Exploring the Perceptual Modalities and Achievement in the Higher Education Settings

Dr. Nahla M. Moussa, Assistant professor – Department Chair**,** College of Education**,** American University in the Emirates**,** Dubai Int. Academic City, PO Box: 503000, Dubai, UAE**,** Email: nahla.moussa@aue.ae

The learning process is an essential component of learning experiences. Enhancing the learning process is a vital aim for many researchers and educators. Exploring students' various perceptual learning modalities helps instructors to integrate different learning styles into teaching and learning environments. This research study aims to explore the learning styles of higher education students in the United Arab Emirates (UAE), and their academic achievement, and present recommendations for best practices to enhance pedagogy, assessment, and achieve learning outcomes. For this paper, learning styles are explored through using the *Perceptual Learning Style Inventory* (Academic Senate for California Community Colleges, 1995). Academic achievement is measured by students' Cumulative Grade Point Average (CGPA). Data analysis revealed that visual and interactive perceptual modalities were found to be the dominant learning styles among higher education students in the UAE. Haptic and olfactory were found to be the less preferred learning styles among students. Higher education students in the UAE are identified with high academic achievements.

Key words: *learning styles, higher education, UAE, visual, aural, interactive, print, kinesthetic, haptic*

Introduction

Learning is an essential topic for many researchers and educators. Exploring the learning process will help educators to enhance teaching approaches and enrich learning environments. Today, our classrooms are full of many students from different backgrounds and different cultures, which results in different learning styles. Educators and instructors need to focus on understanding the mechanism of the learning process and the learning methods that students prefer in the learning situations. Students' learning styles help indicate how they interact with

their classmates and instructors. Many research studies (e.g., Dunn & Dunn, 1998; Cassidy & Eachus, 2000; Harrison, Andrews, & Saklofske, 2003; Demirbaş & Demirkan, 2003; Bozkurt & Aydogdu, 2009) showed that individuals have different perceptual learning modalities which help them absorb, retain, process, and recall the gained information. According to the study of Grence-Legget (2005), many students understand their learning needs, and when they have the freedom to learn through their own learning modalities, they demonstrate higher academic performance, more productivity, and develop a self-directed learning approach. Additionally, understanding students' learning process and the characteristics of their learning modalities can enhance teaching practices (Felder, 1998). Thus, investigating students' perceptual modalities/learning styles is an important matter that will facilitate the learning process and enrich the education environments. Therefore, examining learning styles is on-demand to facilitate teaching and enhance students' learning experiences. This research study aims to explore the perceptual learning styles among higher education students in the UAE and their academic achievement which is measured by students' Grade Point Average (GPA) and present recommendations for best practices in teaching and learning. The findings of this research study will be an addition to the body of knowledge of perceptual learning styles field and will present a clear picture about the students' learning preferences to instructors, professors, and educators. The awareness of students' learning modalities could be integrated into curriculum designing and the delivery of the content, which will facilitate achieving the learning outcomes.

Learning Styles

Examining the meaning of the term 'learning styles' revealed that there is no agreement among researchers on one single definition (Claxton & Murrell, 1987). Research studies on learning and cognition produced several definitions of learning styles. Reichmann (1978) explained learning styles as a set of particular attitudes and behaviours linked to the learning context. Many definitions emerged to explain and facilitate the meaning of learning styles; the most well-known and accepted definition among researchers was proposed by Keefe (1979). Keefe suggested that learning styles can be explained as "characteristics, cognitive, affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with and respond to a learning environment" (p. 4).

The concept of learning styles originally emerged from David Kolb's learning theories; it was first introduced in research by Thelen in 1982 (Fatt, 2000). According to Shah et al., (2013), learning styles can be explained in a composite perspective of characteristics, physiological, cognitive, and affective characters that form an indicator of the way a learner perceives, interacts with, and reacts to the learning environment. Learning styles depend entirely on what each student prefers. If students are learning in their preferred way, they are more likely to retain and understand the information properly. Learning styles can be viewed as a strength each learner possesses because it allows them to learn in the way they find most suitable for them. Learning styles can also be defined as, cognitive (thinking), motivational and affective

(feelings), and physiological (behaviour), and a preferred working environment (Cools, Evans & Redmond, 2009).

Cavas and McCloughlin (2009), explained that Kolb (1984) believes that people learn through exposure to learning experiences, and as they learn they go through a four-stages cycle. The first stage is *concrete experience*, which refers to the learning experience by doing. The second stage refers to *reflective observation*, where learners provide their reflection on their learning experience. In the third stage, *abstract conceptualisation* is placed, where learners create new ideas about what they learn. The final stage refers to *active experimentation*, where learners apply new ideas. Kolb (1985) classified the learning styles into four categories. The first category is the *converger* learning style. Individuals with the converger as the dominant learning style demonstrate significant abilities in the domain of abstract conceptualisation and active experimentation. The second category includes the *diverger* learning style. Individuals who are identified with diverger learning styles express significant abilities in the areas of concrete experience and reflective observation, which is the opposite of the converger. The third category is the *assimilator*, whose abilities demonstrated significantly in abstract conceptualisation and reflective observation. *Accommodator* is the last category where individuals with this learning style express strong abilities in concrete experience and active experimentation, which is the opposite of the assimilators. A study conducted by Cavas and McCloughlin (2009), used Kolb's learning style inventory to determine which learning style is the dominant one, with a total of 481 participants. The results concluded that the 'diverger' learning style was the dominant learning style among the participants.

The Importance of Learning Styles

Examining the preferred learning styles of students is a very crucial matter that helps instructors to understand the way students interact and learn, especially when teaching in a multicultural environment where instructors are required to meet the different needs of each learner. Understanding students' learning styles can provide teachers with teaching strategies that can improve learning and make it more effective. Besides, the relevance of students' learning styles with the teachers' teaching styles, helps students to have longer retention of the information and feel more optimistic about learning outcomes (Lohri-Posey, 2003). The importance of learning styles was found as an influential factor which plays an essential role in students' learning and academic achievement (Chen, Chen, & Xin, 2004). According to Naimie et al. (2010), learning styles' experts demonstrated a certain belief in the theory that students will enjoy the class learning experience and learn more when their preferred learning styles are integrated into the learning environment. Some teachers use students' preferred learning styles to encourage problem-solving skills in the classroom (Fatt, 2000). Determining learning styles in the early childhood stages can enhance children's learning and growth and support their success at the moment and later in the future, even though the determining process is effortful and time-consuming (Ellington & Benders 2012). Learning styles form a basic component that

impacts teaching and pedagogy (Bhat & Mehraj, 2014). The association between students' learning styles and success in the online learning environment was measured by Battalio (2009); the results showed a considerable correlation between students' learning styles and success in online education. Furthermore; it was found that students' learning styles were related to the mode of content delivery. Topçu (2008) showed that considering students' learning styles in online teaching produces effective communication and interaction in asynchronous online discussions, which enhances learning. As there are many differences among students, this causes them to have different learning styles and preferences. Integrating learning styles into teaching environments improves the learning process. Educators who consider achieving learning outcomes need to explore the learning styles or learning modalities of their students so they can design the course curriculum, teaching approaches, and assessment to include the different needs of all students.

What are the Perceptual Modalities?

Plessis and Bisschoff (2007), explained perceptual modalities/learning styles as follows: *Visual learners*, who prefer to learn by looking at graphs, pictures, videos, etc. *Aural learners*, who prefer to study better by listening to lectures in class and recorded material. *A verbal learner* who learns best by reading different materials. *Tactile learners* favour learning by doing hands-on activities. Similarly, *kinesthetic learners* prefer to learn by sensing and body movement. According to the *Institute of Learning Styles* (ILS), perceptual modalities consist of 7 different modalities which are explained as follows:

(1) **Visual**: those who are classified as visual learners prefer to learn through seeing visual representations, pictures, illustrations, and watching demonstrations. Visual learners tend to use visual stimuli such as slides, graphs, images, and often develop live imagination during the learning process. Besides, visual learners prefer to stay quiet and stare at the representation and may struggle when the learned task requires extensive listening.

(2) **Aural**: aural oriented learners prefer to learn through listening to lectures, repeating the ideas that were received verbally. In addition is the tendency to focus on verbal instructions and reproduce symbols and letters by hearing them.

(3) **Interactive**: interactive learners prefer learning through verbalisation in the learning environment, like talking to others, enjoying learning through questioning and answering, and prefering to discuss things with others.

(4) **Print**: categorised print learners prefer to take notes when they are placed in a learning environment, remember easily what was read, and like reading any printed material.

(5) **Kinesthetic**: this modality refers to body movements. Those kinesthetic learners tend to learn by doing, being directly involved in physical activities, trying out new things, expressing their response to music physically, producing gestures when talking, and are not attentive to visual or aural stimuli.

(6) **Haptic**: refers to the sense of touch or grasp. He/she prefers to keep his/her hand engaged in learning activities, like touching things while learning, is passionate about the artwork, and enjoys tasks that require touching and manipulating.

(7) **Olfactory**: this modality refers to the sense of smell and taste. Olfactory learners have a special learning style where they like to learn through depending on the sense of smell and taste, linking between specific smells and memories, showing significance in identifying smells and learning through smelling as an interesting process.

Learning Styles and Academic Achievement

Learning styles were shown to be a critical component of students' academic achievement. When teachers, instructors, and professors measure students' learning styles, they can identify different learning modalities, hence they can integrate them into teaching and learning. The research study of Lindsay (1999) revealed that the consistency between students' learning style and the adopted teaching style enhanced academic achievement. Thus, the consistency between instructional design and individuals' learning style produces better educational outcomes. Academic achievement is one of the factors that impact students' perception of the learning process and encourages them to pursue their learning journey. Academic achievement is an essential goal for many higher education students, as it presents an indicator of the gained skills and abilities that determines students' success in their expected careers and professions. Examining the meaning of academic achievement and success indicates that it is a broad term that represents several meanings. Kuh et al., (2006) defined students' academic success as follows: "student success is defined as academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills and competencies, persistence, attainment of educational outcomes, and post-college performance" (p. 5).

According to White (2015), academic achievement can be understood as a student's progress and accomplishment towards earning an academic degree based on the students' preference of a particular program or major and avoiding academic deterioration or probation; usually, perception of success differs among students. Academic achievement refers to students' academic success, being engaged in educationally useful practices and activities, acquisition of desirable knowledge, competencies, and skills to achieve academic goals (White, 2015).

The research study of York et al., (2015), produced six components of grounded definition to describe academic success including "academic achievement, satisfaction, acquisition of skills and competencies, persistence, attainment of learning objectives, and career success" (p. 9). In higher education settings, the concept of academic success is linked to acquiring high grades in the components of the course assessment. For this study, academic achievement can be defined as achieving preferred learning outcomes and earning high grades. In the UAE, higher education institutions consider the following grade scale to assess students' academic achievements, explained as follows: Excellent (A) = 4.0, Very good +(B+) = 3.50, Very good

= 3.00, Good + (C+) = 2.50, Good (C) = 2.00, Satisfactory + (D+) = 1.50, Satisfactory (D) = 1.00, and Fail (F) = 0.00.

Purpose of the Study

This research study was conducted to examine the learning styles of higher education students in the UAE to present beneficial recommendations to higher education instructors, professors, stakeholders, and policymakers. These recommendations will facilitate the teaching process to ensure achieving the learning outcomes effectively.

Research Questions

(1) What are the learning styles of higher education students in the UAE?

(2) What is the level of academic achievement of higher education students in the UAE?

Methodology

Research design

This quantitative research study adopts a cross-sectional descriptive design. Data was collected and transferred to SPSS 22.0 to be analysed and to develop a conclusion. A quantitative design, descriptive analysis was chosen to achieve the purpose of this research article. Descriptive analysis will help in presenting a clear description and drawing a conclusion of students' learning style preferences and academic achievement.

Participants

The participants of this study consist of 239 higher education students enrolled in different colleges and universities in the UAE. Out of the 239 students, 111 (46.4%) were male students and 128 (53.6%) were female students. Participants' ages ranged from 18 to 45 years which were categorised into groups as shown in Table 1.

Table 1: Participants Distribution by Age Groups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	149	62.3	62.3	62.3
	25-31	67	28.0	28.0	90.4
	32-38	22	9.2	9.2	99.6
	39-45	1	.4	.4	100.0
	Total	239	100.0	100.0	

N= 239

The 239 participants are enrolled in different colleges and majors such as the College of Business Administration, computer information technology, design, education, law, media, and mass communication, and security and global studies, see Table 2.

Table 2: Participants Distribution by College

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	College of Business	72	30.1	30.1	30.1
	Computer Information Technology	14	5.9	5.9	36.0
	College of Design	26	10.9	10.9	46.9
	Education	17	7.1	7.1	54.0
	Media and Mass Communication	44	18.4	18.4	72.4
	College of Security Studies	15	6.3	6.3	78.7
	Engineering	51	21.3	21.3	100.0
	Total	239	100.0	100.0	

Participants are a representative sample from different countries such as the United Arab Emirates, Jordan, Lebanon, Iraq, Egypt, Iran, Pakistan, India, and others, see Table 3.

Table 3: Participants Distribution by Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UAE	90	37.7	37.7	37.7
	Egypt	19	7.9	7.9	45.6
	Lebanon	8	3.3	3.3	49.0
	Syria	15	6.3	6.3	55.2
	Palestine	9	3.8	3.8	59.0
	Jordan	12	5.0	5.0	64.0
	Yemen	12	5.0	5.0	69.0
	KSA	9	3.8	3.8	72.8
	Iraq	5	2.1	2.1	74.9
	India	25	10.5	10.5	85.4
	Pakistan	9	3.8	3.8	89.1
	Iran	26	10.9	10.9	100.0
	Total	239	100.0	100.0	

Research Instrument

To achieve this study, the instrument consists of three main sections; the first one presents the informed consent and a full description of the study. The second part presents the demographic information of the participants, and the third part of the survey includes the *Perceptual Learning Style Inventory* (1995) by the *Academic Senate for California Community Colleges*, *Educational Policies Committee, and the Affirmative Action/Cultural Diversity Committee*. This tool is a multiple answer question that asks the participants to choose the strategies that help them learn the best. The *Perceptual Learning Style Inventory* includes 28 statements/choices that represent students' learning preferences. The student can choose as many learning preferences as he feels the chosen statement describes how he learns better. The 28 statements are categorised as follows; 5 statements represent the *Visual Modality*, 4 statements represent the *Aural*, *Interactive*, *Print*, *Kinesthetic*, *Haptic*, and 3 statements represent the *Olfactory* learning modality.

Data Collection

Data collection process took place in the fall of 2020 and continued for two weeks. The *Perceptual Learning Style Inventory* (Academic Senate for California Community Colleges,

1995) was developed on Google forms and the link was sent to many professors and instructors in many universities and colleges in the UAE. The professors and instructors posted the link to their students and invited them to reply and provide their responses. Data was transferred to SPSS version 22 to be utilised for analysis and present the conclusion.

Data Analysis and Findings

To answer research question 1, descriptive analysis of the *Perceptual Learning Style Inventory* showed that higher education students in the UAE have different perceptual learning modalities that include the seven different learning modalities as explained by the *Perceptual Learning Style Inventory*. The description of students' perceptual learning styles is shown in Table 4 that includes all the items of the *Perceptual Learning Style Inventory. Table 5 presents Perceptual Learning Styles Percentage Summarised by the 7 categories of the perceptual modalities.*

Table 4: Participants Percentage by Perceptual Learning Styles -All Items

Perceptual Learning Styles Items	Frequency	Percent
Motion pictures	120	50.2
Lecture, information giving	121	50.6
Group discussion	158	66.1
Reading assignments	82	34.3
Participant in role playing activities	87	36.4
Project construction	62	25.9
Odor discrimination	10	4.2
Television programs	72	30.1
Audiotapes	51	21.3
Participant in panel discussion	38	15.9
Written reports	48	20.1
Nonverbal/body movements	37	15.5
Drawing, painting, or sculpturing	79	33.1
Tasting	36	15.1
Slides	99	41.4
Records	66	27.6

Questions-and-answer sessions	89	37.2
Independent reading	54	22.6
Physical motion activities	49	20.5
Model building	42	17.6
Scent materials (scratch and sniff)	22	9.2
Graphs, tables & charts	54	22.6
Recitations by others	29	12.1
Interviews	76	31.8
Writing	89	37.2
Participant in physical games	81	33.9
Touching objects	66	27.6
Photographs	117	49

N=239

Table 5: Perceptual Learning Styles Percentage Summarised

Perceptual Learning Styles	Percent
Visual	38.66%
Aural	27.9
Interactive	37.75
Print	28.55
Kinesthetic	26.58
Haptic	26.5
Olfactory	9.5

N=239

Table 5 showed that most the of higher education students in the UAE prefer the visual and interactive learning styles seem to be visual learners (38.66%).

To answer research question 2 and explore students' academic achievement, the mean score for students' GPA was computed. Data analysis revealed that higher education students in the UAE were identified with high academic achievement ($M = 3.3598$, $SD = 1.39138$, Median =

3.2000, Mode = 3.00). According to the grade scale used in the universities in the UAE, the mean GPA represents high academic achievement of the students.

Discussion

Learning styles or perceptual modalities play an important role in facilitating students learning. When learning styles are considered in teaching, it provides a quiet learning environment where students learn, and process information based on their learning preferences. The findings of this research study revealed that higher education students in the UAE prefer the visual and interactive learning modalities as dominant learning styles in the learning context; these findings agree with Moussa, 2018, who found that visual learning style is a dominant learning modality among higher education students. The findings also are supported by the results of Teevan and Schlesselman (2011) who found that 73% of their participants are visual learners. Thus, higher education students prefer learning by seeing visual representations and via interacting, discussing, and group discussion activities. These findings can be implemented in teaching and training sessions for higher education students. The aural and print learning styles followed the visual and interactive modalities to be in the second place of preferences which indicate that students in higher education tend to listen and take notes during sessions and in the learning context. The third most dominant learning preferences is allocated to kinesthetic and haptic modalities, which indicates that higher education students as adult learners prefer visual and interactive, even aural and print over learning via body movements and hands-on-activities. Olfactory learning modality was the least preferred among students, which could be explained based on the nature of the major and courses that the students study. The demographic data showed that the students enrolled in majors that do not require using olfactory learning modality in their learning environment. That explains the reason behind the olfactory modality being the least preferred among students. The findings of academic achievement of higher education students indicate that higher education students feel comfortable and enthusiastic to learn and gain new knowledge; it could refer to the likelihood of the consistency of teaching styles and their perceptual modalities. The limitations of this study are related to the study design as learning styles and preferences are changeable and can differ based on the learning context and the course nature. As this research article is an exploratory study that examines learning styles from the physiological perspective, future research will focus on examining the relationship between learning styles considering them from the cognitive perspective as an influencing factor on students' academic achievement.

Conclusion

This research paper explores the perceptual modalities/learning styles and academic achievement of higher education students in the UAE. Higher education students were found to adopt visual and interactive learning styles as their first preferences which could be integrated into the pedagogy and assessment in the higher education settings. The aural and print learning modalities came in the second, preferred after visual and interactive, which

emphasises the importance of adding more visual aids and intensive discussions to the teaching and learning environments. Print, kinesthetic, and haptic modalities and the olfactory were found to be the least preferred among these higher education students. This is acceptable as the majors of the participants of this study do not require using the sense of smell in learning.

Recommendations

This paper aims to explore higher education students' perceptual learning styles from the physiological perspective and their academic achievement in the UAE. The descriptive analysis revealed that higher education students in the UAE prefer the visual and the interactive modalities as their first preferences. The aural and the print took the second place for preferences among students, followed by kinesthetic and haptic. The olfactory showed to be at the least preference among higher education students. These findings could be integrated into pedagogy and assessment. Based on the findings of this research study, here are the best practices for implementation in pedagogy and assessment. For pedagogy, professors and instructors could include more:

- Visual aids followed by verbal group-discussion questions to strengthen students' learning experiences to include the visual and interactive learners.
- Aural tools followed by a written-based question to enhance the perception of aural and print learners.

For assessment, the findings could be implemented as follows:

- When it is applicable, design the same assessment (quiz, assignment, exam, etc.) in different styles such as a short video, written scenario, image and printed questions; the student can choose the appropriate version of the assessment and complete it.
- When it is applicable, include verbal/oral part of each assessment to include aural learners and offer a substitute written or viewable part to include other learners.

Author Bio

Dr. Nahla Moussa earned her Ph.D. in Adult Education from Auburn University, Alabama, the USA 2015. Currently, Dr. Moussa is the department chair in the college of education at the UAE. Dr. Moussa is a certified program evaluator, Auburn University, USA. Dr. Moussa's research interests focus on many issues in higher education settings, including achievement motivations, well-being and life satisfaction, multicultural education, and integrating modern technology aspects into teaching and learning.

REFERENCES

Academic Senate for California Community Colleges. (1995). An integrated approach to multicultural education. Retrieved from http://www.asccc.org/Publications/Papers/integrated_multieducation.html.

Battalio, J. (2009). Success in distance education: Do learning styles and multiple formats matter? *The American Journal of Distance Education*, 23, 71-87

Bhat, M. A. (2016). The predictive power of reasoning ability on academic achievement. *International Journal of Learning, Teaching and Educational Research*, *15*(1).

Bozkurt, O., & Aydoğdu, M. (2009). A comparative analysis of the effect of Dunn and Dunn learning styles model and traditional teaching method on 6th grade students' achievement levels and attitudes in science education lesson. *Elementary Education Online*, 8(3), 741-754.

Cassidy, S., & Eachus, P. (2000). Learning style, academic belief systems, self-report student proficiency and academic achievement in higher education. *Educational Psychology, 20,* 307–322.

Cavas, B. & McCloughlin, T. (2009). The Kolb learning style inventory and science education: What we can learn about learners' priorities? Conference: *Science Live for Teachers (SL4T)* At: Drumcondra

Chen, C. C., Chen, Y. R., & Xin, K. (2004). Guanxi practices and trust in management: A procedural justice perspective. *Organization Science*, 15, 200-209.

Claxton, D. S., & Murrell, P. (1987). *Learning styles: Implications for improving educational practices* (Report No. 4). Washington DC: Association for the Study of Higher Education.

Cools, Eva & Evans, Carol & Redmond, James. (2009). Using styles for more effective learning in multicultural and e-learning environments. Multicultural Education & Technology Journal. 3. 5-16. 10.1108/17504970910951110.

Demirbaş, O. O., & Demirkan, H. (2003). Focus on architectural design process through learning styles. Design Studies, 24(5), 437-456.https://doi.org/10.1016/S0142-694X(03)00013-9

Dunn, R. & Dunn, K. (1998). *Practical approaches to individualizing staff development for adults*. Westport, CT: Praeger

Ellington, Shannon & Benders, David. (2012). *Learning Style and it's importance in Education.* https://www.researchgate.net/publication/256022625_Learning_Style_and_it's_importance_in_Education

Fatt, J. P. *(2000). Understanding the learning styles of students. International Journal of Sociology and Social Policy, 20(11), 31-45.*

Grence-Legget, L (2005). High school students' comparisons on newer versus traditional learning methods (Doctoral dissertation, Walden University). *Dissertation Abstracts International, 66* (01). Retrieved December 19, 2020 from ProQuest database.

Harrison, G., Andrews, J., & Saklofske, D. (2003). Current perspectives on cognitive learning styles. *Education Canada, 43*(2), 44–47.

https://www.learningstyles.org/

Keefe, J. W. (1979). Learning style: An overview. In J. W. Keefe (Ed*.) Student learning styles: Diagnosing and prescribing programs* (pp. 1-17). Reston, VA: National Association of Secondary School Principals.

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

Kuh, G. D., Kinzie, J. L., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2006). *What matters to student success: A review of the literature* (Vol. 8). Washington, DC: National Postsecondary Education Cooperative.

Lindsay, E.K. (1999). An analysis of matches of teaching style and the uses of education technology. *The American Journal of Distance Education*, 13, (2), 113-119.

Lohri-Posey, B. (2003). Determining learning style preferences of students. *Nurse Educator,28(2), 54.*

Mehraj, Ahmad & Bhat, Mehraj. (2014). *Understanding the Learning Styles and its Influence on Teaching/Learning Process. International Journal of Education and Psychological Research (IJEPR), 3, 14-21.*

Moussa, N. M. (2018). Learning Styles and the Adoption of Modern Technology among Adult Learners. *Institute for Learning Styles Journal*, 1, 11-21.

Naimie, Z., Siraj, S., Abuzaid, R. A., & Shagoholi, R. (2010, October). Hypothesized Learners' Technology Preferences Based on Learning Style Dimensions. *The Turkish Online Journal of Educational Technology, 9(4), 83-93*

Perceptual Learning Styles Inventory (1995). The Academic Senate for California Community Colleges. https://www.asccc.org/sites/default/files/publications/Integrated_0.pdf

Plessis, Pierre & Bisschoff, Tom. (2007). Diversity and complexity in the classroom: valuing racial and cultural diversity. *Educational Research and Review. 2. 245-254.*

Reichmann, S. (1978). *Learning styles: Their role in teaching evaluation and course design*. Paper presented at the 86th annual meeting of the American Psychological Association, Toronto.

Shah, Kanchi & Ahmed, Junaid & Shenoy, Nandita & Natarajan, Srikant. *(2013). How different are students and their learning styles? International Journal of Research in Medical Sciences. 1. 1. 10.5455/2320-6012.ijrms20130808.*

Teevan, C. J., Li, M., & Schlesselman, L. S. (2011). Index of learning styles in a US school of pharmacy. *Pharmacy Practice*, *9*(2), 82.

The Institute for Learning Styles Research (ILSR). Retrieved on Jan 2021, from

Topçu, A. 'Intentional repetition' and learning style: Increasing efficient and cohesive interaction in asynchronous online discussions. British Journal of Educational Technology, 2008;39(5): 901-919.

White, P. (2015). What makes a successful undergraduate? The relationship between student characteristics, degree subject and academic success at a university. *British Educational Research Journal*, 41(4), 686–708. https://doi.org/10.1002/berg.3158

York, T., Gibson, C. & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment and Research Evaluation*, (20) 5, 1-10.