PSYCHOLOGICAL ASPECTS OF VARK LEARNING STYLES IN BLENDED LEARNING: A THEORETICAL ANALYSIS

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Abstract: The rise of digital learning platforms has significantly impacted educational institutions. The educational landscape is constantly changing with the increasing use of blended learning approaches. Blended learning combines traditional in-person teaching with online learning, providing students with a versatile and dynamic platform for knowledge acquisition. However, education is not a one-size-fits-all endeavor, and acknowledging the diversity of students' learning styles is important in enhancing the effectiveness of blended learning. This article aims to theoretically explore the psychological aspects of VARK learning styles within the context of Blended learning. VARK, representing visual, auditory, reading/writing, and kinesthetic learning preferences, offers a structured framework to categorize students based on their preferred mode of learning. The present article also discusses the benefits of incorporating VARK learning styles in blended learning, emphasizing personalized learning experiences, enhanced engagement, and inclusivity. However, challenges such as overgeneralization, resource accessibility, and the need for teacher preparedness should be addressed. Balancing technology integration and face-to-face contact is crucial for successful blended learning.

Index Terms - **Education, blended learning, learning style, VARK, psychological aspects.**

I. INTRODUCTION

The widespread availability of electronic gadgets such as computers, tablets, and smartphones has made technology-enabled learning more accessible and varied. Educational institutions, teachers, and experts are increasingly incorporating web-based education into their teaching methods, providing learners with numerous applications for support. The combination of classroom and web-based teaching methods provides a diverse range of learning modes and methods for enhancing student skills and expertise (Means, Toyama, Murphy, Bakia, & Jones, 2009). Innovative educators have been developing new education delivery methods since the late 1990s, combining in-person teaching with technology-enabled learning. Blended learning has rapidly grown since simple learning management systems emerged, with numerous combinations and

permutations available. In the early 2000s, computers became a part of everyday life, but education lacked integration. As computers and the Internet provided opportunities for connectivity, interaction, visuals, and information access, innovation increased, but in uneven and fragmented ways. David Wiley (2006), a professor at Brigham Young University, highlights "six significant changes in our everyday lives due to technology, particularly the internet. These changes include the shift from **analog to digital**, **tethering to mobile** devices, becoming **isolated to connected**, and transitioning from **generic to personal** experiences. Online information, media, and interactions are increasingly done online, allowing people to access the digital world anytime, anywhere. The web also allows for the growth of niche interest groups and professional connections, while personal experiences are now available on personal devices".

Pappas (2015b) suggests that web-based learning has replaced CD-ROM materials due to its convenience, cost-effectiveness, scalability, and adaptability. This allows learners to access materials anytime, anywhere, with an internet connection, and reflects new information or curriculum changes, making it easier to update.

The use of technology in education, particularly e-learning, has gained popularity in Western countries. However, India faces challenges such as economic support, a lack of social contact, and materialism. To transform Indian teacher education, a combination of classroom teaching and online learning is essential. Blended learning, which combines various delivery modes, offers more choices and effective ways to achieve this transformation. Blended learning is a combination of traditional classroom teaching and ICT-supported learning, including both offline and online learning. It involves using various training media, technologies, activities, and events to create an optimal program for a specific audience. Blended learning programs use various forms of e-learning, possibly complemented with instructor-led training and live formats, ensuring a comprehensive and effective learning experience. It is a well-planned combination of online and face-to-face activities, focusing on learning outcomes and a learner-centered instructional environment, rather than a mere mix of both modes.

Blended learning has gained prominence in recent years as an innovative approach to teaching and learning. It is also a hybrid model that combines traditional face-to-face classroom instruction with online learning, allowing educators to harness the benefits of both environments. In this dynamic educational landscape, it is essential to consider the psychological aspects of students' learning styles. The VARK model, which classifies learners into visual, auditory, reading/writing, and kinesthetic preferences, offers valuable insights into how students process information. This article explores the psychological aspects of VARK learning styles within the context of Blended learning and provides insights on how educators can leverage this knowledge to optimize their teaching methods.

II. DEFINITIONS AND CONCEPT OF BLENDED LEARNING

Blended learning, also known as hybrid or mixed-mode education or learning, is an instructional design system that utilizes various teaching and learning experiences and varies across teachers, programs, and schools, offering virtually endless potential variations. And it is also the combination of traditional classroom teaching methods and online learning for the same students studying the same content in the same course. Christensen, Horn, and Staker (2013) defined blended learning as *"a formal education program in which a student learns at least in part through online learning with some element of student control over time place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home. The modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience".* Blended learning is a mixture of online learning and classroom that contain some of the facilities of online courses with the presence of face-to-face communication (Rovai & Jordan, 2004). Blended learning is a pedagogical strategy that integrates classroom effectiveness and socialization with online technology-enhanced active learning, rather than relying on ratio modalities (Dziuban et al., 2004). According to Pankin, Roberts, Savio (2012) "Blended learning is a structured approach that utilizes multiple learning methods, both within and outside the classroom".

Blended learning is a combination of face-to-face and technology-mediated learning, where students are connected digitally through online communities. This approach allows students to attend traditional classroom classes while completing online components independently, outside of the classroom. This approach allows students to learn from a variety of perspectives, enhancing their overall learning experience. Blended learning referred to the following four different concepts: -
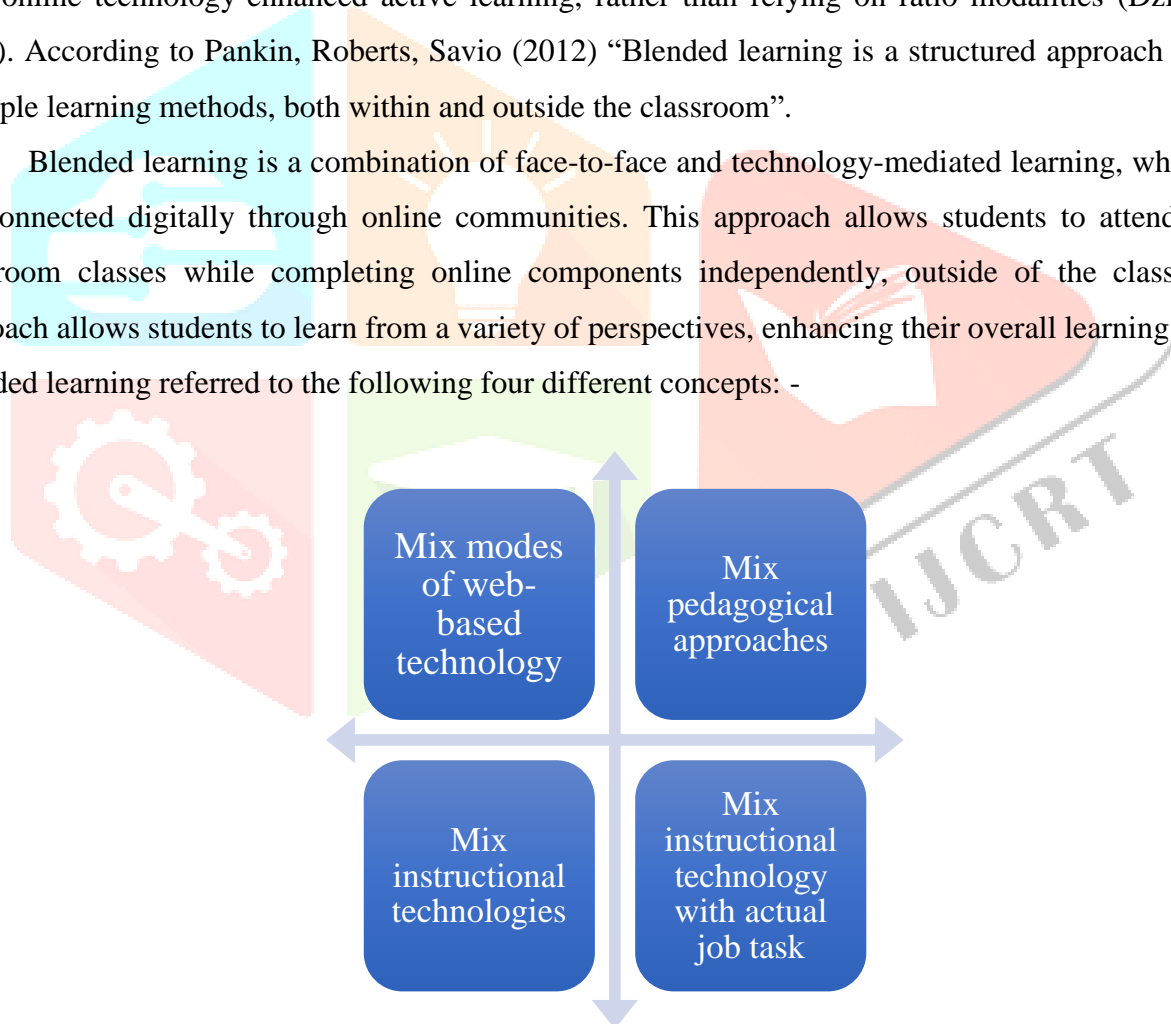

Fig. 1. Shows four different concepts of Blended learning

- **Mix modes of web-based technology:** The integration of live virtual classrooms, self-paced instruction, collaborative learning, streaming video, audio, and text can be combined to achieve educational objectives.

- **Mix pedagogical approaches:** The integration of constructivism, behaviorism, and cognitivism with or without instructional technology can lead to optimal learning outcomes.

- **Mix instructional technologies:** Instructional technologies such as CD-ROM, web-based training, and films are utilized alongside face-to-face instructor-led training.

- **Mix instructional technology with actual job task:** The combination of working and learning experiences is crucial for achieving optimal and effective learning outcomes.

The optimal learning experience for all students is achieved through the use of the best mix of resources. Blended learning is a learning program that utilizes multiple delivery modes to enhance learning outcomes and reduce program delivery costs. Blended learning is a rapidly developing form of education that combines face-to-face classroom instruction with online learning within a course or program. It offers greater flexibility, convenience, and potential increases in learner creativity and independence. Blended learning is an integrated plan utilizing the best of both face-to-face and online learning. It can be divided into three main models: blended presentation and interaction, blended block, and fully online.

Blended learning involves teachers providing online reference materials, assessments, pre-work, remedial teaching, guidance/mentoring, and expert lectures, enabling students to access resources through blogs, email, and online platforms, thereby enhancing their learning experience. According to Hannon & Macken (2014), it can be divided into three main models. These are Blended presentation and interaction, Blended block and fully online.

- **Model 1 - Blended Presentation and Interaction (BPI)**: The flipped curriculum model combines activity-focused face-to-face sessions with online resources, promoting interaction and group work through short lecture podcasts and face-to-face tutorials.

- **Model 2 - Blended Block (BB):** It combines intensive face-to-face sessions, weekly online tutorials and seminars, and online content and resources for activities and interaction.

- **Model 3 - Fully Online (FO):** This model combines lecture podcasts with online resources, learning activities, synchronous online tutorials, and online interaction through collaboration, discussion forums, and group work.

- They also introduce the "Hybrid Model," a fourth model of blended learning that combines elements of the three models. This model can be used for a course, such as using the BPI model for half the semester, then switching to the BB model for the second half, or using the FO model for key lectures or demonstrations.

II.I. STRUCTURES OF BLENDED LEARNING IN EDUCATION

Blended learning combines traditional in-person teaching with online learning activities. It can take various forms, with some classes being primarily face-to-face and others mainly online. Students have the flexibility to choose how they engage with the material, attending in-person sessions or accessing content online. Blended learning is adaptable to individual students' needs and schedules. Teachers play a vital role in guiding students through this diverse learning approach, ensuring it aligns with subject matter and student requirements. Following are the most used in our educational institutions today:

a) **Blended face-to-face class:** The blended face-to-face class model, also known as the "face-to-face driver model," combines classroom time with online activities, allowing students and faculty to share more instructional time for higher-order learning activities like discussions and group projects.

b) **Blended online class:** Also known as the "online driver model," is an inverse of blended face-to-face classes, primarily conducted online but incorporating in-person activities like lectures or labs.

c) **The flipped classroom model:** A sub-model of blended face-to-face or online classes, reverses traditional class structures by allowing students to watch online lectures and complete classroom activities.

d) **The rotation model:** It involves students rotating between different learning modalities, including online learning. It has sub-models like station, lab, and individual rotation, suitable for K-12 education and college campuses. Station rotation requires instructors to rotate between classroom stations, lab rotation involves rotating among campus locations, and individual rotation involves a customized schedule.

e) **The Self-blend model:** This model is a program-level model used by college students, where they enroll in a school and take online courses alongside traditional face-to-face courses, without faculty guidance, choosing which courses to take.

f) **Blended MOOC:** The blended MOOC is a flipped classroom model that integrates in-person class meetings with an online course, allowing students to access materials outside of class and engage in class discussions.

g) **Flexible-mode courses:** Flexible-mode courses provide instruction in both in-person and online formats, allowing students to choose their preferred learning method. like San Francisco State University's hybrid flexible model, allow students to choose between in-person and online instruction, allowing them to tailor their learning experience.

III. UNDERSTANDING VARK LEARNING STYLE

Psychologists have proposed various learning theories to address learning problems, but some students' needs are not met, leading to research on improving unique learning methods to address low education outcomes. Ancient Greek and Roman philosophers, like Aristotle, have influenced educators for centuries, using mnemonic techniques like association and visual imagery to aid special need students in learning. In the early 20th century, psychologists like Ausubell, Bruner, Wertherimer, Bartlett, and Watter studied strategies to enhance learning retention, recognizing various cognitive and informational processing

methods. And other psychologist like Dunn (1984), Kolb (1984), and Price (1987) have acknowledged that learners not only assimilate information through cognitive styles but also employ affective and physiological approaches (Reiff, 1992). Learning is a humanistic process that is meaningful and effective when its goals are clear and vivid. Each learner has a unique personality that influences their approach to learning tasks. Learning styles are innate personality characteristics that evolve over time and are influenced by factors like mental abilities, child rearing practices, school environment, peer interaction, self-awareness, and student involvement. These styles develop from birth and stabilize at adolescence.

The term "learning styles" refer to the unique ways in which students absorb, process, comprehend, and retain information. These styles are influenced by cognitive, emotional, environmental, and prior experiences. Multimodal learners, those with two or more dominant learning styles, have unique approaches to knowledge processing. Some students prefer to focus on figures, numbers, and algorithms, while others prefer theories and mathematical models. Verbal communication is the preference, while visual forms take a backseat. Independent work is prioritized over active, interactive learning. It is crucial for educators to understand and implement best practice strategies in their daily activities, curriculum, and assessments. Learning style, defined by Keefe and Languise (1983), is a combination of cognitive, affective, and physiological factors that determine an individual's perception, interaction, and response to the learning environment. It is influenced by neural organization and personality, which are shaped by human development and the learning experiences of home, school, and society.

Feldman (2004) states that learning style reflects our preferred method of acquiring, using, and thinking about knowledge, and how we handle situations based on our learning style. A learning style is a preferred way of thinking, processing and understanding information. Each person prefers a pattern of thought and behavior that influences his or her learning process (Allen et al. 2020). Kolb (1984) defined learning styles as the methods students prefer to learn, including consistent strategies for processing new information. According to Neil Fleming (2012), "learning style" outlines preferences for various learning behaviors, including time, temperature, lighting, and structural options like group learning, individual learning, or mixed group learning with adults, peers, or alone.

III.I. VARK LEARNING STYLE MODEL

Learning style refers to the various methods a person uses to understand and remember new information. There are four main learning styles: Visual, Auditory, Read/Write, and Kinesthetic. Visual learners learn through seeing, using diagrams, flowcharts, pictures, and symbols. Auditory learners learn through listening, attending lectures, tutorials, and group discussions. Read/write learners learn through reading and writing, and university-style courses are suitable for these learners. Kinesthetic learners learn through doing, often using labs and tutorials. Learning styles are influenced by biological and developmental factors, and understanding them allows for personalized classrooms. Knowing a student's learning style can significantly impact their academic performance. Being aware of one's learning style can help maximize their learning potential.

Figure 2, shows four Types of Learning Styles: **V**isual, **A**uditory, **R**ead/**W**riting, Kinaesthetic.
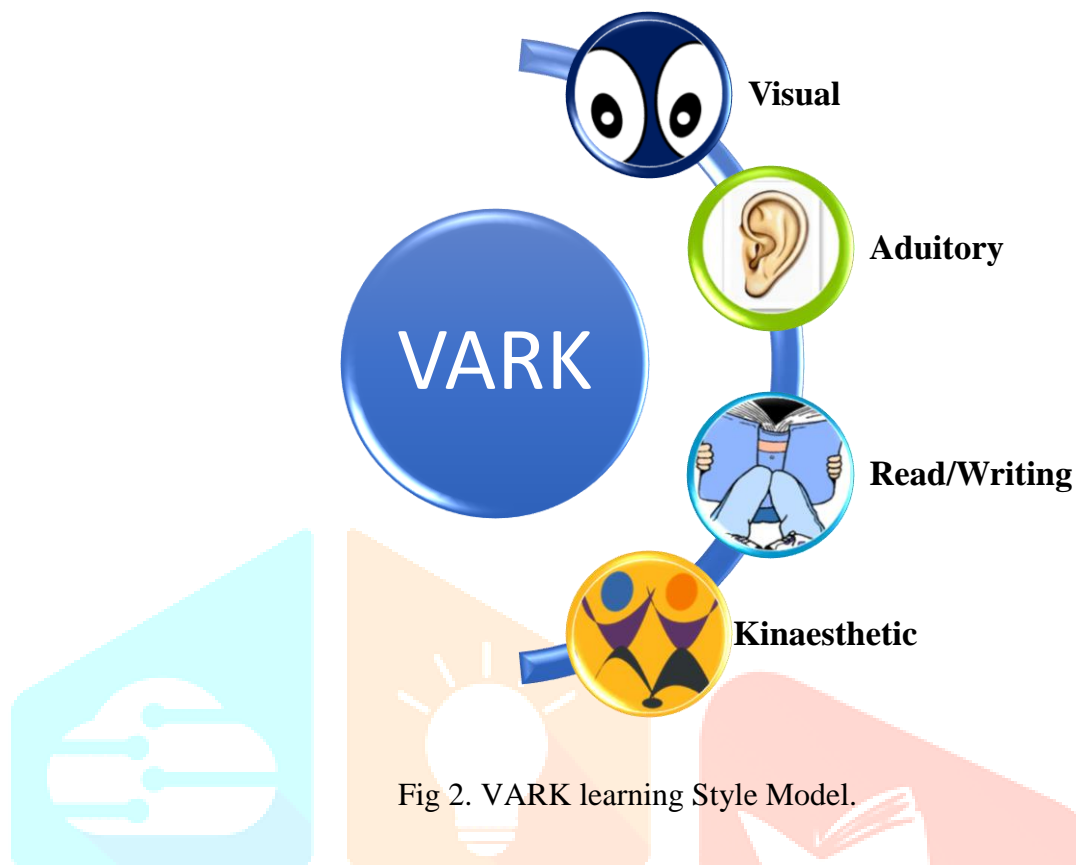

Fig 2. VARK learning Style Model.

Neil Fleming's VARK model, which includes visual, aural, read-write, and kinesthetic modes, emphasizes the importance of different learning styles. It uses a 16-question assessment tool to help users identify their preferences and enhance their learning. The model is available for free online and is popular due to its simple, easy-to-understand results. Fleming suggests that teachers should switch modes during instruction to appeal to all modes present in their classrooms. Students should learn difficult concepts in their preferred mode, practice concepts easily in other modes, and be trusted to explore multi-modal activities.

VARK principles emphasize that accommodating a student's learning preference can boost motivation. Teachers should first learn their personal learning preferences, as the educational system is deeply rooted in Read-Write. The most positive results from VARK come when teachers are matched with students with similar mode preferences. The following figure summarizing the VARK learning styles and their characteristics:

Visual (V) | Learn by sight

- Visual learners preferring visual aids, images, color-coding, and strong aesthetics, and benefits from watching videos and demonstrations.

Auditory (A) | Learn by hearing

- Auditory learners learn best through verbal communication. They prefer lectures, discussions, and audio materials.

Read/write (R) | Learn by read and write

- These learners absorb information best when presented in text form. They enjoy reading and taking notes.

Kinesthetic (K) | Learn by touch

- Kinesthetic learners are tactile and experiential. They prefer hands-on activities and learn by doing.

Fig 3. VARK learning styles and their characteristics

IV. PSYCHOLOGICAL ASPECTS OF VARK LEARNING STYLES IN BLENDED LEARNING

Blended learning is a balanced approach that integrates multiple learning styles, ensuring a holistic and enriching education for all VARK students by incorporating various resources and approaches. Recognizing VARK learning styles in Blended learning enhances students' engagement, motivation, self-efficacy, and confidence, contributing to their overall psychological well-being. Instructors' recognition of diverse learning styles fosters a positive learning environment, promoting a sense of belonging and inclusivity. The psychological aspects of VARK learning styles are crucial to the success of blended learning. By recognizing and accommodating diverse student preferences, educators can create inclusive and effective learning environments. Integrating the VARK model with modern instructional design empowers students to take charge of their learning, making education more engaging and meaningful. VARK learning styles in Blended learning may offer several key benefits such as follows:

o Blended learning and VARK learning styles enable personalized learning experiences. Students can identify their preferred learning style, taking control of their education and accessing resources that align with their strengths. This fosters self-confidence, intrinsic motivation, and deeper understanding. Tailoring instruction to individual preferences makes the learning experience more personal and effective, promoting deeper understanding and retention of knowledge.

o Blended learning can boost student engagement by incorporating VARK learning styles. By offering diverse materials and activities, educators can cater to different learning preferences, such as visual or auditory learners. This customization increases motivation and active participation. Using visual aids, group discussions, written tasks, and hands-on activities for visual learners, auditory learners, and kinesthetic learners can keep students interested and motivated.

o VARK learning styles enable collaboration and differentiation in Blended learning, promoting social interaction, communication, and teamwork. Educators can differentiate instruction by providing diverse learning materials, ensuring effective content access for all students.

o VARK learning styles enhance knowledge retention by aligning students' learning methods with their preferences, particularly in Blended learning environments where students have greater responsibility for their learning.

o Blended learning promotes inclusivity by accommodating diverse learning styles, allowing each student to excel in their unique way.

o The VARK model promotes self-awareness among students, enabling them to understand their preferred learning style, develop strategies to utilize their strengths, and address their weaknesses, a skill that is crucial for future success.

V. CHALLENGES AND CONSIDERATIONS OF VARK LEARNING STYLES IN BLENDED LEARNING

Blended learning is being implemented nationwide to develop 21st-century skills and subject-domain knowledge. It should not replace classroom time, and institutes should strive to be model institutions for successful implementation in higher education. VARK learning styles pose several challenges in Blended learning. Overgeneralization and stereotyping can lead to limiting outcomes, as students' learning preferences may vary across different subjects or contexts. Educators should recognize this and use VARK as a tool for understanding preferences rather than a definitive classification. Learning styles can evolve over time, so educators should be open to this and encourage self-assessment to help students identify their evolving preferences. Inclusivity and accessibility can be challenging, especially in Blended learning. Universal design principles should be used to ensure all students have access to resources and activities that cater to their learning styles. Time and resource constraints can be a challenge, but educators should prioritize those with the greatest impact and collaborate with colleagues to share resources and strategies. Balancing individual needs with group dynamics and curriculum requirements is also a challenge. Institutions should support technology integration while maintaining teacher preparedness and assessment validity and fairness. To overcome these challenges, educators should promote flexibility, provide diverse resources and activities, ensure accessibility, and encourage collaboration among students with different learning styles.

Another challenge is cultural and societal factors, student motivation and engagement, resource availability and equity, psychological and emotional factors, feedback and self-reflection, data privacy and security, and parental involvement. Educators and experts must recognize these factors, encourage intrinsic motivation, provide equitable access to technology, and ensure data privacy and security. Providing a supportive learning environment, providing regular feedback, and ensuring parental involvement can help students adapt to their learning styles. A multifaceted approach is essential for ensuring successful Blended learning.

VI. CONCLUSION

The present article discusses the benefits of incorporating VARK learning styles in Blended learning, emphasizing personalized learning experiences, enhanced engagement, and inclusivity. However, challenges such as overgeneralization, resource accessibility, and the need for teacher preparedness should be addressed. Balancing technology integration and face-to-face contact is crucial for successful Blended learning.

Students' learning styles in blended learning environments, offering new perspectives for researchers, policy makers, and practitioners. It highlights the use of machine learning algorithms to explore learning styles and the delicate interactions between blended learning, academic disciplines, and learning styles. Policy makers can use this analysis for personalized educational policies, while practitioners can promote student-centered, tailor-made teaching (Hu, Peng, Chen, & Yu, 2021). Blended learning is a design construct that offers benefits to students, but it should be balanced with accessibility and flexibility. Face-to-face contact can be costly and difficult, but it's valuable in complex communication. The cost-benefit analysis from Heller (2010) highlights the value of face-to-face contact in complex communication, especially in business and knowledge-intensive areas. Balancing this with accessibility and flexibility is the goal of educational providers, aiming for maximum quality.

VARK learning styles provide valuable insights into student preferences in Blended learning. However, achieving a successful learning environment requires flexibility, inclusivity, ongoing teacher training, and a focus on individual growth. The goal is to provide a diverse learning experience, promoting lifelong learning. Incorporating VARK learning styles in blended learning enhances student engagement, promotes personalized experiences, fosters collaboration, and differentiates instruction. Balancing accommodating students' preferred learning styles with diverse methods is crucial. By leveraging VARK learning styles, educators can create a dynamic and inclusive learning environment.

VII. SUGGESTION FOR FURTHER RESEARCH ON VARK IN BLENDED LEARNING

Future research on VARK learning styles in blended learning can explore how students' learning preferences might change over time due to their exposure to this approach. It's important to understand if these changes affect their academic success and motivation. Additionally, studying how parents can support their children's learning styles in blended learning and applying VARK principles in K–12 education for personalized learning experiences would be valuable research areas.

VIII. ACKNOWLEDGMENT

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