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Understanding the Learning Style Preferences of ODL Students Using VARK Model: Implications for Individualized Pedagogy and Student Success

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: The study aims to assess the learning styles among ODL students in higher education, and propose practical strategies for integrating personalized learning approaches to enhance student engagement and educational outcomes.
Place and Duration of Study: Research was carried out among the higher education students who enrolled in different ODL programs under the dual-mode universities. Survey was administered during Personal Contact Programme (PCP) for the academic session of 2023-2024.
Methodology: Descriptive survey design was employed to gather quantitative data on higher education students learning styles under ODL mode of study and provides a deeper understanding of ODL students' learning preferences based on VARK model. The sample comprised of

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246 post-graduate ODL students from various disciplines. A simple random sampling technique was employed to ensure representation from diverse academic backgrounds of ODL students.

Results: Study revealed significant variations in learning style preferences among the ODL students. There are 89 (36.18%) ODL students with single preference of learning style and 157 (63.82%) ODL students with multimodal preference of learning style. Statistically significant difference found between male and female ODL students concerning their learning styles. Visual learning style is the most preferred learning style, followed by aural, kinesthetic, and read/write learning style respectively. Majority of ODL students preferred to learn by multiple sensory modalities.

Conclusion: Integrating learning style assessments into distance learning practices holds immense promise for enhancing the effectiveness and efficiency of distance education. Designing course curriculum for distance education based on multiple sensory modalities is crucial for enhancing learning outcomes and student engagement. Incorporating various sensory channels such as visual, auditory, kinesthetic, and read/write, ODL professionals can cater to diverse learning styles and preferences, ultimately promoting a deeper understanding of the subject matter and academic success.

Keywords: Learning style; ODL students; higher education; individualized pedagogy; student success.

1. INTRODUCTION

Learning involves a process of seeing, observing, and understanding something, which turns into understanding knowledge [1]. Different learners learn differently [2]. All students have their own learning styles [3]. Understanding students' learning styles is vital because it allows educators to build instructional strategies based on individual preferences. Depending on whether the students learn best as visual, auditory, or kinesthetic learners, or by other learning methods, instructors can create inclusive learning methods that integrate needs for all types of learners. This in turn, promotes a high level of engagement, which is necessary for optimal retention and comprehension and hence promotes students' success. Learning style describes the distinctive qualities and preferences of learners regarding how they process information and react to environmental stimuli [4]. It is a pattern of behaviour developed for new learning. This approach of learning emphasises how differently people receive and process information. Due to the variations in cognitive processing, learning processes change from person to person [5]. Learning style for students is the preferred way to learn something new [2]. It is also how students understand and remember knowledge. It has an important effect on the learning processes of the students, which influences the outcomes of learning [6]. When the students are interested, it encourages them to continue learning. Students can acquire more information faster if they are aware of their preferred learning style [7]. Thus, understanding learning styles is important for educators who seek to enhance teaching and learning outcomes.

It is important for higher education students to build their own learning potential in order to the career learning process [8]. The Open and Distance Learning (ODL) system has significantly improved access to quality higher education in India [9]. Therefore, recognising the learning style is extremely important in an Open and Distance Learning (ODL) environment where students learn separately at home and feel alienated from their friends and teachers [10]. Different learning styles are adopted by students in distance learning systems depending on their individual backgrounds and the inputs they receive from their teacher [4]. Investigating the various learning styles of ODL students in higher education is worthwhile, especially considering the instructional inputs. Research indicates that every student most commonly modifies his, or her own learning style based on the environmental or classroom context [11]. It has been discovered that learning styles influence students' learning behaviours [5]. Amongst the factors that contribute to the achievement of distance learners are accessibility, application of suitable methodology, course content, learning material and criteria for assessment. Learning style is another important aspect that contribute to the success of students' learning through ODL mode of study [6]. Teachers need to understand students' learning strategies in order to assist

their learning [11]. Information regarding learner preferences for learning can help the professionals become aware to the diversity that students bring to the classroom [12]. By assessing students' learning styles in an ODL setting, the findings can help teachers to develop and execute distant learning-specific teaching approaches to boost student motivation and learning. Consequently, student responses can help ODL professionals to figure out how to make studying more engaging for ODL students in order to stimulate their interest and inspire them to learn. For this reason, determining the preferred learning style of each student is important for creating a curriculum that is both effective and engaging. Understanding each student's abilities, prior knowledge, preparedness, interests, and dedication will help the teacher provide effective instruction and possibly improve the learner's learning process [8]. This study, therefore, aims at depicting the learning style preferences of ODL students in higher education setting under the dual-mode university. Then, adjustments can be made to meet the varied needs of the students [5].

1.1 Rationale of the Study

Learning preferences have been associated indirectly to students' academic success. Student performance might be correlated with learning preferences, or styles. Most students have a preferred way to learn. Some people learn best while listening, some people need to see something being done first, while others must do it to learn it. The thing is, everyone needs all four modalities to truly commit information to memory: visual, auditory, read/write and kinesthetic. Therefore, it is essential to identify learning styles with the aim of ensuring that a teacher instructs according to the learner's learning style. A teacher who teaches only the way they learn makes learning difficult for the person they are instructing. However, teachers should have necessary knowledge regarding learning styles to assist learners to identify the best styles for them. Additionally, it will enable individuals to develop their self-esteem and learn how to manage their learning, especially in an ODL environment. Although every student has their own preferred learning style, it is crucial to have some ideas about others and how to strengthen weaker styles. Utilizing multiple learning styles can strengthen learning experiences; therefore, student success in a distance learning environment may depend on understanding the learning style. Students will not just expect equal opportunity to an excellent education as traditional offerings, but they want a learning experience on their own. Therefore, this study aimed to find out the most preferred learning styles for ODL students in higher education under the dual-mode university. Understanding learners' preferences for visual, auditory, reading/writing, and kinesthetic modalities enables ODL professionals to design and deliver learning material in alignment with these preferences, thereby enhancing student engagement, motivation, and academic performance. Therefore, understanding the preferred learning styles and cognitive abilities will enable the ODL professionals to optimize the learning experience for ODL students.

1.2 Research Questions

1. What are the learning style preferences found in ODL students at higher education level?
2. Is there any gender difference in learning styles among the ODL higher education students?

1.3 Purpose of the Study

This study attempts to fill the gap in student learning styles research by investigating the preferred learning styles of ODL students to develop and implement teaching approaches that are specific in distance learning setting to increase students' motivation and learning. Thus, the specific objectives of this study sought to investigate:

1. To study the learning style preferences of ODL students at higher education level.
2. To compare the learning styles of ODL higher education students in respect to their gender.

2. METHODOLOGY

This study employed a descriptive survey research design to explore the learning styles of higher education students and to provide a comprehensive understanding of ODL students' learning preferences.

2.1 Population of the Study

The population consisted of all the post-graduate students enrolled in the ODL section under the dual-mode university in West Bengal.

2.2 Sample and Sampling Technique

The participants in this study were post-graduate ODL students enrolled in diverse disciplines under the dual-mode university. A simple random sampling method was employed to ensure representation from different academic disciplines. The sample consisted of 246 final year post-graduate students under the ODL mode of study in the main campus of the dual-mode university in the state of West Bengal.

2.3 VARK Instrument

The research utilizes version 7.1 of the VARK questionnaire, developed by Neil Fleming, to assess individual learning preferences across four modalities: Visual (V), Auditory (A), Reading/Writing (R), and Kinesthetic (K) [13]. It encompasses 16 questions, each with four options. Learners were permitted to select more than one response per item to appropriately describe their preferred response in a particular situation The function of each item is to categorize the respondent's learning style preference. This questionnaire helps to identify how individuals best absorb and process information, thereby promoting more individualized and efficient learning experiences.

2.4 Data Collection and Statistical Analysis

The hard-copy of the VARK questionnaire downloaded from the VARK official website was distributed to the ODL students during their personal contact programme in October 2023. A total three hundred questionnaires were distributed to the ODL students who were available at the time of the research study. A total of 246 questionnaires were completed and submitted by the ODL students. The students were informed that the VARK questionnaire was prepared to assess the learning style preferences of the students, participation is voluntary in this study and, study results would not be used for any other dissemination other than the research purposes.

The VARK learning style preferences were calculated using the guidelines provided on the VARK website. The VARK questionnaire was evaluated using the stepping-stone method as described on the VARK website. Each VARK component was analyzed using descriptive statistics. To compute the proportion of ODL students for each VARK component, the number of students who favoured each modality of learning was divided by the total number of ODL students (n=246).

6. RESULTS AND DISCUSSION

Demographic Profile: Out of the 300 post-graduate ODL students, who have been invited to participate in the present study, 246 ODL students answered the questionnaire; therefore, the response rate was 82%. Table 1 shows a comparison of learning preferences and characteristics of ODL students. It is important to give an impression and describe the ODL students who participated in the present study. Out of 246 participants, 213 were female, which constituted 86.58%, while the remaining 33 participants were male, which represented 13.42%.

Table 1 also illustrates that 12.61%, 11.78%, 3.66 % and 8.13% of ODL students identified only the visual, aural, read/write and kinesthetic modes as their preferred learning style, respectively. That means just 36.18% of ODL students only preferred one sensory modality (visual, aural, read/write, or kinesthetic) as a learning style. There are 89 (36.18%) ODL students with single preference of learning style and 157 (63.82%) ODL students with multimodal preference of learning style.

Fig. 2 shows that 89 (36.18%), 81 (32.93%), 54 (21.95%) and 22 (8.94%) ODL students were single, bimodal, trimodal and quad modal, respectively.

Table 1. Comparison of ODL students learning style preferences based on demographic profile

(n=246)

Variable	Unimodal				Multimodal	Sum
	V	A	R	K		
No. of students	31 (12.61)	29 (11.78)	9 (3.66)	20 (8.13)	157 (63.82)	246 (100)
Male	4 (12.12)	2 (6.06)	1 (3.03)	2 (6.06)	24 (72.73)	33 (13.42)
Female	27 (12.67)	27 (12.67)	8 (3.76)	18 (8.46)	133 (62.44)	213 (86.58)

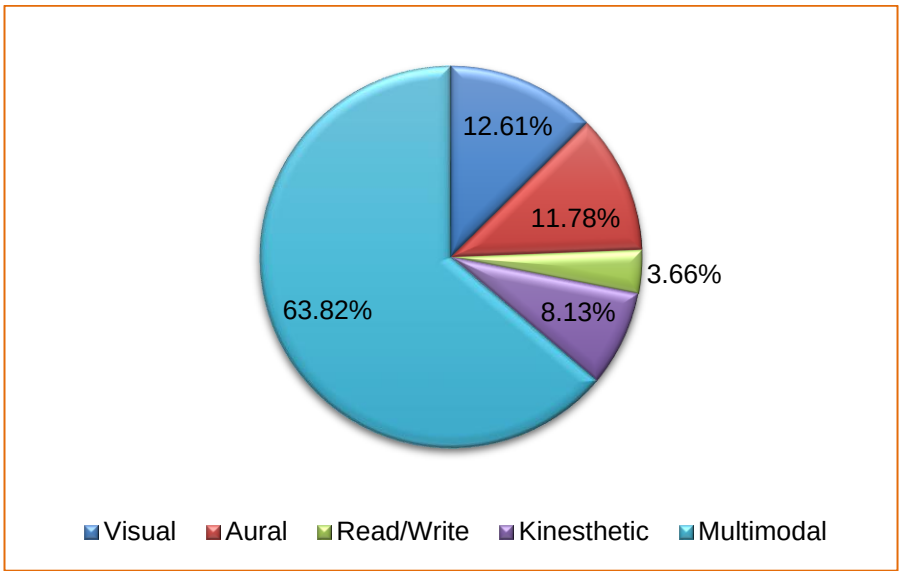

Fig. 1. The percentages of ODL students with unimodal and multimodal learning preferences (n= 246)

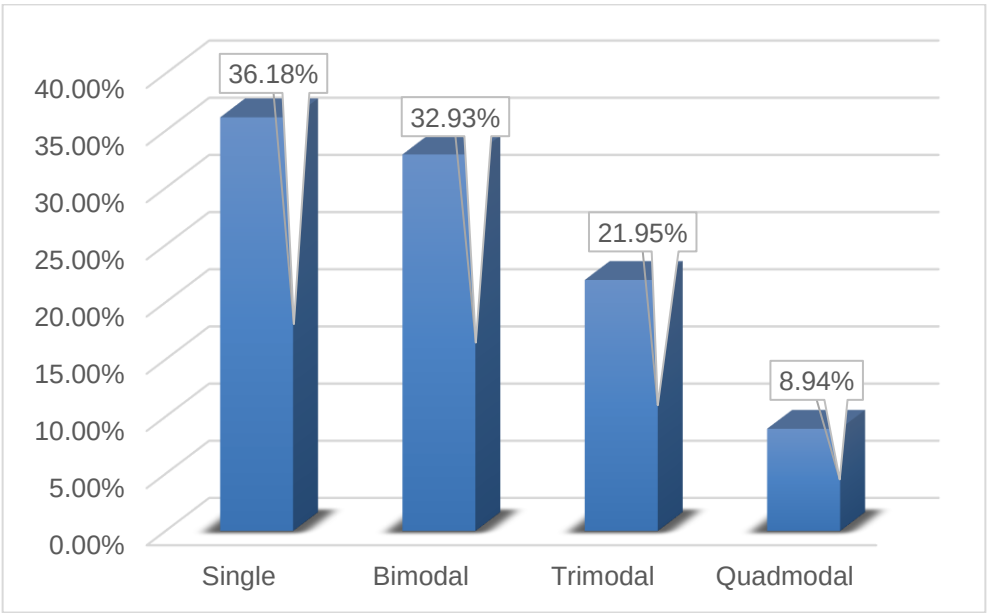

Fig. 2. The percentage of students who preferred two, three or four modes of the learning style preferences

There was a statistically significant difference between male and female ODL students concerning their learning styles i.e., female students used unimodal (37.56%) more than male students (27.27%); further analysis revealed that male students used multimodal (72.73%) more than female students (62.44%).

From the data in Table 2, it can be seen that the visual learning style is the most preferred learning style among the ODL students. Individuals with this learning style typically grasp concepts more effectively when presented with visual aids rather than verbal explanations. This means for processing information through visual stimuli such as images, diagrams, and spatial representations. The data also suggests that ODL students learn and understand better when they can see patterns in things. The students are also excited by colourful notes, and they like interesting designs and features. The second

most preferred learning style is aural, where information is conveyed through lectures, discussions, and retain information through listening and verbal instruction. This type of individuals prefers auditory information processing. Based on the data, the kinesthetic is the third most preferred learning style among the ODL students. Kinesthetic learning style refers to individuals who best absorb and retain information through physical activities, hands-on experiences, and movement. They excel in tasks that involve physical engagement, such as laboratory experiments, simulations, and interactive demonstrations. Based on Table 2, the read/write learning style is the least preferred learning style among the ODL students. This learning style refers to individuals who exhibit a preference for processing information through written text and written communication. These learners excel in tasks that involve reading and writing, such as textbooks, notes, essays, and written assignments. They have a strong ability to comprehend information presented in written form and demonstrate proficiency in organizing thoughts and expressing ideas through written language.

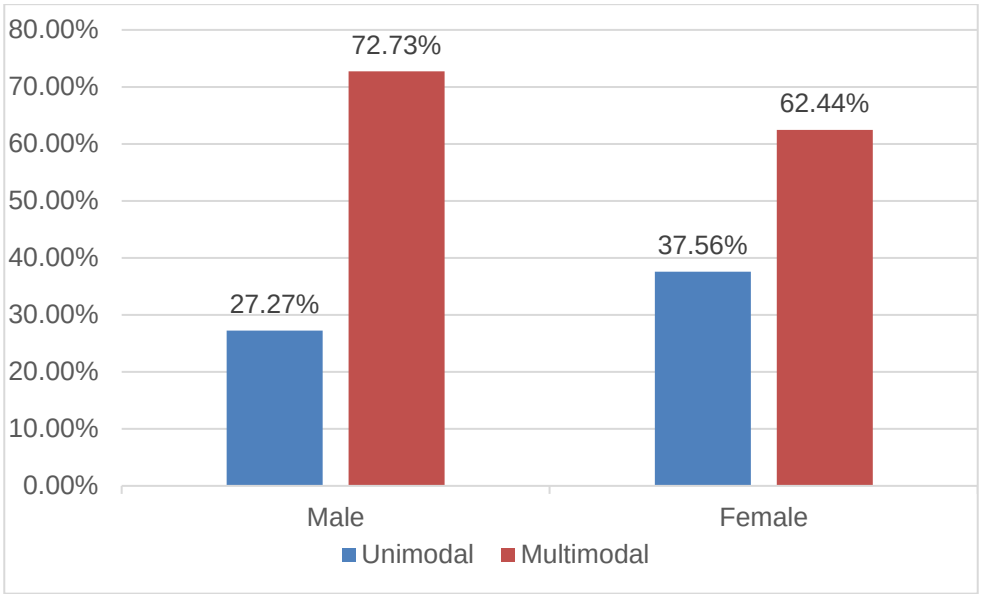

Fig. 3. Percentage of ODL male and female students with unimodal and multimodal learning preferences

Table 2. The Model of ODL Students based on preferred Learning Styles

(n=246)

ODL Students Preference	Learning Style	Total	Percentage	Single & Multimodal Percentage
Single	V	31	12.61%	
	A	29	11.78%	
	R	9	3.66%	36.18%
	K	20	8.13%	
Bimodal	VA	25	10.16%	
	VR	7	2.85%	
	VK	21	8.54%	
	RK	8	3.25%	
	AR	7	2.85%	63.82%
	AK	13	5.28%	
Trimodal	VAR	12	4.87%	
	VAK	21	8.54%	
	VRK	7	2.85%	
	ARK	14	5.69%	
Quad modal	VARK	22	8.94%	

Fig. 4 shows that there are 22 (8.94%) ODL students who preferred quad modal learning style, which means use of all components for learning i.e., visual, auditory, read/write, and kinesthetic. By considering the learning style among the total number of 246 responders in the present study, it is found that there are 89 (36.18%) ODL students with single preference of learning style, 81 (32.93%) ODL students with bi-modal preference of learning style, and 54 (21.95%) ODL students with tri-modal preference of learning style. However, a further analysis showed that the majority of ODL students i.e., 157 (63.82%) preferred to learn by multiple sensory modalities. The multiple sensory modalities learning style encompasses individuals who benefit from engaging with information through various sensory channels, including visual, auditory, kinesthetic, and read/write modalities. These learners demonstrate flexibility in their approach to learning, utilizing a combination of sensory experiences to comprehend and retain information effectively. They thrive in environments that offer diverse instructional methods, such as multimedia presentations, hands-on activities, verbal discussions, and written materials. Therefore, recognizing and accommodating the multiple sensory modalities learning style is crucial for ODL professionals to provide inclusive and engaging learning experiences that cater to the diverse needs and preferences of ODL learners.

The purpose of this study was to determine the learning preferences among ODL students of higher education institution. It was observed that most of the ODL students favoured learning by more than one information-presentation mode. The learning style of most of the ODL students i.e., 63.82% is multimodal preference. This means the ODL students are competent in 2 styles or more than 2 styles. Most of the ODL students are competent of VA (10.16%) and VK (8.54%) learning style. The ODL student learns better from the audio-visual demonstration of the teacher and practice in real setting. One of the main findings of our study was that learning styles differ between male and female students. In terms of the least preferred learning style, it is found that both male and female ODL students least preferred read/write (R) learning style. Thus, ODL professionals should focus on understanding the unique needs of each ODL student rather than stereotyping based on gender, fostering inclusive learning environments that accommodate a range of learning styles regardless of gender identity. In conclusion, multimodal learning style was the favoured method of instruction for ODL students at our university. Among the single-mode learning styles, the visual (V) style had the highest proportion, followed by the aural (A) type of learning style.

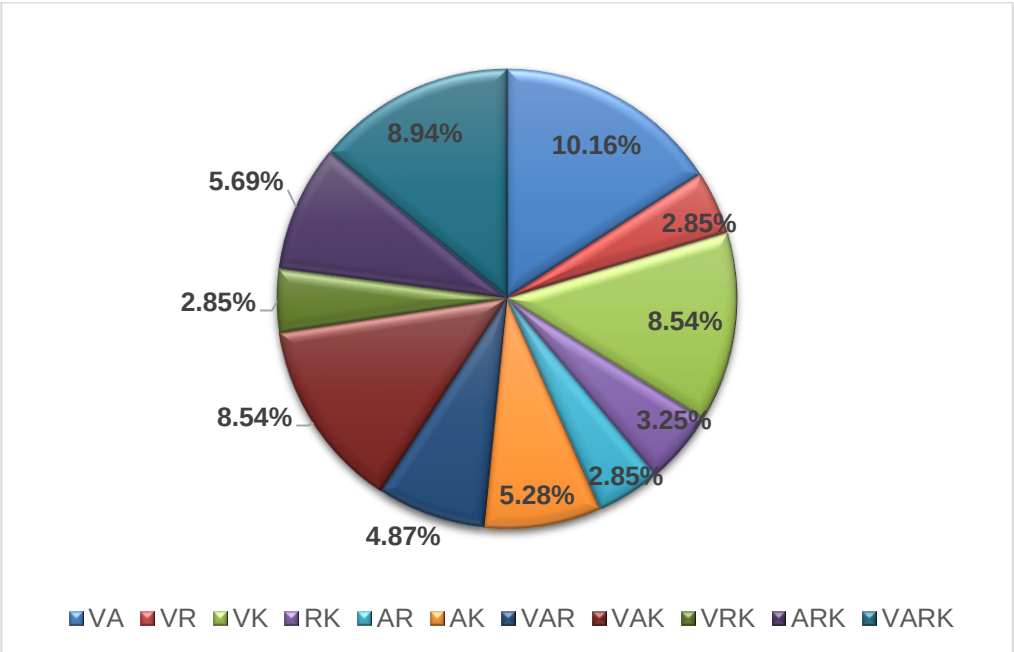

Fig. 4. Percentages of ODL students with a preferred combination of learning styles

4. CONCLUSION

This research study has illuminated the profound impact that understanding individual learning preferences can have on teaching and learning practices. In distance education contexts, where face-to-face interaction is limited, understanding students' learning preferences becomes even more crucial for designing engaging and impactful instructional experiences. The identification of learning styles among ODL students is paramount for designing effective distance learning courses. Understanding how students prefer to receive and process information enables ODL professionals to tailor learning materials and instructional strategies to meet diverse learning needs, thereby enhancing engagement, comprehension, and overall learning outcomes. Moreover, accommodating diverse learning styles in distance learning courses promotes inclusivity and equity, ensuring that all students have equitable access to educational resources and opportunities for success. By acknowledging and addressing individual learning preferences, the ODL professionals can mitigate barriers to learning and foster a supportive learning environment conducive to student success in distance learning contexts. In summary, recognizing and addressing students' learning styles in distance learning environments is essential for optimizing educational outcomes and promoting student success.

The VARK model of learning styles states that individuals have preferences for different ways of receiving and processing information. Based on research result is found that teaching-learning material design should be created by designing creative activities and environment that goes in line with the learning abilities of the ODL students to enhance their motivation and positive perception. This will enhance the learning achievement of the ODL students. The information collected from the study's findings may be helpful in raising the standard of instruction and learning for ODL students. As a result, it is critical that ODL instructors know which learning style each of their ODL students prefers by giving them a survey to complete before the new session starts. The findings of this study have effects on teaching and instructional design. The results of this study have implications for instructional design and teaching.

In this regard, it is also vital to point out that ODL practice has significantly contributed to improving access for all to quality higher education in India. Apart from the VARK model being used to understand the students' differences in learning preferences, this study further implies that the ODL system will need to be transformed to a learner-centric approach. In such a situation, ODL professionals need to understand that students have four major learning styles, visual, auditory, read/write, and kinesthetic. A learning style is a manner of processing information that people favour to learn or acquire information. When you are helping your students, you probably choose teaching methods that suit your learning style. In general, a very successful learner learns in several different ways. Overall, every student also has a preference for each kind of learning style or possess each type of learning style, and most of them dominate in one or multimodal styles of learning. The current research study has identified the presence of different learning styles, multiple learning styles and a range of major, minor, and negligible learning styles among the ODL students. Therefore, it can be suggested that most of the ODL students had different types of learning styles or a combination of different learning styles. Overall, the VARK model can be useful for understanding the individual differences in learning preferences and can be used for suggesting the teaching and learning practices to achieve the best learning results. This would involve the interpretation that a variety of teaching methods and materials can be used by the ODL professionals according to the learning style of different students and in relation to that students can also find using their learning style which learning material or activities would be most effective. In essence, the identification of students' learning styles represents a foundational step towards fostering inclusive, equitable, and learner-centered learning environments.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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