646
Analytic	0.262	0.643	0.407	0.683
Sharpener	0.043	0.627	0.069	0.944
Leveler	-0.123	0.690	-0.179	0.857
Deductive	-0.538	0.511	-1.053	0.292
Inductive	-1.510	0.649	-2.325	0.020*
Field Dependent	0.535	0.410	1.306	0.191
Impulsive	0.167	0.470	0.355	0.722
Reflective	-0.187	0.587	-0.319	0.749
Metaphoric	0.539	0.518	1.041	0.297
Literal	0.045	0.583	0.078	0.937

As highlighted in Table 6, the relationship between the first level of learning achievement (18-20) and visual, tactile, closure, open, and inductive learning styles was statistically significant, implying that the high achievers were mostly grouped

into these learning styles. However, there was no significant relationship between the average category of A and other categories of learning styles. The relationship between the second category of learning achievement (16-18) and the categories of learning styles are presented in Table 7.

Table 7

Relationship Between Second Category of Learning Achievement and Learning Styles

Styles	Estimation	Standard Error	Z	p
(Intercept)	-0.629	2.604	-0.242	0.809
Visual	1.133	0.531	2.134	0.032*
Auditory	0.017	0.474	0.038	0.970
Tactile	0.892	0.432	2.066	0.038*
Extroverted	-0.066	0.424	-0.157	0.875
Introverted	-0.687	0.557	-1.234	0.217
Random	-0.653	0.494	-1.321	0.186
Concrete	-0.010	0.593	-0.017	0.986
Closure	-0.259	0.483	-0.537	0.591
Open	0.411	0.463	0.888	0.374
Global	0.095	0.450	0.211	0.832
Particular	0.415	0.728	0.57	0.568
Synthesizing	-0.265	0.502	-0.529	0.596
Analytic	0.047	0.561	0.085	0.932
Sharpener	-0.161	0.581	-0.279	0.780
Leveler	0.0531	0.616	0.086	0.931
Deductive	0.270	0.458	0.59	0.555
Inductive	1.009	0.507	1.988	0.046*
Field Dependent	-0.317	0.340	-0.931	0.351
Impulsive	0.547	0.489	1.119	0.263
Reflective	0.182	0.504	0.363	0.716
Metaphoric	-0.217	0.483	-0.451	0.652
Literal	-0.678	0.488	-1.389	0.164

Table 7 shows that the relationship between the second level of learning achievement and visual, tactile, and inductive learning styles was statistically significant, implying that the high achievers were mostly grouped into these learning styles, while there was no significant relationship between the average category of B and other categories of learning styles. In addition, there was not any significant relationship between the average categories of C and D and learning styles. The

relationship between the four categories of average scores and learning strategies are provided in Table 8.

Table 8

Relationship Between Four Categories of Learning Achievement and Learning Strategies

Learning Strategies	Levels of Achievement	Estimation	Standard Error	Z	p
Intercept	A	-1.5798	1.3922	-1.1335	0.256
	B	-0.511	1.3354	-0.383	0.702
	C	0.8749	1.6102	0.543	0.587
	D	-6.1973	3.1135	-1.99	0.046
Goal Setting	A	0.4514	0.3858	1.17	0.242
	B	-235	0.3691	-0.637	0.524
	C	-0.2167	0.4319	-0.502	0.616
	D	-0.1887	0.7634	-0.247	0.804
Task Strategies	A	0.2041	0.4033	0.506	0.613
	B	-0.0387	0.3891	-0.099	0.921
	C	-0.5981	0.48	-1.246	0.213
	D	1.0277	0.8178	1.257	0.208
Help-Seeking	A	-0.5461	0.3918	-1.394	0.163
	B	0.1545	0.3767	0.41	0.682
	C	0.6875	4746	1.449	0.147
	D	-0.2999	0.6782	-0.442	0.658
Self-Evaluation	A	0.1254	0.3979	0.315	0.753
	B	0.1685	0.3849	0.438	0.662
	C	-0.5473	0.4677	-1.17	0.242
	D	0.4022	0.7949	0.506	0.612

As shown in Table 8, no significant relationship was found between the average categories of A, B, C, and D and learning strategies. This result indicates that there was no difference between high and low achievers in using learning strategies.

Discussion

Findings revealed that visual was the most frequent style reported by online students. This might be due the fact that MA students of TEFL should be good at making summary of their lessons, enjoy guessing meanings, predict outcomes, and determine similarities and differences among academic issues related to their discipline. Closure-oriented was the second style recorded by the students,

indicating that they might be good at focusing on learning tasks, meeting deadlines, planning beforehand for assignments and tasks, and preferring explicit instructions and directions. Field-independent was the third style, which might be related to the fact that students prefer to separate materials from a certain context, even while exposing distractions. However, they may not be good at dealing with facts and information holistically.

The findings also showed that the auditory style was the least frequent style. This finding is in line with that of Zapalska and Brozik (2006), showing that learners with auditory learning style did not choose online education as their initial option of learning. The finding revealed that the blend of distinct techniques could provide a situation for learners in which all types of learning style could be successful in an online course. Huang et al. (2012) similarly reported that online participation was known as a mediating factor, and its mediating impacts on relationship between learners' performance and learning styles were confirmed. The results also revealed that learners whose learning styles were identified as sensory / intuitive took part online more often and for a longer term. The sensory learning style was found to be very compatible with online learning environments. The result of this study showed that the visual (i.e., sub-category of sensory styles) was reported as one of the most learning style preferences. Hsu (2015) also found that most learners who were passing the online course were visual and that no significant relationship was found between the type of learning style and perceived usefulness of technology use. El-Sabagh (2021) found that students' preferences and styles could have an impact on the effectiveness of learning. He further suggested that instructional materials and activities should be developed based on students' learning styles resulting in enhancing their participation and motivation.

The results also showed that the most frequent strategies were related to goal setting strategies, while the lowest ones were gained by task-strategies. In addition, no difference was found between the high and low achieving online graduate students in strategy use. This finding is similar to that of Reichelt et al. (2014), showing that the average score for transfer was higher in informal situation than in formal one, but the difference was not considerable. Results did not prove that learners obtaining a personalized computer program had higher-ranking performance on transfer compared to those receiving a formal version. The findings also corroborate those of Goda et al. (2015), indicating significant relationship between learners' type of learning and maximum learning achievement, as learners who displayed the learning habit type scored remarkably higher on the test than learners of the cunctation type. The results of their study also showed that regulated learning or making a learning habit could enhance learning usefulness and lead to better online learning achievement. However, the findings are in contrast with those of Sahragard et al. (2016), indicating that students majoring in EFL used more metacognitive strategies than students of other fields.

Conclusions

The study aimed to investigate learning strategies and styles of online graduate students of TEFL as well as to determine the relationship between online students' learning styles and strategies with their learning achievements. The most learning style preferences were obtained by synthesizing, field-independent, closure-oriented, random-intuitive, and visual. With regard to learning strategies, the finding also showed that online graduate students mostly used goal setting strategies. The findings revealed that high achievers were mostly grouped into visual, tactile, inclusive, closure, and open learning styles; however, there was no difference between low and high achieving students in learning strategy use. It is argued that instructional methods and strategies should be in line with learners' learning styles and preferences, since as Butler (1987) argues, adapting to learning styles seems the easiest and most impressive factor for improving learning performance. Online instructors can also help online learners get familiar with their own styles and strategies, because as Kolb (1984) notes, learners with a clear learning style preference are interested to learn more effectively if learning is directed toward their preference.

To enhance online learning outcomes, it is necessary to assess learners' learning styles and strategies. Therefore, online instructors need to pay attention to students' styles and strategies and select appropriate materials and methods based on their styles and strategies. Online students should also identify their styles and strategies and adapt their learning to their style so as to improve their online learning outcomes. Policy makers can also identify online learners' styles and based on which provide infrastructure, materials, and facilities for online learners and instructors. They can also hold some training sessions for learners to make them familiar with effective learning styles and strategies to help them achieve online learning success.

Future researchers can compare the styles and strategies used by students in online and F2F classes to gain more insights into graduate students' styles and strategy use. Other psychological variables, including autonomy, self-efficacy, self-regulation, self-directedness, satisfaction, and motivation can also be investigated, and the relationship between such variables and online students' learning achievement can be compared. In another study, interview can be conducted with online instructors to explore the techniques and strategies they use to consider various styles and strategies of online learners. Future researchers can also conduct group discussion and interview with online learners to gain more insights into the styles and strategies they use. They can also compare styles and strategies used by female and male online graduate students.

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