Journal of Creative Practices in Language Learning and Teaching (CPLT)
Volume 12, Number 1, 2024

The Relationship Between Learning Styles and English Language Achievement and Gender Among Diploma Students at A Public University in Malaysia

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Received: 8 January 2024
Accepted: 29 January 2024
Published: 25 May 2024

CITE THIS ARTICLE:

Ab Manan, N. A., Yusof, J., & Azizan, N. (2024). Relationship between learning styles and English language performance among diploma students at a public university in Malaysia. *Journal of Creative Practices in Language Learning and Teaching, 12*(1), 167-182. http://doi. 10.24191/cplt.v12i1.25388

ABSTRACT
The objectives of the study were to identify the preferred learning styles of diploma level students who are learners of English as a second language, in an environment where English is used as the medium of instruction, to determine whether there is a significant relationship between learning styles and English language achievement, and to establish whether there is a relationship between learning styles and gender. The participants for the study were 257 diploma level students from a public university in Malaysia. The research instrument chosen for the study was VAK Learning Style Inventory developed by Victoria Chislett and Alan Chapman (2005). The data collected were analysed descriptively using Microsoft Excel to determine the participants' learning style preferences. A non-parametric Chi-square test of independence was conducted to establish whether there is a relationship between the two sets of categorical variables which were learning

style preferences and English language achievement, and between learning style preferences and gender. It was found that contrary to the conclusions made by numerous earlier studies, there is no significant relationship between language learning styles and English language performance. In addition, it was also found that gender has no bearing in learning style preferences.

Keywords: Learning styles; visual; auditory; kinaesthetic; learning style models

INTRODUCTION

Learning style concept has been accepted in the field of education since the mid-1970s (Griffiths, 2012). The fundamental idea of this concept is that learners can be categorised into one or more 'styles' (e.g. Visual, Auditory or Kinaesthetic) and teaching them according to their preferred learning styles will bring positive outcomes (Newton & Miah, 2017). One of the earlier proponents of learning styles was Reid (1987) who stressed that foreign and second language learners come from different language backgrounds, thus have different characteristics. Due to this reason, their learning styles may vary depending on their age, gender, level of proficiency, fields of study and others. This sentiment is shared by Ismail et al. (2022) who stressed that students have different ways or styles of grasping knowledge. For example, Fauzi and Mohamed (2023) found that female and male students differ in the way they memorise new information. Thus, recognizing the potential gender differences in learning preferences and adjusting their instructional strategies accordingly, teachers can create a more inclusive and equitable learning environment for all students. In addition, according to Toyama and Yamazaki (2020), by diagnosing the learners' learning styles and tailoring instructional conditions accordingly, learning outcomes will be enhanced.

The shift of focus in the field of foreign and second language learning from teaching methodology and processes to language learning processes and the characteristics of language learners (Belcher, 2006; Xing, 2023) has propelled numerous research investigating language learners' characteristics including their learning styles. Although evidence highlighting the differences in how individuals prefer to process new information is abundant (e.g. Anual et al., 2017; Fadzillah et al., 2021; Wahab & Nuraeni, 2020), the implication of these differences on learning outcomes is still surrounded by controversy (Pashler et al., 2009). Proponents of learning styles assessment believe that learning styles can be used as a valuable teaching tool inside the classroom (e.g. Sternberg et al., 2008). They believe that by identifying the learners' learning styles and matching them to appropriate teaching methods, learning can be improved (Toyama &Yamazaki, 2020). Learning style proponents argue that understanding one's learning style profile can also assist learners to focus on overcoming their perceived weaknesses (Zhou, 2011). However, there are also scholars who rejected this idea and claim that catering to learners' learning style does not lead to improved learning outcomes (e.g. Willingham, 2005). They argue that learners might use the 'miss-match' of their preferred learning style to a certain subject or to a teacher's method of teaching as an excuse for poor classroom performance (Willingham et al., 2015).

The current study was conducted with the researchers being aware of the underlying arguments related to learning styles. However, the researchers are of the opinion that understanding learners' characteristics is important in improving English language instruction in

general. English language teachers who are aware of their students' learning styles will vary their instruction accordingly, which may indirectly improve the students' performance. In fact, there is a large body of literature which has demonstrated that the belief in the idea of learning styles has positive consequences for both teachers and students. For example, some teachers have expanded their teaching repertoire to match their students' learning styles (Newton & Miah, 2017; Scott, 2010), while a few studies found that students change their study method to match their perceived learning style (Husmann & O'Loughlin, 2018; Morehead et al., 2016).

Similar to previous research (e.g. Amin et al., 2021; Anas et al., 2021; Tahir, 2020), the main objective of the current study was to identify the students' preferred learning styles and to determine whether there is a significant relationship between learning styles and academic achievement. The first objective of the study was to identify the preferred learning styles of diploma level students from different academic programmes at a public university in Malaysia where English is used as the medium of instruction. The second objective of the study was to determine whether there is a significant relationship between learning styles and English language achievement. Subsequently, the third objective was to establish whether there is a relationship between learning styles and gender. The formulated research objectives and research questions are as follows:

RO1: To identify the preferred learning styles of diploma level students from three different academic programmes in a public university in Malaysia.

RO2: To determine whether there is a significant relationship between learning styles and English language achievement.

RO3: To establish whether there is a relationship between learning styles and gender.

RQ1: What are the preferred learning styles of diploma level students from three different academic programmes in a public university in Malaysia?

RQ2: Is there a significant relationship between learning styles and English language achievement?

RQ3: Is there a relationship between learning styles and gender?

LITERATURE REVIEW

Definition of Learning Styles

Sternberg (1994) defined learning style as a preferred way of using one's ability, while Reid (1995) stated that individuals have different learning styles which means they differ in their natural, habitual and preferred way(s) in absorbing, processing and retaining new information and skills. Generally, the term 'learning style' refers to the idea that different students learn more effectively when information is presented in a certain way that matches their preferences (Wininger et al., 2019). Varying instructional modes to match students' learning styles is essential because different method of instruction may be optimal for different types of learners. According to Pashler et al.

(2009), different methods of presentation take advantage of the specific perceptual and cognitive strengths of different individuals.

Learning Style Research

Research on Learning Styles has been conducted in different settings to identify the learners' preferred learning styles and to establish whether there was a relationship between their preferred learning styles and their academic achievements. These researchers conducted their studies in different learning environments, for example, among accounting undergraduates in face-to-face class (Anas et al., 2021), accounting undergraduates in online classes (Fadzillah et al., 2021), physiotherapy students (İlçin et al., 2018), and medical students during their clinical year (Amin et al., 2021).

While numerous studies (e.g. Amin et al., 2021; Ibarrientos, 2021; Tahir, 2020) have reported significant relationship between learning styles and academic performance, others (e.g. Anas et al., 2021; Eid et al., 2021) have found no significant relationship. Similarly, there has been inconsistency in the findings of studies investigating the relationship of learning styles and gender. Almomani (2019) found that males preferred 'Auditory' learning style, while females preferred 'Visual' learning style, and there was no difference in their preference for 'Kinaesthetic' learning style. However, Anual et al. (2017) and Eid et al. (2021) found that there was no relationship between learning styles and gender.

Learning Style Models

There have been innumerable conceptualizations of learning style models being discussed in the literature. Nonetheless, they are all underpinned by the idea that each learner has different preference for how he or she processes information, and that learner will learn better when instruction matches the preference (Pashler et al., 2009). Coffield et al. (2004) identified seventy-one (71) different learning style models in their review of learning style literature. According to Wininger et al. (2019), despite the number, the most popular models utilized in education are those originating from Fleming and Mills's (1992) VARK model. However, the VAK model, a version of this theory is the most commonly adopted by educators, include only 'Visual', 'Auditory' and 'Kinaesthetic' groups (Scott, 2010). The foundation of VAK learning styles lies on the belief that some students are visual learners, while others are auditory or kinaesthetic learners. 'Visual' learners prefer learning via visual stimuli such as charts, graphs, and pictures. On the other hand, 'Auditory' learners learn by listening to lectures and reading while 'Kinaesthetic' learners learn by doing. Students may prefer one, two, or three learning styles and those who have preference for more than one learning style are considered 'multimodal' learners.

As mentioned earlier, seventy-one (71) learning style models were identified in the literature review by Coffield et al. (2004). However, only a few learning style models will be briefly discussed in this section. Among the earliest learning style models was introduced by Rita and Kenneth Dunn in 1978 (Dunn et al., 2000). The model classifies learning styles into five dimensions which include 'environmental', 'emotional', 'sociological', 'physical' and 'psychological'. Subsequently, Kolb (1984) proposed a learning style model with four elements related to its Learning Style Inventory (LSI). The four elements are 'accommodators', 'divergers',

'convergers', and 'assimilators. Based on Kolb's work, Honey and Mumford (1992) introduced the Honey and Mumford's Learning Style Questionnaire (LSQ). This model classified learning styles into four categories namely 'activist', 'theorist', 'pragmatist' and 'reflector'. Another well-documented learning style inventory, the Grasha-Riechmann Student Learning Styles Scale (GRSLSS), was developed by Grasha (1996). This model consists of six learning style categories namely 'avoidant', 'collaborative', 'competitive', 'dependent', 'independent' and 'participant'. Finally, Felder and Spurlin (2005) introduced the Index of Learning Survey (ILS). The first dimension of this model is 'sensory' or 'intuitive', the second dimension is 'visual' or 'verbal', while the third and fourth dimensions are 'active' or 'reflective' and 'sequential' or 'global' respectively.

Learning Style Instruments

Most learning style instruments are either multiple choice questions or self-report questionnaires utilized to categorize students into one of several styles (Dembo & Howard, 2007). Unfortunately, many of the learning style inventories do not come with reliability analysis reports. Among the researchers who published their instruments' reliability reports include Dunn and Dunn (1992) whose Learning Style Inventory (LSI) 1996 version was estimated to have internal consistency of .60 (Coffield et al., 2004), while VAK Learning Style Inventory developed by Victoria Chislett and Alan Chapman (2005) has a reliability coefficient of 0.767. The learning style models and instruments discussed in the previous sections are summarized in Table 1.

Table 1
Summary of Learning Style Models

	Learning Style Models	Instrument	Dimensions
1.	Victoria Chislett and Alan Chapman (2005)	VAK LSI	'Visual', 'Auditory' and 'Kinaesthetic'
2.	Flemming (2001)	VARK LSI	'Visual', 'Aural', 'Read/ write', 'Kinaesthetic'
3.	Dunn and Dunn (1992)	LSI	'Environmental', 'Emotional', 'Sociological', 'Physical' and 'Psychological'
4.	Kolb (1984)	LSI	'Accommodators', 'Divergers', 'Convergers', And 'Assimilators'
5.	Honey and Mumford (1992)	LSQ	'Activist', 'Theorist', 'Pragmatist' and 'Reflector'
6.	Grasha-Riechmann (1996)	GRSLSS	'Avoidant', 'Collaborative', 'Competitive', 'Dependent', 'Independent' and 'Participant'
7.	Felder and Spurlin (2005)	ILS	'Sensory' or 'Intuitive', 'Visual' or 'Verbal'. 'Active' or 'Reflective', 'Sequential' or 'Global'

METHODOLOGY

Research Instrument

The research instrument chosen for the study was VAK Learning Style Inventory, developed by Victoria Chislett and Alan Chapman (2005). The main reason this inventory was chosen out of the many learning style inventories available was because it comes with a reliability report and has an estimated reliability coefficient of 0.767. In addition, VAK model is the most commonly adopted by educators (Scott, 2010). The inventory consists of 30 multiple choice statements in both English and Bahasa Malaysia to ensure that all participants understand the statements clearly. Each statement comes with three different alternatives representing different sensory receivers. All alternative 'As' in the inventory have a word representing 'visual' sensory, for example the word 'read'. On the other hand, alternative 'Bs' have a word representing 'auditory' sensory receiver such as the word 'listen' in the statement, while alternative 'Cs' have a word representing 'Kinaesthetic' sensory receiver such as the word 'try' included in the statement. Since each alternative represents one sensory receiver; 'A', 'B' and 'C' alternatives represent visual, auditory and kinaesthetic sensory receiver respectively, respondents who predominantly choose As, Bs, or Cs, are identified as having a 'Visual', 'Auditory' or 'Kinaesthetic' learning style respectively. If the total number of two or three sensory receivers are the same, the respondents are considered as having 'Multimodal' learning styles.

Participants

The participants for the study were 257 diploma level students from three different colleges from a public university in Malaysia. Table 2 shows the participants' demographics.

Table 2
Distribution of Participants Across Three Colleges in Terms of Gender

	CBE	CCA	CCIM	TOTAL
MALE	89	4	27	137
FEMALE	77	22	38	120
TOTAL	166	26	65	257

Out of the 166 participants from College of Built Environment (CBE), 86 were males while 77 were females. There were 4 males and 22 females out of 26 participants from College of Creative Arts (CCA) and 27 males and 38 females out of 65 participants from College of Computing, Informatics and Media (CCIM). In total there were 137 males and 120 females all together.

Table 3 shows the distribution of the students' level of English language performance across the three colleges.

Table 3
Distribution of the Students' Level of English Language Performance Across the three Colleges.

	COLLEGES			
ENG. LEVEL	CBE	CCIM	CCA	TOTAL
GOOD	73	17	6	96
AVERAGE	58	43	13	114
WEAK	35	5	7	47
TOTAL	166	65	26	257

The students' English language achievement was based on their performance for English subject during their *Sijil Pelajaran Malaysia* (SPM). Those who scored 'A+', 'A' and 'A- 'were considered 'Good' students while those who scored 'B+', 'B' and 'B- 'were considered 'Average'. Those who scored 'C+', 'C' and 'C- 'were considered as 'Weak' students. Table 3 shows the distribution of the students' level of English language performance across the three colleges.

Data Collection and Analysis

The researchers had converted VAK Learning Style Inventory questionnaire into a Google Form and the participants responded to the questionnaire which was distributed online by the researchers during March 2023 semester. The data collected were analysed descriptively using Microsoft Excel to determine the participants' learning style preferences, which would address the first research question (RQ1). In order to address the second (RQ2) and third research questions (RQ3), a non-parametric Chi-square test of independence was conducted as proposed by Rana and Singhal (2015) to determine whether there is a relationship between the two sets of categorical variables which were learning style preferences and English language achievement, and between learning style preferences and gender.

RESULTS AND DISCUSSIONS

Addressing the First Research Question.

RQ1: What are the preferred learning styles of diploma level students from three different academic programmes in a public university in Malaysia?

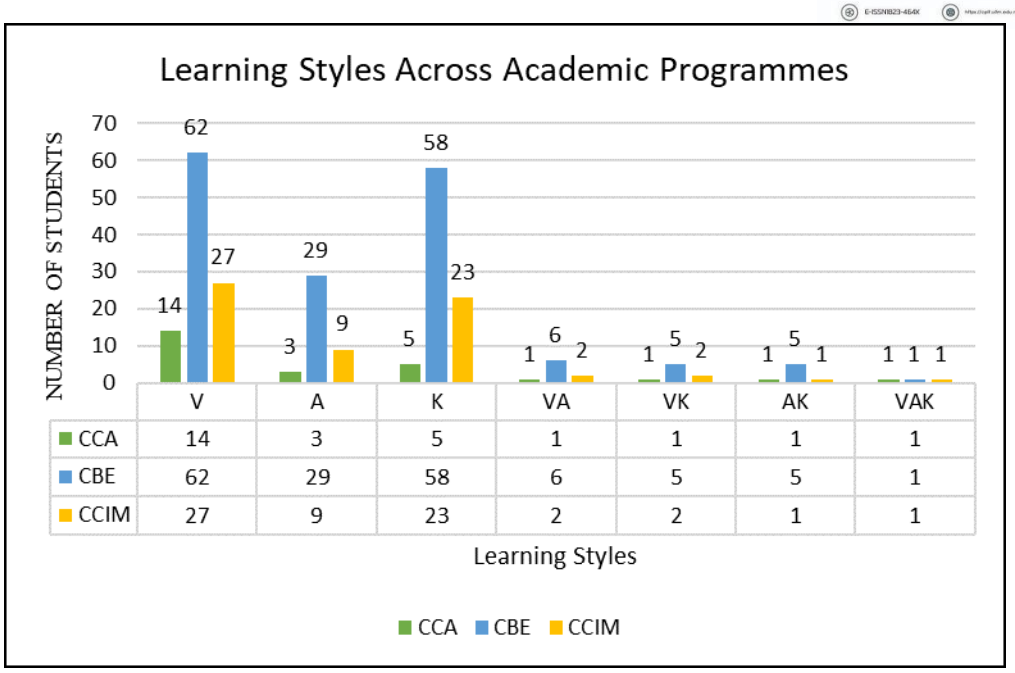

Figure 1: Learning Styles Across Academic Programmes

Figure 1 shows the number of students from three different colleges who are considered as 'Visual', 'Auditory' and 'Kinaesthetic' learners as well as those who are considered as multimodal. 'Visual' learners seem to dominate (76.1%) all the three colleges with 14, 62 and 27 learners from CCA, CBE and CCIM respectively. It is followed by 'Kinaesthetic' learners (33.5%) with 5, 58 and 23 learners from CCA, CBE and CCIM respectively. Only 15.9% or 41 out of the 257 learners, are 'Auditory'. Based on Figure 1, it can be seen that the number of multimodal learners is small. Only 27 (10.5%) out of 257 participants are considered multimodal learners.

Addressing the Second Research Question.

RQ2: Is there a significant relationship between learning styles and English language achievement?

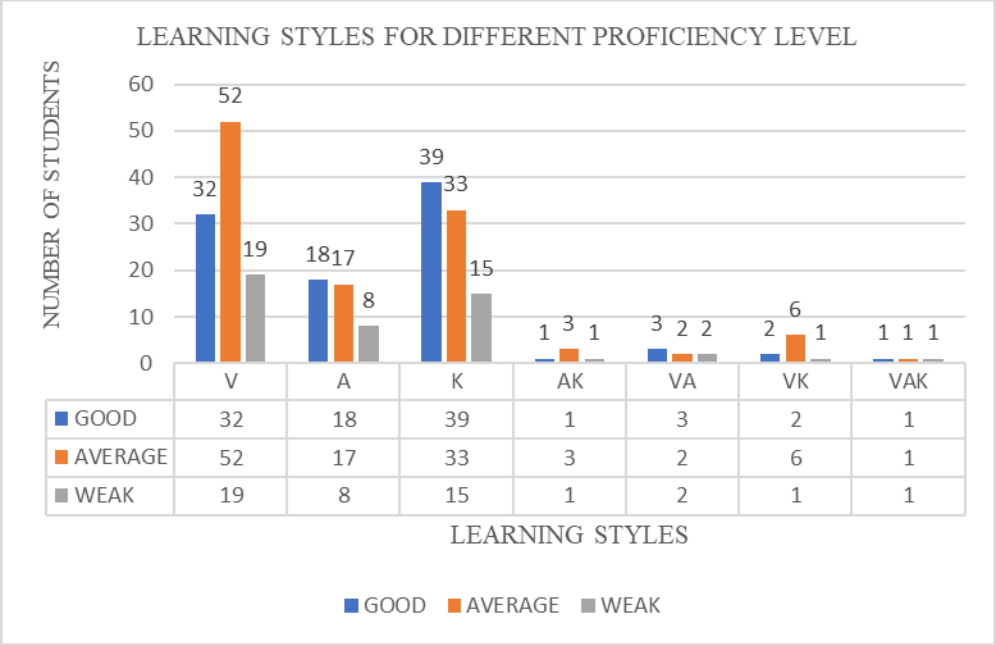

Figure 2: Learning Styles from Different Proficiency Level

Based on Figure 2, the majority, 39 out of 96 of 'Good' learners (40.6%), prefer 'Kinaesthetic' learning style while 32 or 33.3% of them prefer 'Visual' learning style. The remaining 18 (18.75%) of the 'Good' learners prefer 'Auditory' learning style. On the other hand, the majority (45.6%) of 'Average' learners and 40.4% of 'Weak' learners prefer 'Visual' learning style followed by 'Kinaesthetic' learning styles with 28.9% and 31.9% for 'Average' and 'Weak' learners respectively. The results of the study are consistent with the findings of Chetty et al. (2019) and Almomani (2019) who also found that students with 'Kinaesthetic' learning style show good academic achievement, followed by 'Visual' learning style.

The majority of 'Good' learners in the study are found to be unimodal while only a small percentage are multimodal, which is totally in contrast with the study conducted by Amin et al. (2021) who found that learners who used multimodal learning style had excellent academic performance and achieved better results compared to unimodal learners. Fadel (2008) also found that multimodal learners in his study outperformed unimodal learners. According to Capretz (2006), each learning style has its own strengths and weaknesses, thus, Moradkhan and Mirtaheri (2011) were of the opinion that a learner who sticks to only one style is never going to be an ideal learner. However, the findings of the current study show otherwise.

As mentioned in the Methodology section, a non-parametric Chi-square test of independence was conducted to determine whether a relationship exists between the two categorical variables which were learning style preferences (V=Visual, A=Auditory & K=Kinaesthetic) and English language achievement. A null hypothesis was set as follows:

H0 =There is no relationship between learning styles and English language achievement.

Table 4 shows the results of statistical analysis of Chi-square test of independence. The probability value was set at (α=0.05) and degree of freedom was (*df*=6). The critical value (CV) derived from the statistical analysis is **21.0** while the *p* value is **0.49.**

Table 4
The Results of Chi-Square Test of Independence

ENG. LEVEL	LEARNING STYLES							TOTAL
	V	A	K	AK	VA	VK	VAK	
GOOD	0.8718	0.2255	0.8101	0.2758	0.6758	1.6934	0.0822	4.6347
AVERAGE	1.0896	0.2338	1.3009	0.4031	0.0000	0.3269	0.0130	3.3672
WEAK	0.0014	0.0024	0.0521	0.0080	1.6146	1.4630	0.3713	3.5129
CHI-SQUARE (X^2)								11.5148

The decision *'to reject'* or '*fail to reject*' the null hypothesis is based on the following rules. If the value of X^2 > CV, the decision is to reject the null hypothesis, however if the X^2 < CV, then the decision will be 'fail to reject' the null hypothesis. While for the *p* value approach, if the *p* value is less than α=0.05, the decision is to reject the null hypothesis whereas if the *p* value is greater than α=0.05, than the decision will be 'fail to reject' the null hypothesis.

Since the Chi-square value (X^2) is 11.51, which is less than the CV of 21.0, the null hypothesis fails to be rejected. Similarly, the p value (0.49) calculated is more than the α value of 0.05, the null hypothesis also fails to be rejected. This means that there is no relationship between learning styles and English language achievement.

The results are consistent with earlier studies that found no relationship between learning styles and academic achievement (Anas et al., 2021; Dayon, 2018; Fadzillah et al., 2021), and are in contrast with other research that found significant relationship between learning styles and achievement (Amin et al., 2021; Tahir, 2020; Ibarrientos, 2021).

Addressing the Third Research Question.

RQ3: Is there a relationship between learning styles and gender?

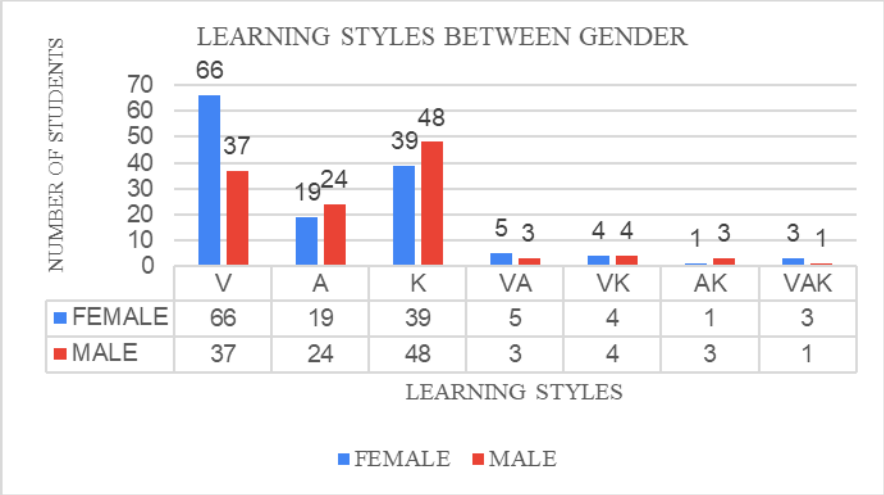

Figure 3: Distribution of Learning Styles Between Genders

Based on Figure 3, it can be seen that the majority (48.2%) or 66 out of 137 female participants prefer 'Visual' learning styles, whereas 39 or 28.5% prefer 'Kinaesthetic' learning style. Only 19 or 13.9% are 'Auditory' learners. On the other hand, the majority (40%) or 48% of the male participants prefer 'Kinaesthetic' learning styles while 37 or 30.8% prefer 'Visual' learning style. The remaining 24 out of 120 male participants or 20% of them prefer 'Auditory' learning style.

To answer the third research question, the null hypothesis was formulated as follows;

H0: There is no relationship between learning style and gender.

Table 5 shows the results of statistical analysis of Chi-square test of independence. The probability value was set at (α=0.05) and degree of freedom was (*df*=6). The critical value (CV) derived from the statistical analysis is **12.6** while the *p* value is **0.085.**

Table 5
The Results of Chi-Square Test of Independence

	LEARNING STYLES							
GENDER	V	A	K	AK	VA	VK	VAK	TOTAL
FEMALE	2.2413	0.6711	1.1736	0.1268	0.0164	0.6013	0.3531	5.1836
MALE	2.5588	0.7662	1.3398	0.1448	0.0187	0.6865	0.4031	5.9179
CHI-SQUARE (X^2)								11.1015

Since the Chi-square value (X^2) is 11.10, which is less than the CV of 12.6, the null hypothesis fails to be rejected. Similarly, the *p* value (0.085) calculated is more than the α value of 0.05, the null hypothesis also fails to be rejected. This means that there is no relationship between learning styles and gender.

The study concludes that gender has no bearing on learning style preferences, which is in line with the conclusion made by Anual et al. (2017), Eid et al. (2021), Gholami and Bagheri (2013), and Gayathri and Indhu (2016). However, this is inconsistent with Almomani's (2019) study which found that males preferred 'Auditory' learning style, while females preferred 'Visual' learning style, and there was no difference in their preference for 'Kinaesthetic' learning style.

CONCLUSION

The study was conducted with the hope to confirm whether there is any significant relationship between learning styles and academic achievement, specifically in English language course. It was found that contrary to conclusions made by numerous studies, there is no significant relationship between language learning styles and English language performance. In addition, it was also found that gender has no bearing in learning style preferences. The results of the study have shed some lights on the limitations of learning style research. The way someone prefers to learn does not necessarily mean the method is the most effective and efficient. This is supported by Liew et al. (2015) as well as Awang et al. (2017) as they too found no significant contribution of learning styles towards academic achievements. Other than those mentioned above, with different settings of classes, be it on-line or face-to-face, learning styles have no significant relationship to academic performance (Cimermanová, 2018).

Although research in learning styles can be found in abundance in teaching/learning literature, the models adopted and the instruments used varied greatly from one study to another. Furthermore, the instruments measuring learning style preference are mostly self-report questionnaires which means that the answers given by the students may not be very reliable. Felder (2020) pointed out that according to some proponents of learning styles, a person's learning style profile of strengths and weaknesses can change depending on the subject, the teacher, and even the student's mood.

In view of these limitations, future research with more appropriate methodologies is needed to validate the use of learning style assessments in education. Until this happens, however, we should not simply disregard the idea of learning styles since as educators, our intuitions about what is appropriate for our students is usually the best.

REFERENCES

Almomani, J. A. (2019). Preferred cognitive learning patterns (VAK) among secondary students admitted to King Saud University and its effect on their academic achievement in Physics. *International Education Studies, 12*(6), 108-119.

Amin, N. A. M., Nizman, N. I. M., Zainal, N. Z., Razif, M. A. M., Manan, N. A., & Samad, N. A. (2021). Learning style and academic performance among clinical years' medical students. *Malaysian Journal of Medicine and Health Sciences, 17*(SUPP11), 8-12.

Anas, N., Mohd Isa, N. S., Omar, N., Mohd Fatzel, F. H., & Mohd Ghazali, Z. (2021). The relationship between students' learning styles and academic performance: Final year accounting students. *EDUCATUM Journal of Social Sciences*, *7*(1), 1-9. https://doi.org/10.37134/ejoss.vol7.1.1.2021

Anual, N., Samat, M., Karim, Z., & Hashim, N. (2017). Learning styles and academic achievement among university students. *Proceedings of the 2nd International Conference on Economic Education and Entrepreneurship (ICEEE 2017)*, 520-526. https://www.scitepress.org/Papers/2017/69855/69855.pdf

Awang, H., Samad, N. A., Faiz, N. S. M., Roddin, R., & Kankia, J. D. (2017, May 6-7). *Relationship between the learning styles preferences and academic achievement* [Paper presentation]. International Research and Innovation Summit, Melaka, Malaysia. https://doi:10.1088/1757-899X/226/1/012193

Belcher, D. D. (2006). English for Specific Purposes: Teaching to perceived needs and imagined future in worlds of work, study and everyday life. *TESOL Quarterly, 40*(1), 133-156.

Capretz, L. F. (2006). Clues on software engineers' learning styles. *International Journal of Computing & Information Sciences, 4*(1), 46-49. https://doi.org/10.48550/arXiv.1507.06943

Chetty, N. D. S., Handayani, L., Sahabudin, N., Ali, Z., Hamzah, N., Rahman, N. S. A., & Kasim, S. (2019). Learning styles and teaching styles determine students' academic performances. *International Journal of Evaluation and Research in Education, 8*(3), 610-615. https://doi: 10.11591/ijere. v8i3.20345

Chislett, V., & Chapman, A. (2005). VAK learning styles self-assessment questionnaire. *BusinessBalls*. https://www.businessballs.com/freepdfmaterials/vak_learning_styles_questionnaire.pdf

Cimermanová, I. (2018). The effect of learning styles on academic achievement in different forms of teaching. *International Journal of Instruction, 11*(3), 219-232. https://doi.org/10.12973/iji.2018.11316a

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Should we be using learning styles? What research has to say to practice*. Learning and Skills Research Center.

Dembo, M. H., & Howard, K. (2007). Advice about the use of learning styles: A major myth in education. *Journal of College Reading and Learning, 37*(2), 101-109.

Dayon, C. A. (2018). Learning styles and academic performance of students in English 3. *The ASTR Research Journal, 2*, 1-8.

Dunn, R., & Dunn, K. (1992). *Teaching elementary students through their individual learning styles.* Allyn & Bacon.

Dunn, R., Burke, K., & Whitley, J. (2000). *What do you know about learning style? A guide for parents of gifted children.* Parenting for High Potential, June, 8-13. URL: https://cdnsm5ss2.sharpschool.com/UserFiles/Servers/Server_4072017/File/Gifted%20Learners/2_3%20PHP%20What%20Do%20You%20Know%20Ab.pdf

Eid, A., Almizani, M., Alzahrani, A., Alomair, A., Albinhamad, A., Albarrak, I., Alzuaki, A., Alyahya, S., & Abdulrahman, K. (2021). Examining learning styles with gender comparison among medical students of a Saudi University. *Advances in Medical Education and Practice, 1*(12), 309–318.

Fadzillah, N. S. M., Ahmad, M. A. N., Jamaluddin, J., Mohd Din, N., & Jabar, F. A. (2021). Relationship between learning style and academic performance of Accounting undergraduates in online classes. *GADING (Online) Journal for Social Sciences, 24*(4), 64-68. https://gadingss.learningdistance.org

Fadel, C. (2008). *Multimodal learning through media: What the research says*. Cisco Systems.

Fauzi, M. T. N. L, & Mohamed, W. N. W. (2023). Gender differences on the use of memory strategies of ESL learning in higher education. *Journal of Creative Practices in Language Learning and Teaching, 57*(11), 113-124. https://cplt.uitm.edu.my/v1/images/v11n1/Article7.pdf

Felder, R. M., & Spurlin, J. (2005). Applications, reliability and validity of the index of learning styles. *International Journal of Engineering Education, 21*, 103-112.

Felder, R. M. (2020). Opinion: Uses, misuses, and validity of learning styles. *Advances in Engineering Education, 8*(1), 1–16. https://advances.asee.org/wp-content/uploads/vol08/issue01/Papers/AEE-Pathways-Felder.Pdf

Fleming, N. D., & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To Improve the Academy,1*,137–144.

Gayathri, B., & Indhu, K. (2016). A study of learning style preferences among first year undergraduate medical students using VARK model. *Education in Medicine Journal, 8*(4),15–21. http://dx.doi.org/10.5959/eimj.v8i4.440

Gholami, S., & Bagheri, M. (2013). Relationship between VAK learning styles and problem-solving styles regarding gender and students' fields of study. *Journal of Language Teaching and Research, 4*(4), 700-706. https://www.academypublication.com/issues/past/jltr/vol04/04/08.pdf

Grasha, A. (1996). *Teaching with style: A practical guide to enhancing learning by understanding teaching & learning styles*. Alliance Publishers.

Griffiths, C. (2012). Learning styles: Traversing the quagmire. In S. Mercer, S. Ryan, and M. Williams (Eds.), *Psychology for language learning: Insights from research, theory and practice*. Palgrave Macmillan.

Honey, P., & Mumford, A. (1992). *The manual of learning styles*. Peter Honey Publications.

Husmann, P. R., & O'Loughlin, V. D. (2018). Another nail in the coffin for learning styles? Disparities among undergraduate anatomy students' study strategies, class performance, and reported VARK learning styles. *Anatomical Sciences Education, 12*(1), 6–19. https://doi.org/10.1002/ase.1777

Ibarrientos, J. A. R. (2021). Learning styles in relation to academic performance of BTVTED students. *Journal of English Education and Linguistics, 2*(2), 68-92. https://doi.org/10.56874/jeel.v2i2.571

İlçin, N., Tomruk, M., Yeşilyaprak, S. S., Karadibak, D., & Savcı, S. (2018). The relationship between learning styles and academic performance in TURKISH physiotherapy students. *BMC Medical Education, 18*(291), 1-8. https://doi.org/10.1186/s12909-018-1400-2

Ismail, N. N. A., Abdullah, T., & Rauf, A. A. H. (2022). Insights into learning styles preference of Engineering undergraduates: Implications for teaching and learning. *Journal of Nusantara Studies, 7*(1), 390-409. http://dx.doi.org/10.24200/jonus.vol7iss1pp390-409

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Liew, S. C., Sidhu, J., & Barua, A. (2015). The relationship between learning preferences (styles and approaches) and learning outcomes among pre-clinical undergraduate medical students. *BMC Medical Education, 15*(1), 1-7.

Moradkhan, D., & Mirtaheri, S. (2011). The relationship between Iranian EFL learners' perceptual learning styles and their teachers' teaching styles. *Journal of English Studies, 1*(4), 41-52. https://www.sid.ir/paper/326944/en

Morehead, K., Rhodes, G. M., & DeLozier, S. (2016). Instructor and student knowledge of study strategies. *Memory, 24(*2), 257-71. https://doi.org/10.1080/09658211.2014.1001992

Newton, P. M., & Miah, M. (2017). Evidence-based higher education – Is the learning styles 'myth' important? *Frontiers in Psychology, 8*, 1-9. https://doi.org/10.3389/fpsyg.2017.00444

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105–119. https://doi.org/10.1111/j.1539-6053.2009.01038.

Rana, R., & Singhal, R. (2015). Chi-square test and its application in hypothesis testing. *Journal of the Practice of Cardiovascular Sciences, 1*(1), 69-71.

Reid, J. M. (1987). The learning style preferences of ESL students. *TESOL Quarterly, 21*(1), 87-110. https://doi.org/10.2307/3586356

Reid, J. M. (1995). *Learning styles in the ESL/EFL classroom*. Heinle & Heinle Publishers.

Scott, C. (2010). The enduring appeal of 'learning styles.' *Australian Journal of Education, 54*(1), 5–17. https://doi.org/10.1177/000494411005400102

Sternberg, R. J., Grigorenko, E. L., & Zhang, L. F. (2008). Styles of learning and thinking matter in instruction and assessment. *Perspectives on Psychological Science, 3*(6), 486–506.

Sternberg, R. J. (1994). Allowing for thinking styles. *Educational Leadership, 52*(3), 36–40.

Tahir, W. M. M. W. (2020). The relationship between students' learning styles and academic performance in accounting. *Academic Journal of Business and Social Sciences, 4*(1), 1-8.

Toyama, M., & Yamazaki, Y. (2020). Are there effects of a match between learning style and teaching style in an EFL classroom? *Innovation in Language Learning and Teaching, 14*(3), 243–258. https://doi.org/10.1080/17501229.2019.1575386

Wahab, I., & Nuraeni, N. (2020). The analysis of students' learning style. *Seltics Journal: Scope of English Language Teaching, Literature and Linguistics Journal, 3*(1), 41-46.

Willingham, D. T. (2005). Ask the Cognitive Scientist: Do Visual, Auditory, and Kinesthetic Learners Need Visual, Auditory, and Kinesthetic Instruction? *American Educator*, 28-32. https://www.aft.org/ae/summer2005/willingham

Willingham, D. T., Hughes, E. M., & Dobolyi, D. G. (2015). The scientific status of learning styles theories. *Teaching of Psychology, 42*(3), 266–271. https://doi.org/10.1177/0098628315589505

Wininger, S. R., Redifer, J. L., Norman, A. D., & Ryle, M. K. (2019). Prevalence of learning styles in educational psychology and introduction to education textbooks: A content analysis. *Psychology Learning & Teaching, 18*(3), 221–243.

Xing, B. Y. (2023). A review of research on learning style. *Open Journal of Modern Linguistics, 13*(2), 263-275. https://doi.org/10.4236/ojml.2023.132016

Zhou, M. (2011). Learning styles and teaching styles in college English teaching. *International Education Studies, 4*(1), 73–77. https://doi.org/10.5539/ies.v4n1p73

Conflict of Interest

There is none.

Acknowledgement

The authors would like to thank all the students from the College of Built Environment (CBE), College of Creative Arts (CCA) and College of Computing, Informatics and Media (CCIM) who participated in the study.

Authors' Contributions

NAAM and NA carried out the introduction and literature review sections. JY and NA collected and refined the data. NAAM performed the data analysis. JY also wrote the methodology section. NAAM wrote the discussion and implication sections. All authors read and approved the final manuscript.

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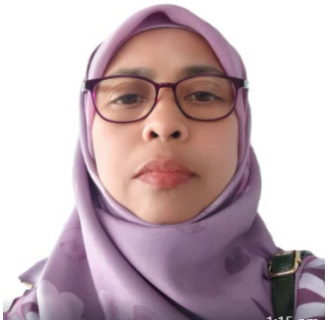	Noraziah Azizan, a senior lecturer at the Academy of Language Studies UiTM Perak has a great experience in teaching proficiency, ESP for Diploma and Degree courses in UiTM. She completed her Degree in Teaching English as A Second Language (TESL) at Universiti Kebangsaan Malaysia and Masters in English as Second Language (ESL) from International Islamic University, Malaysia. Her research interests include second language teaching and learning, teaching strategies, applied Linguistics, English Communication Skills and ESP. She has more than 20 years of experience teaching at secondary and tertiary levels, and has a deep interest in curriculum development.