Discover Psychology

Discover

Research

EFL learners' learning styles and their reading performance

Hassan Banaruee[1] · Danyal Farsani[2] · Omid Khatin-Zadeh[3]

Received: 7 September 2022 / Accepted: 29 November 2022
Published online: 12 December 2022

Abstract
Language learners struggle with achieving their highest reading competence, particularly when they sit standardized tests with authentic advanced passages. The related literature shows a significant gap in suggesting specific techniques or strategies for individuals to develop a reading competence. To fill this gap, this study investigated the potential relationship between EFL learners' reading performance and their learning styles. One hundred thirty-seven participants were administered the TOEFL PBT for their recruitment test, at which the reading scores were evaluated and analyzed. Ehrman and Leaver's Questionnaire (2003) was used to classify participants' learning styles in an ectenic-synoptic continuum. We used the Pearson Product Moment Correlation Coefficient to find any potential correlation between learners' performance and their scores as an ectenic or a synoptic learner. The results revealed a positive correlation between synoptic learners and success in the reading tasks. Consequently, a regression model provided the classification of successful learners at reading tests. Knowing that teachers have a variety of learners in their classes and their preferred learning styles can help course instructors to design activities that will exercise a range of cognitive processes and perspectives.

Keywords Field-dependent · Field-sensitive · Learning style · Reading comprehension · Psychological processing · Education

1 Introduction

Learning styles define the dissimilarities in how students process learning [45]. Features such as the surrounding environment and personal experiences affect the way learners choose their idiosyncratic styles. Thus, teachers should supply teaching analyses accustomed to learners' desired styles. According to several studies (e.g., [3, 40], a learning style is described as preferences, characteristics, and abilities every individual processes and receives information with. It is also related to the fact that individuals have personal strategies while learning (see, [5, 13, 66]). In other words, creating a roadmap for the future can provide a basis for practical standards that fit individuals learning styles. Accordingly, reading is assumed fundamental to learning, it seems rational to make individual learners aware of the concept of optimal learning situation and why some readers outperform others as good readers. Previous studies (e.g., [6, 67]) have indicated that reading comprehension is relevant to cognitive factors and styles. Learners take perspectives and have different perceptions that are the result of the interaction between the environment [28] and their cognitive styles [42]. Reading comprehension is the process of unlocking meaning from connected text [6]. Reading is an integral section of language tests, and it can change the academic and professional lives of many students (cf. [65]. Indeed, students have different levels of performance in language skills. They argued that learning styles are crucial in students' learning strategy choices,

✉ Danyal Farsani, danyal.farsani@ntnu.no | [1]University of Bonn, Bonn, Germany. [2]Norwegian University of Science and Technology, Trondheim, Norway. [3]School of Foreign Languages, University of Electronic Science and Technology of China, Chengdu, China.

and specific styles can lead to learners' success. Utilizing members of a group's cognitive styles leads to increase in their collective intelligence [1]. Hence, it can be assumed that when teachers provide their teaching styles adjusted to the students' needs positive outcome can be expected. Employing two sets of data, a learning style questionnaire and a reading comprehension test, this study investigates and discusses the potential correlation between EFL learners' reading performance and their learning styles.

1.1 Theoretical background

Learning styles, formerly discussed as cognitive styles, are grounded on a psychological basis and form long-lasting and constant characteristics [62]. A learning style is "the more or less consistent way in which a person perceives, conceptualizes, organizes and recalls information and students' learning styles will be influenced by their genetic make-up, previous learning experiences, culture and the society they live in" [27]. In this vein, Kozhevnikov [46] argues that a learning style is consistent dynamic that is not necessarily influenced by other variables. Even in multicultural settings, teachers can benefit from awareness of their learners' cognitive styles, as basic cognitive styles may not change in different contexts [9]. The theory is revisited very often, with new terminology and divisions. This diversity makes it challenging to create a unified model or indicator of styles. Nevertheless, enhancing learners' awareness about their learning process, factors, and styles empowers them to match their strategies to their assignment [54]. While learning styles and strategies are sometimes used interchangeably, in some studies, they are defined differently. For instance, learning styles are considered the general approaches to learning, whereas learning strategies are the unique and particular systems to take in a specific setting [58]. Learners need to recognize the learning strategies and their strengths and, therefore, develop their learning capacity,also, they can take advantage of learning styles by coordinating learning strategies with them. When teaching tasks are aligned with learners' cognitive styles, their learning capabilities will be enhanced [2]. This is a form of engineering education. Still, educational settings have not benefited from the available literature regarding different learning styles. Neither learners' preferences and styles are tested according the programs nor teaching styles are designed and practiced to match their cognitive desires. Learning styles are attached to individual's personality traits and teaching in line with the learners' expectations enhances their mental skills [11], their level of proficiency [18], and their listening skills [67]. A considerable number of studies has been carried out, and many tools such as self-report surveys, interviews, direct observations, and think-aloud techniques are accessible to investigate the learning styles. In addition, Teachers need to be aware of learners' preference to provide them with the most effective corrective feedback (for detailed examples, see [8]. Theorists view learning styles differently, and their methods for assessments and observations differ. De Bello [10] claims that there are numerous interpretations of learning styles. Some widely employed models and instruments are listed below.

- Myers-Briggs [49]—Type Indicator
- Dunn and Dunn [21]—Learning Style Assessment Instrument
- Gregorc [37]—Mind Styles and Gregorc Style Delineator
- Felder and Silverman [33]—Index of Learning Styles
- Oxford [53]—Learning Styles and Strategies
- McCarthy [47] —4 Mat System
- Honey and Mumford [39]—Learning Styles Questionnaire
- Kolb [44]—Learning Style Inventory
- Gardner [36]—Multiple Intelligence Inventory
- Herrmann [38]—Brain Dominance Model
- Ehrman and Leaver [25]—Learning Styles Questionnaire
- Fleming [35]—VAK/ VARK Model

These models have shared and different characteristics, and apparently, their particular advantages. In summary, various learning strategy instruments have produced results beyond those mentioned above. Ehrman and Leaver's model provides sufficient information in more facets, which is employed in this study. As frequently stated, each learning style model proposes different descriptions and classifications. Therefore, only an overview of Ehrman and Leaver is manageable in the following section.

1.2 Ehrman and leaver learning styles questionnaire

Ehrman–Leaver cognitive styles consists of a superordinate construct, synopsis–ectasis, and ten subscales. The ten opposite pairs are; field-independent vs. field-dependent, random vs. sequential, field-sensitive vs. field-insensitive, global vs. particular, impulsive vs. reflective, inductive vs. deductive, synthetic vs. analytic, analog vs. digital, concrete vs. abstract and leveling vs. sharpening. Initially, the questionnaire [25] saw a systematic, conceptual link among the scales. They initially thought that global, inductive, random, and leveling were ways for learners to group the information or treat it all at once and so used the term 'synopsis' to refer to that set of poles, and ectasis was adopted for the other pole [25]. Shortly, synoptic learners trust their intuition and primary perceptions, but ectenic learners tend not to. Take, the impulsive–reflective subscale, as an example. Reflective learners need to contemplate and think deeply about an entity. While impulsive learners prefer to answer questions immediately, probably with the least amount of thinking. Many researchers and theorists (e.g., [48, 64, 65] argue that a field-sensitive learner might be field-dependent or independent, impulsive or reflective in an unpredictable way. Unfortunately, such grouping of styles has not received sufficient attention, or probably it is cumbersome and challenging to pursue. The Ehrman and Leaver Learning Styles Questionnaire consists of three items for each of the ten subscales (for detailed explanations about the constructs of the questionnaire, see Ehrman & Leaver, [26].

1.3 Methodology and design

Since the data was collected from individual participants on two settings, we deployed a one-shot case design, with a quantitative approach. The participants of this study were 137 EFL advanced learners. They were administered a TOFEL PBT test for the recruitment examination. The test consisted of five sections, namely; listening, vocabulary, reading, cloze test, and grammar. Only the reading scores were collected and analyzed. Each section of the test was assigned 100 scores. In order to pass the test, the test takers had to succeed in 50 percent of each section to be recruited as teachers.

1.4 Participants

We recruited two groups of participants with the population of 137 EFL advanced learners. 31 participants were non-randomly selected qualified English teachers at Iran Language Institute, so that we had a homogeneous group of participants who had passed the teaching recruitment test previously. And 106 participants of this study were teaching candidates selected based on convenience sampling who attended the test. All of the participants were native Persian speakers. Age and gender were not studied in this studied, hence the participants were selected regardless of these variables.

1.5 Data collection procedures

Initially, formerly recruited EFL teachers filled out Ehrman and Leaver's questionnaire [26] (E & L). The previously qualified teachers participated in the study individually. Their reading scores were available at the administrative office. The data related to their reading scores were excavated from the results of their tests as the test consisted of more modules. Subsequently, the teaching candidates filled out (E & L) questionnaires after their TOFEL PBT. Their reading scores were collected from the administrative office after 1 month. To quantify the results from the (E & L) questionnaire, an ecteno-synoptic continuum was created and scored from zero to ten. Every synoptic feature equaled a score. Thus, the candidate with 5 synoptic learning styles received 5. In other words, the spectrum began with zero that is a complete ectenic learner to ten that is a complete synoptic learner. A test of the Pearson Correlation Coefficient was provided to find a possible correlation between the ecteno-synoptic range and the scores achieved on the reading tasks. Eventually, a test of multiple regressions was calculated to signify the most prominent learning style.

2 Results

This section comprises four parts. At first, the results from descriptive statistics reporting minimum scores, maximum scores, the mean and standard deviation on the reading test, and the learners' ecteno-synoptic scores are presented. Secondly, the inferential statistics regarding the first research question, including three tests of the Pearson-Product Correlation Coefficient, are provided. Third, the inferential statistics of multiple regressions, including the regression

Table 1 Learners' Learning styles and Reading Performance Descriptive Statistics

Scores	Mean	Std. deviation	N
Passed Learners Scores	79.8	5.6	31
Passed Learners Ecteno-Synoptic Scores	6.0	1.36	31
Failed Learners Scores	46.8	12.1	106
Failed Learners Ecteno-Synoptic Scores	3.9	1.08	106
All Learners Ecteno-Synoptic Scores	4.4	1.4	137
All Learners Reading Scores	54.3	17.66	137

Table 2 The Correlation between All Ecteno-Synoptic Scores and Reading Scores

		Ecteno-synoptic score	Reading score
Ecteno-Synoptic Score	Pearson Correlation	1	0.768
	Sig. (2-tailed)		0.000
Reading Score	Pearson Correlation	0.768	1
	Sig. (2-tailed)	0.000	
	N		137

Table 3 The Correlation between Passed Ecteno-Synoptic Score and their Reading Scores

		Passed learners scores	Passed ecteno-synoptic scores
Passed Learners Scores	Pearson Correlation	1	0.708
	Sig. (2-tailed)		0.000
Passed Ecteno-Synoptic Scores	Pearson Correlation	0.708	1
	Sig. (2-tailed)	0.000	
	N	31	31

Table 4 The Correlation between Failed Ecteno-Synoptic Score and Learners' Reading Scores

		Failed Learners Scores	Failed Ecteno-synoptic Scores
Failed Learners Scores	Pearson Correlation	1	0.627
	Sig. (2-tailed)		0.000
Failed Ecteno-synoptic Scores	Pearson Correlation	0.627	1
	Sig. (2-tailed)	0.000	
	N	106	106

model summary, statistical significance through ANOVA, and estimated regression model coefficients, are represented. Finally, some discussions related to each analysis are provided.

The descriptive statistics provided in Table 1 compares the candidates reading scores from the examination and their ecteno-synoptic score.

As is notable, Table 1 shows that 31 participants from the total number of 137 achieved significant reading scores, and the other 106 participants performed below the acceptable level of performance. The mean difference between the successful and failed learners' reading performance is 33. The mean difference between the successful learners' ecteno-synoptic scores and the failed ones is 2.1. This gap indicates a general relationship between the learning styles and the performance of the participants. Furthermore, to investigate the relationship between the participants learning (Tables 2, 3, 4) styles and their reading performance, three tests of the Pearson-Product Correlation Coefficient were provided; the first test found the relationship between all the scores achieved. The second found the relationship between the scores from successful examinees, and the last one found the relationship between the scores from the failed learners.

A Pearson product-moment correlation was run to determine the relationship between Ecteno-Synoptic Score and Reading Score. There was a strong, positive correlation between Ecteno-Synoptic Score and Reading Score, which is statistically significant ($r = 0.768$, $n = 137$, $p = 0.000$).

A Pearson product-moment correlation was run to determine the relationship between Passed Learners Scores and Passed Ecteno-Synoptic Scores. There was a strong, positive correlation between Passed Learners Scores and Passed Ecteno-Synoptic Scores, which is statistically significant ($r = 0.706$, $n = 14$, $p = 0.005$).

A Pearson product-moment correlation was run to determine the relationship between Failed Learners Scores and Ecteno-synoptic Scores. There was a strong, positive correlation between Failed Learners Scores and Failed Ecteno-synoptic Scores, which is statistically significant ($r = 0.706$, $n = 14$, $p = 0.005$).

Accordingly, analyses of multiple regressions, including the regression model summary, statistical significance through ANOVA, and estimated regression model coefficients, were conducted to investigate learning styles that may predict the reading performance of teaching candidates. Table 5 provides the R, R2, adjusted R2, and the standard error of the estimate, which can be used to determine how well a regression model fits the data. In general, the higher the R-squared, the better the model fits your data.

Statistically, the "R" value signifies the quality of the prediction of the dependent variable. Consequently, the first model, field insensitive-sensitive, is the highest quality learning style (in a discrete fashion). A value of 0.66 indicates a good level of prediction, yet not the desirable and significant one. Considering all learning styles present in a learner, the most prominent model could be the last one. As a result, the most successful reading performance needs a learner with insensitive-sensitive, reflective-impulsive, Abstract-Concrete, sharpener-leveler, sequential-random, Digital-Analogue, Analytic-synthetic, deductive-inductive learning styles. As observable from the initial model with field insensitive-sensitive R2 value, which is 0.44, this independent variable explains 44% of the variability of our dependent variable, reading performance. Above all, significantly observable from Table 5, as R^2 values increase, the standard error of the estimate values decreases (better fit and minor estimation error); this shows the model fits significantly well. The most predicative component in the field insensitive-sensitive learning style with the highest impact factor on learners' reading proficiency. Nevertheless, the most compelling model is a coordinating combination of all learning styles (the first and the last model are represented below. To see all ten models, refer to the Appendix 2).

M1.: field insensitive-sensitive.

M10.: field insensitive-sensitive, reflective-impulsive, Abstract-concrete, sharpening-leveling, sequential-random, Digital-analogue, Analytic-synthetic, deductive-inductive.

The result from Table 6 indicates that the learners with higher ecteno-synoptic scores on these variables tend to have higher reading scores. None of the models is negatively correlated with the reading scores. This table illustrates that two of the models are most representative of the multiple regression model, with all ten predictors produced;

Model One: $R^2 = 0.75$, $F(8, 128) = 47.474$, $p < 0.001$. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, abstract-concrete, field dependent-independent, sharpening-leveling, sequential-random, digital-analogue, analytic-synthetic.

Table 5 Model Summary[k] of the Regression Based on Learners Learning Styles and their Reading Scores

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.66[a]	0.44	0.43	13.29
2	0.79[b]	0.63	0.62	10.85
3	0.82[c]	0.67	0.67	10.21
4	0.84[d]	0.70	0.69	9.84
5	0.84[e]	0.71	0.70	9.69
6	0.85[f]	0.73	0.72	9.41
7	0.86[g]	0.74	0.72	9.28
8	0.86[h]	0.75	0.73	9.14
9	0.86[i]	0.74	0.73	9.17
10	0.87[j]	0.76	0.74	8.86

The superscript letter in the R columnrepresent the order of Model Summary.

Table 6 ANOVA[k] of Learners Reading Performance and their learning Styles

Model		Sum of Squares	Df	Mean Square	F	Sig
1	Regression	18,559.099	1	18,559.099	104.992	.000[a]
	Residual	23,863.456	135	176.766		
2	Regression	26,630.873	2	13,315.437	112.988	.000[b]
	Residual	15,791.681	134	117.848		
3	Regression	28,546.357	3	9515.452	91.203	.000[c]
	Residual	13,876.198	133	104.332		
4	Regression	29,635.174	4	7408.794	76.479	.000[d]
	Residual	12,787.380	132	96.874		
5	Regression	30,102.524	5	6020.505	64.017	.000[e]
	Residual	12,320.031	131	94.046		
6	Regression	30,916.122	6	5152.687	58.215	.000[f]
	Residual	11,506.432	130	88.511		
7	Regression	31,303.094	7	4471.871	51.879	.000[g]
	Residual	11,119.461	129	86.197		
8	Regression	31,729.032	8	3966.129	47.474	.000[h]
	Residual	10,693.523	128	83.543		
9	Regression	31,583.546	7	4511.935	53.699	.000[i]
	Residual	10,839.009	129	84.023		
10	Regression	32,366.578	8	4045.822	51.498	.000[j]
	Residual	10,055.977	128	78.562		
	Total in Per Model	42,422.555	136			

The superscript letter in the R columnrepresent the order of Model Summary.

Model Two: $R^2 = 0.76$, F (8, 128) = 51.498, $p < 0.001$. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpening-leveling, sequential-random, digital-analogue, analytic-synthetic, deductive-inductive.

The closeness of these two models analyzes the coefficients more interesting and vital to contribute to selecting one of them as the most appropriate model. Holding variables constant and analyzing their coefficients provided significant estimated model coefficients. The general form of the equation to predict reading scores from learning styles; field insensitive-sensitive, field dependent-independent, sequential-random, particular-global, deductive-inductive, analytic-synthetic, digital-analog, abstract-concrete, sharpening-leveling, reflective-impulsive, attained from the estimated model coefficients is field insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpening-leveling, sequential-random, digital-analog, analytic-synthetic, deductive-inductive. That is if we consider the learning styles numerical items, reading score = 60.95—(6.81 × field insensitive-sensitive)—(18.76 × reflective-impulsive)—(13.16 × abstract-concrete)—(15.39 × sharpening-leveling)—(22.06 × sequential-random)—(7.43 × digital-analogue)—(13.40 × analytic-synthetic)—(8.97 × deductive-inductive). This predictor is obtained from the Coefficients table, as shown below:

The results from Table 7 show that the p-value for field dependent-independent is 0.189. This value is greater than the standard alpha level of 0.05, which indicates that it is not statistically significant. In other words, a field insensitive-sensitive predictor with this high p-value is unlikely to be a meaningful addition to the model because changes in its value are not related to changes in the criterion (response) variable (reading score). Typically, the coefficient p-values are employed to determine which terms are to be kept in the regression model. In the model obtained from Table 7 above, the removal of field dependent-independent is considered a fit for the model. The equation shows that the coefficient for field insensitive-sensitive learning style is 6.8. The coefficient indicates that for every additional score in this learning style, 6.8 scores rise in the reading are expected. Consequently, Model Two: $R^2 = 0.76$, F (8, 128) = 51.498, $p < 0.001$ is considered fit, that is eight variables added statistically significantly to the prediction, $p < 0.05$.

3 Discussions

The results can be discussed as the analyses in the sections above demonstrated from the total number of 137 participants (31 participants achieved significant reading scores, and the other 106 participants performed below the acceptable level of performance). First, Table 1 showed that the mean difference between the successful and failed learners'

Table 7 The Estimated Regression Model Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	T	Sig	95% Confidence interval for B	
		B	Std. Error	Beta			Lower bound	Upper bound
8	(Constant)	51.269	6.856		7.478	0.000	37.702	64.835
	field insensitive-sensitive	8.428	2.932	0.225	2.874	0.005	2.627	14.230
	reflective-impulsive	−16.828	2.333	−0.469	−7.214	0.000	−21.444	−12.212
	Abstract-concrete	12.698	2.096	0.360	6.058	0.000	8.550	16.845
	Field dependent-independent	−3.483	2.639	−0.089	−1.320	0.189	−8.706	1.739
	sharpening-leveling	−11.787	2.858	−0.270	−4.124	0.000	−17.442	−6.131
	sequential-random	13.535	3.196	0.344	4.236	0.000	7.212	19.858
	Digital-analogue	5.343	2.013	0.151	2.655	0.009	1.361	9.326
	Analytic-synthetic	−6.418	2.842	−0.139	−2.258	0.026	−12.042	−0.794
10	(Constant)	60.951	7.073		8.618	0.000	46.956	74.946
	field insensitive-sensitive	6.813	2.640	0.182	2.580	0.001	1.588	12.037
	reflective-impulsive	−18.767	2.181	−0.523	−8.603	0.000	−23.083	−14.450
	Abstract-concrete	13.163	1.965	0.373	6.700	0.000	9.276	17.050
	sharpening-leveling	−15.391	2.765	−0.353	−5.566	0.000	−20.862	−9.919
	sequential-random	22.069	3.728	0.561	5.920	0.000	14.693	29.446
	Digital-analogue	7.432	2.050	0.210	3.626	0.000	3.376	11.488
	Analytic-synthetic	−13.400	3.139	−0.289	−4.269	0.000	−19.610	−7.189
	deductive-inductive	−8.970	2.841	−0.220	−3.157	0.002	−14.592	-3.348

reading performance was 33. The mean difference between the successful learners' ecteno-synoptic scores and the failed ones was 2.1, indicating that more synoptic learners were generally successful. The continuum in an overall observation would be 6–4. On average, successful learners enjoyed six synoptic learning styles and four ectenic learning styles. Second, it was found from Table 2 that there was a strong, positive correlation between ecteno-synoptic scores and reading scores. This result indicated that the more synoptic learning styles a learner possessed received a higher reading score on the examination; the more ectenic learning styles a learner possessed, the lower the learner received a lower reading score. Third, tables three and four confirmed the results from table two, which illustrated the successful and failed learners' scores and their ecteno-synoptic scores in particular tests. There was a strong, positive correlation between passed learners' scores and their ecteno-synoptic scores, and there was a strong, positive correlation between failed learners' scores and failed ecteno-synoptic scores. Fourth, it was derived from Table 5 that the primary model for Iranian successful learning style at reading performance is being field-insensitive. Adding more learning styles to the model, the most prominent model was the last one which was successful reading performance = (Constant), insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpener-leveler, sequential-random, digital-analogue, analytic-synthetic, deductive-inductive. It was found that synopsis is the favorable learning style superordinate to succeed in reading tasks. This model indicates that the more a learner was field sensitive, field-independent, impulsive, concrete, leveler, random, analog, synthetic, and inductive was successful, which is not the fact, even though the model fits significantly. The result from table one indicated that the mean difference between the synoptic and ectenic styles was only 2. Fifth, the result from Table 6 indicated that even though none of the models is negatively correlated with the reading scores. There are two of the models that are the most representative of the multiple regression models, with all ten predictors produced;

Model One: $R^2 = 0.75$, F (8, 128) = 47.474, $p < 0.001$.

Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, abstract-concrete, field dependent-independent, sharpening-leveling, sequential-random, digital-analogue, analytic-synthetic.

Model Two: $R^2 = 0.76$, F (8, 128) = 51.498, $p < 0.001$.

Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpening-leveling, sequential-random, digital-analogue, analytic-synthetic, deductive-inductive.

The eventual general form of the equation derived from Table 7 to predict reading scores from learning styles; field insensitive-sensitive, field dependent-independent, sequential-random, particular-global, deductive-inductive, analytic-synthetic, digital-analog, abstract-concrete, sharpening-leveling, reflective-impulsive, attained from the estimated model coefficients was: field insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpening-leveling, sequential-random, digital-analog, analytic-synthetic, deductive-inductive. That is if we consider the learning styles numerical items, reading score = 60.95—(6.81 × field insensitive-sensitive)—(18.76 × reflective-impulsive)—(13.16 × abstract-concrete)—(15.39 × sharpening-leveling)—(22.06 × sequential-random)—(7.43 × digital-analogue)—(13.40 × analytic-synthetic)—(8.97 × deductive-inductive). The closeness of these two models made the coefficients more interesting and vital to contributing to selecting one of them as the most appropriate model.

The findings of the study are in accordance with a large body of research (e.g., [4, 7, 12, 16, 17, 24, 34, 35, 41, 43, 50, 55, 57, 63]. The importance and effectiveness of learning-style-matched teaching and learning a foreign or second language is highlighted in some studies (see, [16, 18, 65]. Research on learning styles must be theoretically well-motivated, which the current study's findings are thoroughly in line with their findings and affirms that knowing learners' styles and providing instructions to the favorable ones are highly effective. The findings also accord with Cohen and Weaver [15] and Nunan [51] who found that this learner-oriented instructions and strategies led to higher motivation, self-efficacy, and proficiency.

Based on Ehrman and Leaver [26], ectenic learners are field insensitive, field-dependent, reflective, abstract, sharpener, sequential, digital, analytic, and deductive. Besides, synoptic learners are field sensitive, field-independent, impulsive, concrete, leveler, random, analog, synthetic, and inductive. Based on the model found in this study, successful Iranian learners tend to be synoptic but not complete synoptic learners. That is, learners are exposed or imposed to various learning styles on a continuum. Directly or indirectly, the current results accord with studies [19, 20, 22, 23] as they all claimed that there is no individual with a fixated learning style and learners possess various styles which might be strong or more potent at one style in comparison to another. In other words, they take advantage of one style at a time and the others at another. This is in line with studies [41, 56, 59].

Such findings contradict researchers who claimed there appears the little existence or absence of a published independent evaluation of self-report measures [3]. Peterson, Rayner, and Armstrong [60] reclaimed that cognitive or learning

styles' significant potential source of the problem is the quality of research on the topics. In brief, these contrastive claims about the efficacy of learning styles seem to have partly resulted from measures of development and the contexts in which the studies were conducted, the current study in the context of Iran revealed the opposite findings, and it is claimed that there were high positive correlations found between learners' reading success and the type of learning style they had. Moreover, the results from multiple regressions revealed that particular types of learning styles are great predictors of achieving high reading scores and proficiency.

The chief objective of the study was also to reveal whether particular learning styles are predictors of reading scores and the model which fits. According to the analyses, there were significant positive correlations between the learning styles and the reading scores obtained and the regression model of field insensitive-sensitive, reflective-impulsive, abstract-concrete, sharpening-leveling, sequential-random, digital-analog, analytic-synthetic, deductive-inductive was concluded fit and significant. In this respect, the findings reaffirm the studies of EFL learners in various countries (e.g., [14, 53] reveal that some strategies (mostly metacognitive ones) are likely to be predictors of proficiency among second language learners.

In summary, particular learning styles can be predicted among Iranian EFL learners. A number of these findings have been summarized in the literature review. However, Ehrman and Leaver's model provides sufficient information in more facets. As frequently stated, each learning style model proposes different descriptions and classifications of learning styles. In this study, we investigated the relationship between learning styles and L2 reading task performance results and possible predictors based on Ehrman and Leaver Questionnaire [26].

4 Conclusion

It is concluded that the predicting learning styles resulting from the multiple regression model suggest that Iranian EFL learners hierarchically need be field sensitive, impulsive, concrete, leveling, random, analog, synthetic, and deductive to achieve the highest reading score and proficiency. Incorporating learning styles into the classroom adds variety and opportunities for effective language production. Providing tasks and teaching methodologies that benefit different types of learners with different features and psychological mindsets in classrooms contributes to practical and utilized learning. It is recommended that teachers provide analyses in classes and highlight their learners' styles to find their strengths in classes being adjusted to learners' aims after elaborate needs analyses. Iranian EFL learners must hierarchically be field sensitive, impulsive, concrete, leveling, random, analog, synthetic, and deductive to achieve the highest reading score and proficiency. Respectively, learners need to gather material by osmosis which happens gradually through unconscious assimilation of ideas and knowledge by relating everything together and observing the whole scene. It is recommended that learners move from specific to the general and have the assembly of components into a constructed whole, interact with the world, be experiential, look for similarities, and react quickly as having thoughts after actions. The entire point of these learning style models is to understand students' tendencies for learning, and to help them branch out into other learning styles, rather than being fixated in all comfort zones. So whether you are puzzling out which dimension you fit into to grasp your methods, or thinking about how to alter your teaching to reach students of various styles, what is worth remembering is that variety is the key. Knowing that you have a range of learners in your class and that they will all benefit from exploring the whole array of learning styles can help you design activities that will exercise a range of processes and perspectives.

5 Suggestions for further studies

In our study, gender differences were not under investigation, which, as learning styles are directly related to individual differences, compelling results may be concluded. Other levels and types of tests could be challenging studies to be conducted as the models were reviewed in the literature. This study only considered the relationship between learning styles and the performance of EFL learners on reading tasks; more skills can be investigated. The domain yields research

on various aspects of learning styles and preferences not only in the field of language learning, but also in other fields such as STEM and in particular mathematics [30, 31]. Future research can investigate the factors (both verbal and non-verbal) which affect learners' learning styles in mathematics and other STEM related subjects [29].

Acknowledgements The authors thank the anonymous reviewers for the constructive comments that led to the development of the article. The authors also thank Zahra Eskandari and Afsane Askari for proof-reading the manuscript.

Author contributions Authors, HB, DF, and OK-Z contributed equally to the conception or design of the work, and drafting the article. HB collected the data, and managed the data analyses. All authors H.B., D.F., and O.Kh., approved the final version of the article to be published. The authors declare no conflict of interest. All authors read and approved the final manuscript.

Funding Open access funding provided by Norwegian University of Science and Technology. The authors are thankful to Norges Teknisk-Naturvitenskapelige Universitet NTNU for covering the APC.

Data availability The raw data supporting the conclusions of this article can be made available by the authors under request, without undue reservation.

Declarations

Ethics approval and consent to participate All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The questionnaire and methodology for this study was approved by the Human Research Ethics committee of Chabahar Maritime University (Ethics approval number: N-210951).

Competing interests The authors declare no conflict of interest.

Appendix 1

E & L Learning Style Questionnaire v. 2.0
copyright 2003, Ehrman and Leaver

Name: _____

INSTRUCTIONS: Date: _____

Mark in the space for each pair of items what you think you are like. For example, if you like bicycling much more than swimming, you might mark in space 2 (or even 1), like this:

I like riding a bicycle. I like swimming.
0. Most like this ___ _x_ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

If you sort of like swimming better, you might mark in space 6.

I like riding a bicycle. I like swimming.
0. Most like this ___ ___ ___ ___ ___ _x_ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

If you think you are in the middle or really do both equally, use space 5. Try to avoid using space 5 if you can.

I like riding a bicycle. I like swimming.
0. Most like this ___ ___ ___ ___ _x_ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

There are no right or wrong answers on this questionnaire.

****

Here are the questions:

1. When I work with new language in context, in stories or articles or at sentences; I often pick up new words, ideas, etc., that way, without planning in advance.

I don't usually get much from the context unless I pay close attention to what I'm doing. (1a)

1. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

2. When working with new material with additional subject matter around it, I comfortably find and use what is most most important.

When there is a lot of information that comes with what I need to learn, it's hard to tell what's most important. It all seems to fall together sometimes, and it's hard work to sort things out. (2a)

2. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

3. I like to reduce differences and look for similarities.

I like to explore differences and disparities among things. (3a)

3. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

4. I tend to be most aware of the 'big picture;'

I notice specifics and details quickly. (4a)

4. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

5. I react quickly.

I take my time to react. (5a)

5. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

6. I understand best by assembling what I'm learning into a whole.

I understand best by disassembly ofwhat I'm learning into its component parts. (6a)

6. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

7. I tend to learn things through metaphors.

I like it when people say what they mean directly. (7a)

7. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

8. To learn, I like to interact with the world.

I like to learn through concepts and ideas. (8a)

8. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

9. I learn best when I can work out for myself the best sequence to use, even if it's different from the one in the book or lesson.

I learn best when there is a sequence of steps provided, so I can do things in order. (9a)

9. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

10. When I learn, I mostly start with examples or my experience and make generalizations or rules.

When I learn, I mostly start with rules and generalizations and apply them to my experience to learn. (10a)

Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

11. I often find that I have picked up new words, phrases, and so on without realizing it.

I usually have to undertake focused study before I learn new words or phrases. I wouldn't describe myself as someone who learns by 'osmosis.' (1b)

11. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this

1 2 3 4 5 6 7 8 9

12. I like out-of-context material like grammar rules.

Grammar rules and pieces of language that are out of context are hard for me to work with. (2b)

12. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

13. I notice mostly how things are similar.

I quickly notice differences, even fairly fine distinctions. (3b)

Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

14. I notice the 'forest' before the 'trees.'

I tend to be aware of the 'trees' before the 'forest.' (4b)

14. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

15. I don't have to spend much time preparing for something; instead, I start off working immediately.

Before starting anything, I want time to orient myself to it. (5b)

15. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

16. I often make up new words or sentences using language I already know.

I seek to understand the system that is behind words and sentences by pulling them apart in my mind. (6b)

16. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

17. I prefer to learn by using lots of associations.

I prefer to use rehearsal and repetition. (7b)

17. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

18. I like to learn through applying knowledge and theory.

I like to learn through descriptions and grammars that formally represent knowledge. (8b)

18. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

19. Too much emphasis on a curriculum or textbook can get in the way of my learning.

Organized textbooks and lesson plans really help me. (9b)

19. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

20. I like to figure out grammar rules for myself.

I prefer to get the grammar rules from the teacher or a book. (10b)

20. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

21. I learn best from language that is in meaningful context like stories and conversations.

I don't like to have to learn from just conversations, informal language use, or readings for native speakers that I haven't been prepared for. (1c)

21. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

22. When faced with new language, I reconceptualize it so that it makes sense in my own terms.
I accept what is presented to me and take it pretty much as presented. (2c)

22. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

23. I tend not to remember small distinctions, such as those between similar-seeming words or symbols.
I have a good memory for fine distinctions such as those between similar-seeming words or symbols. (3c)

23. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

24. I start with the main points and work down to the details.
I begin with the details to work up to the main points. (4c)

24. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

25. I often act or speak without thinking about it.
I tend to think about things before I do or say them. (5c)

25. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

26. I sometimes make up new ways to say things.
I prefer figuring out how words and sentences are put together. (6c)

26. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

27. It helps to understand the meanings behind the actual words. .
It's usually okay to take what I'm learning at face value. (7c)

27. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

28. I like learning when I can touch, see, or hear.
I prefer to learn abstractly through theories. (8c)

28. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

29. It doesn't matter if the material I'm learning isn't very organized; I can find a way to use it.
It's important to go step-by-step as I learn. (9c)

29. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

30. When learning, I make guesses and then seek evidence to confirm or modify my ideas.
When learning, I would rather learn what I need to know directly, without fumbling around. (10c)

30. Most like this ___ ___ ___ ___ ___ ___ ___ ___ ___ Most like this
1 2 3 4 5 6 7 8 9

Appendix 2

All the ten predicative models.

1. Predictors: (Constant), field insensitive-sensitive
2. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive
3. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete
4. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, field dependent-independent

5. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, field dependent-independent, sharpening-leveling
6. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, field dependent-independent, sharpening-leveling, sequential-random
7. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, field dependent-independent, sharpening-leveling, sequential-random, Digital-analogue
8. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, field dependent-independent, sharpening-leveling, sequential-random, Digital-analogue, Analytic-synthetic
9. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, sharpening-leveling, sequential-random, Digital-analogue, Analytic-synthetic
10. Predictors: (Constant), field insensitive-sensitive, reflective-impulsive, Abstract-concrete, sharpening-leveling, sequential-random, Digital-analogue, Analytic-synthetic, deductive-inductive

References

1. Aggarwal I, Woolley AW, Chabris CF, Malone TW. The impact of cognitive style diversity on implicit learning in teams. Front Psychol. 2019;10(112):1–11. https://doi.org/10.3389/fpsyg.2019.00112.
2. Alalouch C. Cognitive styles, gender, and student academic performance in engineering education. Educ Sci. 2021;11(9):502. https://doi.org/10.3390/educsci11090502.
3. Allinson C, Hayes J. The cognitive style index. J Manage Stud. 1996;33:119–35.
4. Allwright D. Autonomy in Language Pedagogy. CRILE Working Paper 6. Centre for Research in Education, University of Lancaster, U.K. 1990.
5. Arifin S, Setyosari P, Sa'dijah C, Kuswandi D. The effect of problem-based learning by cognitive style on critical thinking skills and students' retention. J Technol Sci Educ. 2020;10(2):271–81. https://doi.org/10.3926/jotse.790.
6. Askari A, Khoshsima H, Khatin-Zadeh O, Banaruee H. Learners' factors in L2 reading comprehension global. J Educ Stud. 2017;3(2):63–78. https://doi.org/10.5296/gjes.v3i2.
7. Ball D, Perry C. An exploration of individual differences in teachers' temperaments and multiple intelligences. Probl Educ 21st Century. 2009;18:21–32.
8. Banaruee H, Khoshsima H, Askari A. Corrective feedback and personality type: a case study of Iranian L2 learners. Glob J Educ Stud. 2017;3(2):14–21. https://doi.org/10.5296/gjes.v3i2.11501.
9. Baranova E, Rubtsova D, Rumyantseva N, Voropaeva Y, Semanina A. Considering cognitive styles when teaching the language to representatives of different cultures. E3S Web of Conf. 2021;284:09009.
10. De Bello TC. Comparison of eleven major learning styles models: Variables, appropriate populations, validity of instrumentation and the research behind them. J Read, Writ, Learn Disabil. 1990;6:203–22.
11. Bouiri O, Lotfi S, Talbi M. Correlative study between personality traits, student mental skills and educational outcomes. Educ Sci. 2021;11:153.
12. Byrne D. A study of individual learning styles and educational multimedia preferences an experiment using self- directed online learning resources, school of computer applications. Ireland: Dublin City University Press; 2002.
13. ChanLin LJ. (2009). Use of learning strategies in web-based project tasks. Proceedings of the World Conference on Educational Multimedia, Hypermedia & Telecommunications, ED-MEDIA 2009. London, 19–20 March 2009, 1677–1682. Carbo, M., 1997. Reading styles times twenty. Educational Leadership 54, 38–42.
14. Cohen AD, Scott K. A synthesis of approaches to assessing language learning strategies. In: Oxford R, editor. Language learning strategies around the world: cross cultural perspectives. Manoa: University of Hawaii Press; 1996. p. 89–106.
15. Cohen AD, Weaver SJ. Strategies-based instruction for second language learners. In: Reyandya WA, Jacobs GM, editors. Learners and language learning. Anthology series 39. SEAMEO Regional Language Center: Singapore; 1998. p. 1–25.
16. Dadour ES, Robbins J. University-level studies using strategy instruction to improve speaking ability in Egypt and Japan. In: Oxford R, editor. Language learning strategies around the world: cross-cultural perspectives. Manoa: University of Hawaii Press; 1996. p. 157–66.
17. Delaney CJ, Shafer FK. Teaching to multiple intelligences by following a "slime trail." Middle Sch J. 2007;39(1):38–43.
18. Derakhshan A, Shakki F. An investigation into the relationship between Iranian EFL high and low proficient learners and their learning styles. SAGE Open. 2018;8(4):1–10. https://doi.org/10.1177/2158244018809.
19. Duff A. Learning style of UK higher education students: Four studies of the reliability and replicability of the learning style questionnaire (LSQ). Bristol Bus Sch Teach Res Rev. 2000;14(3):131–77.
20. Dunn R. The Dunn and Dunn Learning Style Model: Theoretical Cornerstone, Research and Practical Applications. In: Armstrong S, Graff M, editors. Bringing theory and practice, proceedings of the 8th annual european learning styles information network conference. Hull: University of Hull; 2003.
21. Dunn R, Dunn K. Teaching students through their individual learning styles: & practical approach. Reston: Reston Publishing Company Inc; 1978.

22. Dunn R, Griggs S. Learning styles: quiet revolution in american schools. Reston: National Association of Secondary School Principals; 1988.
23. Dunn R, Griggs S. Synthesis of the Dunn and Dunn learning style model research: who, what, when, where, and what? New York: St. Johns' University Press; 2003.
24. Ehrman M, Oxford R. Effects of sex differences, career choice, and psychological type on adult language learning strategies. Mod Lang J. 1989;73:1–13.
25. Ehrman ME, Leaver BL. Development of a profile approach to learning style diagnosis. Unpublished manuscript. 2002.
26. Ehrman M, Leaver BL. Cognitive styles in the service of language learning. System. 2003;31(3):393–415.https://doi.org/10.1016/S0346-251X(03)00050-2.
27. Ellis R. Understanding Second Language Acquisition. Oxford: Oxford University Press. 1985.
28. Farsani D. The name game: the role of cultural affordances in learning probability. Learn Math. 2022;42(2):17–8.
29. Farsani D, Breda A, Sala V. Non-verbal interaction and students' visual engagement in mathematics and English classes. Acta Sci. 2022;24(5):1–26.
30. Farsani D, Mendes J. Proxêmica e comunicação não verbal na interação em sala de aula. Psicologia Escolar e Educacional. 2021. https://doi.org/10.1590/2175-35392021229866.
31. Farsani D, Villa-Ochoa JA. Analyzing students' visual attention through spy glasses. Uniciencia. 2022. https://doi.org/10.15359/ru.36-1.34.
32. Felder RM, Brent R. Understanding student differences. J Eng Educ. 2005;94:57–72. https://doi.org/10.1002/j.21689830.2005.tb00829.x.
33. Felder RM, Silverman LK. Learning and teaching styles in engineering education. Eng Educ. 1988;78(7):674–81.
34. Ferro TR. Review of the gregorc style delineator. In: Conoley JC, Impara JC, editors. The twelfth mental measurements yearbook. Lincoln: University of NebraskaPress; 1995. p. 427–8.
35. Fleming, N. D. V.A.R.K Visual, Aural/Auditory, Read/Write, Kinesthetic. New Zealand: Bonwell Green Mountain Falls. 2006.
36. Gardner H. Intelligence reframed: multiple intelligences for the 21st century. New York: Basic books; 1999.
37. Gregorc AF. Gregorc style delineator. Maynard, MA: Gabriel Systems Inc; 1982.
38. Herrmann, Ned. The theory behind the HBDI and whole brain technology. 1999.
39. Honey P, Mumford A. The manual of learning styles. Maidenhead: Peter Honey Publications; 1992.
40. Hsieh SW, Jang YR, Hwang GJ, Chen NS. Effects of teaching & learning styles on students' reflection levels for ubiquitous learning. Comput Educ. 2011;57:1194–201. https://doi.org/10.1016/j.compedu.2011.01.004.
41. Kato F. Results of an Australian study of strategy use in learning Japanese Kanji characters. Sydney: University of Sydney; 1996.
42. Khatin-Zadeh O, Eskandari Z, Banaruee H, Seckel MJ, Farsani D. Understanding perceptual change as a movement in literal and metaphorical sentences. Cogent Arts Humanities. 2022;9(1):2118446. https://doi.org/10.1080/23311983.2022.2118446.
43. Koch K. A conversation with Rita Dunn. Institute for Learning Styles Journal, 1, 1-11. 2007.
44. Kolb DA. The Kolb's learning styles inventory. Boston: Hay Group; 1999.
45. Kolb A, Kolb D. Learning styles and learning spaces: enhancing experiential learning in higher education. Acad Manag Learn Educ. 2005;4(2):193.
46. Kozhevnikov M. Cognitive styles in the context of modern psychology: Toward an integrated framework of cognitive style. Psychol Bull. 2007;133(3):464–81.
47. McCarthy B. Using the 4MAT system to bring learning styles to schools. Educ Leadersh. 1990;48(2):31–7.
48. Miller P. Learning styles: the multimedia of the mind. Research report, Programs ED 451340. 2001
49. Myers I. The Myers-Briggs type indicator. Palo Alto: Consulting Psychologists Press; 1962.
50. Nikolaou, A. & Koutsouba, M. (2011). Incorporating 4MAT Model in Distance Instructional Material--An Innovative Design. European Journal of Open, Distance and E-Learning, 1 https://www.learntechlib.org/p/73815/. Accessed Oct 27 2022.
51. Nunan D. Does learner strategy training make a difference? Lenguas Modernas. 1997;24:123–42.
52. Olagbaju OO. Cognitive styles and gender as predictors of students' achievement in summary writing in selected secondary schools in Ibadan Nigeria. Educ Res Internat. 2020;8462368:1–10.
53. Oxford RL. Language learning strategies: what every teacher should know. Boston: Heinle & Heinle; 1990.
54. Oxford RL. Style analysis survey. Tuscaloosa: University of Alabama; 1993.
55. Oxford RL. Language learning strategies around the world; Cross-Cultural Perspectives. Manoa: University of Hawaii Press; 1996.
56. Oxford RL, Ehrman ME. Adults' language learning strategies in an intensive foreign language program in the United States. System. 1995;23:359–86.
57. Oxford RL, Leaver BL. A synthesis of strategy instruction for language learners. In: Oxford R, editor. Language learning strategies around the world: cross-cultural perspectives. Manoa: University of Hawaii Press; 1996. p. 227–46.
58. Oxford RL. Language Learning Strategies in the Context of Autonomy, Synthesis of Findings from the International Invitational Conference on Learning Strategy Research, Teachers College, Columbia University, New York, NY. 1999.
59. Park, G. Language learning strategies: Why do adults need them? Unpublished manuscript, University of Texas, Austin, Texas, USA. Park-Oh, Y.Y. 1994. Self-Regulated Strategy Training in Second-Language Reading: Its Effects on Reading Comprehension, Strategy Use, Reading Attitudes, and Learning Styles of College ESL Students. Tuscaloosa: University of Alabama. 1994.
60. Peterson ER, Rayner SG, Armstrong SJ. Researching the psychology of cognitive style and learning style: Is there really a future? Learn Individ Differ. 2009;19:518–23.
61. Purpura J. Learner characteristics and L2 test performance. In: Oxford RL, editor. Language learning strategies in the context of autonomy, synthesis of findings from the international invitational conference on learning strategy research. New York: Columbia University; 1999. p. 61–3.
62. Sabry KA, Baldwin LP. Web-based learning interaction and learning styles. Br J Educ Technol. 2003;34:443–54.
63. Sellars M. Students and their learning: initiatives and partnerships. Problems of education in the 21st Century. 2008;7:139–46.

64. Witkin HA, Goodenough DR. Cognitive styles: essence and origins: field dependence and field independence. New York: International Universities; 1981.
65. Yarahmadzehi N, Banaruee H. Learning styles and recruitment exam performance among Iranian teaching candidates. Int J English Lang Transl Stud. 2017;5(4):41–9.
66. Yazdani Fazlabadi B, Khatin Zadeh O. Personality types and cloze passage task: a study of correlation between personality traits and performance on cloze passage tasks. Roshd FLT. 2016;30(3):26–33.
67. Zare-Behtash E, Bakhshizadeh Gashti Y, Khatinzadeh O, Banaruee H. Personality type and performance on listening tests: a study of correlation between personality traits and performance on "Listening for Gist" and "Minimal Pairs." Int J Psychol Behav Sci. 2017;7(5):123–6. https://doi.org/10.5923/j.ijpbs.20170705.01.