

The impact of Differentiated Instruction Using VARK theory to Improve English Writing Proficiency of Tribal Learners in Kerala

Mini R G^{*1}, Dr. S. Florence²

^{*1}Ph. D Research Scholar, Department of English, Annamalai University, Chidambaram, Tamil Nadu, India. Email: minivijay143@gmail.com

²Professor, Department of English, Department of English, Annamalai University, Chidambaram, Tamil Nadu, Kerala. , florencejeyaraaj11@gmail.com

Abstract

This study examines the effectiveness of differentiated instruction using VARK (Visual, Auditory, Reading/Writing, Kinesthetic) model to improve English writing skills among tribal students in the Idukki district of Kerala, India. These tribal students are experiencing challenges due to factors like poverty, linguistic barriers, and cultural isolation from traditional teaching methods like direct method. The primary objective of this study was to determine if an instructional approach tailored to individual learning styles could enhance the writing abilities of these marginalized students. A pre-test was conducted to 105 tribal students from grades 8 and 9 to check their writing skills, and they were grouped based on their VARK learning preferences after that. Over a ten-day intervention period, each group received instruction on key English grammar concepts through methods aligned with their specific learning style, such as visual charts, auditory discussions, written assignments, and kinesthetic role-playing. Following the intervention, a post-test were used to measure improvements in writing skills. Statistical analysis using a paired t-test showed a significant improvement in writing scores, with the mean score rising from 25.37 to 43.83. The findings suggest that a VARK-based differentiated approach is a powerful tool for enhancing academic performance and fostering a more inclusive and engaging learning environment for students in such contexts.

Keywords: Tribal students, Differentiated instruction, VARK model, English writing skills, Educational intervention, Learning styles, Idukki, Kerala.

1.1 Introduction

In India, education continues to be a powerful instrument of social transformation, but access and quality still vary widely across regions and communities. The tribal communities, particularly those in remote areas like the Idukki district of Kerala, often face educational disadvantages due to geographic isolation, poverty, linguistic diversity, and lack of exposure to modern teaching methods. Among the many subjects tribal students struggle with, English remains one of the most challenging due to its limited practical use in their daily lives and the traditional methods used to teach it. As Carol Ann Tomlinson notes, “Effective teachers don’t teach differently to different students they teach responsively to the differences students bring to the classroom” (Tomlinson, 2015).

The tribal children in Idukki, a district located in the central part of Kerala, are an integral part of the region's diverse social and cultural fabric. These children belong to several indigenous tribal communities, each with its distinct way of life, cultural practices, and learning methods. Understanding their unique traits, lifestyle, and educational challenges is vital to improve their educational outcomes, particularly in subjects like English. The tribes of Idukki, including the Muthuvans, Mannans, Malayarayangans, and others, live in isolated and inaccessible areas, making their educational journey significantly different from the mainstream (Bir Bahadur, 2020). They are connected to nature, live in close-knit communities, and depend heavily on agriculture, forest products, and animal husbandry for survival. These children are raised in environments that place high value on oral traditions, practical skills, and community cooperation. Paulo Freire argues, “Education must begin with the solution of the teacher-student contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers and students” (“An Excerpt From Pedagogy Of The Oppressed by Paulo Freire,” 2021). This notion is particularly relevant in culturally rooted communities like these.

Culturally, the tribal children in Idukki are disconnected from the mainstream educational system, which is based on urban-centered knowledge and values. The formal educational system in Kerala does not always take into account the cultural traditions, oral knowledge, and community-based learning that are central to the lives of the tribal children. The tribal children are raised in environments where learning is often experiential and based on practical skills. They learn from elders through oral storytelling, direct participation in community activities, and hands-on experiences such as farming, foraging, and animal husbandry. These learning methods are very different from the rote memorization and textbook-based instruction typically used in schools. This cultural disconnection leads to feelings of alienation among the tribal students. “As Bruner famously asserted, “any subject can be taught effectively in some intellectually honest form to any child at any stage of development”, emphasizing the need for curriculum adaptability.” (Jerome S. Bruner, 1966) “Amartya Sen argues, Education is among the most important instruments for human capability. It empowers individuals to lead lives they have reason to value.” (Bustos & Fabiany, 2025). The tribal children experience a lack of understanding

or even discrimination from their teachers and peers, which lower their self-esteem and hinder their academic progress. The economic factors also play a significant role in the education of the tribal children in Idukki. Many tribal families live in poverty, and education is not given a priority. In these communities, the children are expected to contribute to household activities such as farming, animal care, and the collection of forest products. This means that many tribal children miss school or drop out to assist their families with these responsibilities. Furthermore, the cost of education, including expenses for uniforms, textbooks, and transportation, are prohibitive for many tribal families. This economic strain perpetuates the cycle of poverty in tribal communities.

1.2 English as a gateway to Academy

Language, especially English, is the gateway to all learning, highlighting how a lack of English proficiency can limit children's access to knowledge and opportunities. English is a gateway to academic excellence, especially in subjects like Science, Mathematics, Computer Education, and Social Studies. In many schools, particularly in upper grades and competitive exams, English is the medium of instruction. Without fluency in English, the tribal students face significant barriers in understanding the core concepts, which negatively impacts their performance. As Jim Cummins explains, "Language proficiency is not just a cognitive skill; it is a tool for accessing academic content and participating in educational discourse" (Cummins, 2000). The issue becomes more acute when the students move to high school and college. The entrance exams for professional courses such as Medicine, Engineering, and Law are mostly conducted in English or expect comprehension of English-based questions. The students with a weak foundation in English find it difficult to prepare for these exams, which reduces their chances of gaining admission to reputed institutions. Cummins notes, "If a child's academic language proficiency (CALP) is not adequately developed, then assessments of their content knowledge will likely reflect their limited command of the language of instruction rather than their true understanding of the subject matter" (*BICS and CALP*, 2025).

As John Dewey observes, "Education is not preparation for life; education is life itself" (Dou, 2025). This understanding is essential to rethink how education can be made meaningful to tribal students. But the education status on ground in Idukki is different. The dropout rate among tribal children in Idukki is a major concern. Many children who attend school up to the primary level do not continue their education beyond that. The reasons for this high dropout rate are multifaceted, including the challenges of accessing school, language barriers, cultural disconnect, economic constraints, and a lack of motivation. The tribal children drop out of school because they fail to see the relevance of the education being offered.

Cummins emphasizes that "A strong foundation in the first language is key to acquiring a second language" (Cummins, 2000), suggesting that bridging the gap between tribal students' native languages and English is essential for their academic success. Literacy among tribal children is critically low, and this gap significantly hampers their educational progress. While much focus has been placed on the challenges these students face, it is equally important to explore how to improve the methods used to teach them, ensuring they receive the quality education they deserve. This study focuses on the writing skills of tribal children in Kerala, identifying writing difficulties as a major barrier to their academic success. The inability to write effectively in English directly affects their performance across subjects and hinders their overall educational attainment.

2.1 Review of literature

2.1.1 Validity of VARK theory

Recent research has raised significant doubts about the effectiveness of learning styles as a pedagogical approach. Studies by Pashler et al. (2009), Willingham et al. (2015), and several other scholars have consistently shown that tailoring instruction to presumed learning styles does not lead to improved educational outcomes when compared to evidence-based instructional practices. As a result, many researchers now question the validity and practical value of learning styles in formal education. However, given the unique sociocultural and educational contexts of marginalized groups, it remains relevant to explore whether such approaches hold any potential benefits in specific settings. In this study, the focus is on tribal students in Kerala, examining whether learning styles have any role in addressing their distinctive educational needs and supporting more inclusive learning experiences

The conference paper "*Exploring the VARK Model: A Review of the Validity and Reliability of the Questionnaire and Its Relationship to Learning Outcomes*" (Tomić, Ćurić, & Rastovski, 2023) provides a comprehensive evaluation of the VARK learning style model and its effectiveness as a tool for understanding individual learning preferences. The authors analyzed forty studies from various fields, including medicine, kinesiology, and economics, to assess how valid and reliable the VARK questionnaire is for identifying visual, auditory, reading/writing, and kinesthetic learning preferences. The paper highlights that the VARK questionnaire has been widely accepted as both valid and reliable for measuring learning style preferences. It also points out that these preferences can influence academic performance and engagement, although the relationship is not straightforward. Factors such as age, gender, and cultural background may play significant roles in shaping learning styles, making the connection between learning preference and achievement complex and context-dependent. Importantly, the paper emphasizes that no single teaching approach can suit all learners. Instead, educators should consider students' diverse learning preferences when designing lessons and materials. The findings suggest that aligning instructional methods with learners' VARK profiles can enhance understanding, motivation, and participation. However, the authors caution against overgeneralization, noting that multiple variables influence

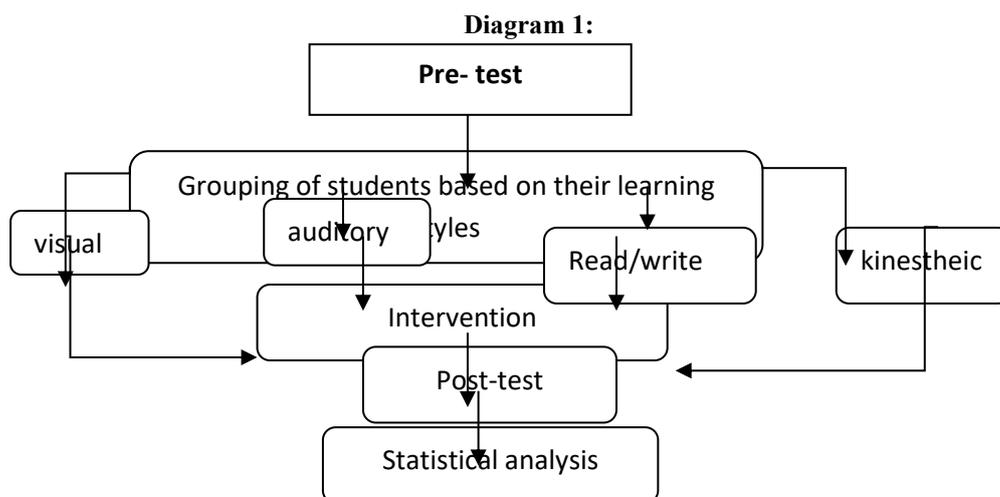
learning outcomes. Overall, this review reinforces the importance of recognizing individual differences in education and supports the thoughtful integration of VARK-based strategies to make teaching more inclusive and effective.

The article *“Development of VARK Learning Styles Assessment Instrument for Secondary School Students”* by Akilu Isma’il and Umar Sodangi (2025) focuses on creating and validating a new version of the VARK Learning Style Inventory specifically designed for secondary school learners. Using a research and development design, the authors applied the 4-D model along with the Oriondo and Dallo-Antonio framework to construct the VARK-LSI-SS instrument. A total of 278 students from different school types and academic levels were selected through multistage sampling. The study established strong content validity using Aiken’s V ($V = 0.87$), confirming expert consensus on the relevance of each item. Exploratory Factor Analysis supported the four-factor structure of Visual, Auditory, Read/Write, and Kinesthetic learning styles, explaining 65.6% of the total variance. The instrument also demonstrated high internal consistency, with Composite Reliability values ranging between 0.75 and 0.85 and AVE values from 0.53 to 0.71. Fleiss’ Kappa ($\kappa = 0.18-0.32$) indicated fair to moderate inter-rater reliability. The VARK-LSI-SS proved to be a valid and reliable tool for assessing learning style preferences among secondary students. The authors recommend its use in future research to explore its influence on academic achievement, learner engagement, and instructional effectiveness in classroom settings.

3.1 Method

As Goh points out, "The lack of proficiency in writing can undermine academic performance" (Goh, 2002), emphasizing the broad impact that poor writing skills can have on students' academic careers. In light of this, the study explores the potential of differentiated instruction, particularly using VARK (Visual, Auditory, Reading/Writing, Kinesthetic) theory, to improve writing skills in these students.

Tomlinson argues that "Differentiated instruction helps students engage and succeed by aligning teaching methods with their learning preferences" (Tomlinson, 2014), making it a promising approach for addressing the diverse needs of tribal children and helping them overcome the challenges they face in learning English.



3.2 Assessment

The participants in this study were tribal students enrolled in 8th and 9th standards across various tribal schools in Idukki district. A total of 105 students participated, representing a diverse group from several educational institutions within the tribal community. The primary task of the research was to identify the learning style of each student. To achieve this, students were given a VARK-based questionnaire and directed to choose the most suitable response for each item. The study employed a structured questionnaire for data collection, consisting of 24 carefully crafted questions based on Neil Fleming’s VARK model designed to evaluate participants' preferences for learning styles. As Fleming notes, "Understanding individual learning styles is key to tailoring effective educational strategies" (Fleming, 2001). The questionnaire encompassed four components corresponding to visual, auditory, read/write, and kinesthetic learning styles, with six questions dedicated to each section. Participants responded using a Likert-scale format, rating their preferences from "Always," "Often," "Sometimes," "Rarely," to "Never."

Following the questionnaire, a series of experimental tasks were conducted to further validate the students' learning style preferences:

Table 1: Learning Style Assessments

Learning Style	Assessment Activity	Description	Supporting Reference
Visual	50 objects were placed on a table and displayed for 5 minutes. Participants wrote down as many as they could remember.	Tested the ability to process and retain visual information.	Reid notes that visual learners perform better when information is presented through images and spatial arrangements (Reid, 273).
Auditory	Names of 50 objects were recited five times. Participants wrote down as many as they could recall.	Measured ability to process and retain information through listening.	Based on auditory processing and verbal recall principles.
Read/Write	A written list of 50 objects was given. After a 5-minute gap, participants recalled and wrote the items.	Assessed the ability to absorb and retain written information.	Aligns with preferences of learners who process through reading and writing.
Kinesthetic	A scavenger hunt with 50 hidden objects. Participants found and recorded them.	Measured ability to learn through hands-on, experiential activities.	Dunn and Dunn highlight kinesthetic learners thrive when moving, touching, and experiencing (Dunn & Dunn, 229).

Table 2: Learning Style Distribution of 105 Children

Learning Style	Number of Students	Percentage	Description
Visual	26	24.8%	These students preferred processing information through images, diagrams, and spatial arrangements.
Auditory	13	12.4%	These students learned best when information was presented verbally.
Read/Write	13	12.4%	These learners processed information most effectively through written text.
Kinesthetic	42	40.0%	The largest group; they thrived on hands-on, movement-based, and experiential learning.
Multimodal	11	10.5%	These students combined two or more learning styles depending on the context.
Total	105	100%	Represents the full sample of participants.

Upon further analysis, it was observed that all 11 multimodal learners exhibited a strong preference for kinesthetic learning. To simplify the project's focus and accommodate this overlap, the multimodal learners were incorporated into the kinesthetic learning group for further study.

Table 3: Revised Learning Style Distribution of 105 Children

Learning Style	Number of Students	Percentage	Description
Visual	26	24.8%	These students preferred processing information through images, diagrams, and spatial arrangements.
Auditory	13	12.4%	These students learned best when information was presented verbally.
Read/Write	13	12.4%	These learners processed information most effectively through written text.
Kinesthetic (includes multimodal)	53	50.5%	The majority of learners; they thrived on hands-on, movement-based, and experiential learning, including those with blended/multimodal tendencies.
Total	105	100%	Represents the full sample of participants.

This adjustment allows for a more streamlined approach to investigating the learning needs and preferences of the kinesthetic group. To initiate the instructional process, a pre-test was administered to the 105 students to gauge their writing skills. This preliminary assessment provided invaluable insights into the students' strengths and weaknesses, thereby informing the subsequent differentiation process. As Black and Wiliam state, "Pre-assessments allow teachers to design instruction that meets students at their current level of understanding" (Black and Wiliam, 1998). Understanding the baseline capabilities helped in customizing teaching strategies to bridge the gaps effectively.

Following the pre-test, the 105 students were differentiated based on their distinct learning styles, which were categorized into four primary groups: visual, auditory, read/write, and kinesthetic learners. The instructional approach was carefully adapted to cater to these different groups, based on the principles of VARK theory. As Fleming rightly asserts, "VARK acknowledges the different ways individuals absorb, process, and retain information, and promotes educational practices that respect these differences" (Norasmah and Amiruddin, 2025) . Recognizing that not all students learn the same way was crucial for designing a successful intervention.

To ensure that all learners could engage meaningfully with the content, a variety of instructional strategies were employed. Visual learners were supported through diagrams, flowcharts, and graphic organizers, which helped to concretely represent abstract grammar rules. Auditory learners benefited from listening activities such as audio recordings, podcasts, and oral discussions, allowing them to internalize grammar through sound. Read/write learners were given ample opportunities with written texts, worksheets, and structured reading assignments to reinforce their understanding. Kinesthetic learners, on the other hand, engaged in hands-on activities, role-playing, and simulations that connected language learning to movement and action.

Among these, kinesthetic learners formed the largest group, comprising 53 students, including 11 multimodal learners. As Dunn and Dunn explain, "Kinesthetic learners acquire knowledge best through real-world experiences and interactive tasks" (Banaruee, Farsani, and Khatin-Zadeh 2022). To meet their needs, the instructional plan incorporated activities that involved physical engagement, such as dramatizations of daily life scenarios, crafting projects where language and creativity intertwined, and interactive games that reinforced grammar in a playful, memorable way. Role-playing activities allowed students to simulate conversations, promoting practical usage of grammatical structures, while simulations and storytelling linked academic learning with cultural relevance.

By acknowledging and respecting the diverse learning needs of the students, the instructional process aimed to foster an inclusive and dynamic environment. This approach not only enhanced academic achievement but also helped in building students' confidence, creating a positive association with language learning that could support their broader educational development.

The instructional content focused on the following English grammar concepts:

1. Simple and Continuous Tenses: Students learned to identify, form, and use simple and continuous tenses in sentences.
2. Articles: Instruction covered the proper use of definite and indefinite articles in context.
3. Prepositions: Students learned to recognize and use common prepositions correctly.
4. Kinds of Sentences: Instruction included identifying and constructing different types of sentences, such as declarative, interrogative, imperative, and exclamatory sentences.
5. Forming Questions: Students learned to form questions from simple and continuous tenses.

3.3 Post-Test

A combination of multiple-choice, fill-in-the-blank, and short answer questions were distributed to students to check writing skills.

4.1 Results

To evaluate the effectiveness of the instructional intervention, quantitative analysis was performed on pre- and post-intervention data collected via Likert-scale questionnaires. The following steps were employed:

A paired-samples t-test was conducted to compare pre- and post-intervention means for writing skills.

Key outputs:

t-value: Indicated the magnitude of difference between pre- and post-scores. p-value: Determined statistical significance ($\alpha = 0.05$). A p-value < 0.05 implied that observed improvements were unlikely due to chance.

Table 4: T tests

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	w.s.pre - w.s.post	-18.37143	3.72687	0.36371	-19.09267	-17.65019	-50.512	104	0

The principal objective of the study is to determine whether the pedagogical strategies implemented significantly enhance the writing abilities of the participants. A structured approach was followed, wherein each student was administered a set of paper before the intervention and the same after its conclusion. The first of these papers was a written examination, evaluated on a scale of 50 marks, intended to examine the students' basic writing competence. According to Black and

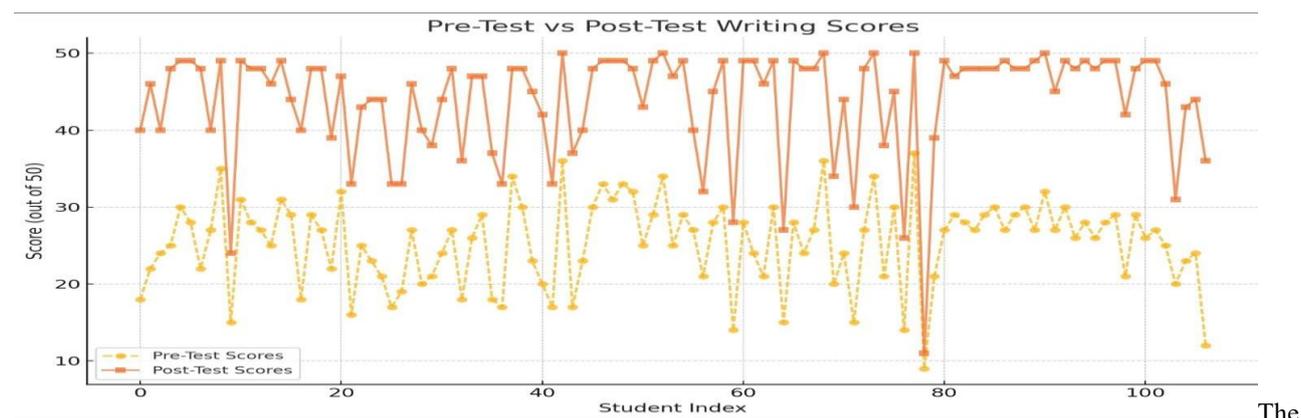
Wiliam, "assessment plays a central role in improving classroom learning", reinforcing the value of this pre-assessment (Aljoudi 2019).

Once the teaching intervention was over, students were once again asked to complete the same set of questions. The post-test written examination, marked on the same 50-point scale, served as a critical measure of improvement. As Hattie argues, "Feedback is powerful when it reduces the gap between where the student is and where s/he is meant to be" reinforcing the study's methodological approach (Sandal and Sperle 2024).

Table 5: pre and post-test written examination, marks

Score Range	Pre-test Count	Post-test Count
10–20	20	1
21–30	69	5
31–40	15	23
41–50	0	76

In terms of statistical analysis, a dependent or paired t-test appeared as the most suitable method to evaluate the significance of differences between pre-test and post-test scores. Since the same group of students were tested twice once before and once after the intervention the paired t-test allowed for direct comparison of the two sets of scores. In this context Pallant states that, "The paired-samples t-test (also called the dependent-samples t-test or the matched-samples t-test) is used for within-subjects designs where each participant provides two data points (e.g., before-and-after measurements, or scores under two different conditions)." (Pallant, 2020). Upon analyzing the data, the mean score for the pre-test was calculated to be 25.37, while the mean score for the post-test rose significantly to 43.83.

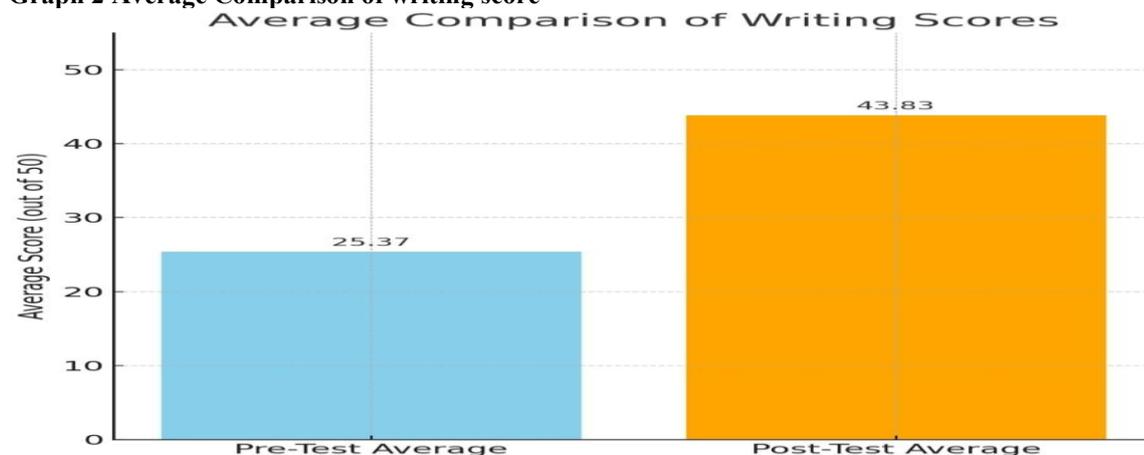


dramatic improvement in the students' writing performance is attributed largely to

Graph 1 Student Index

the differentiated instructional strategies implemented through the VARK learning model.

Fleming asserts that "the use of learning strategies that are aligned with a modality preferences is also likely to lead to persistence learning tasks, a deeper approach to learning, active and effective metacognition" (Fleming. 2001). By tailoring the intervention to accommodate various learning preferences like visual, auditory, reading/writing, and kinesthetic, the program ensured that students could engage with the material in ways that resonated with their individual strengths. The visual learners benefited from diagrams, mind maps, and visual organizers. Here Paivio explains, "Imagery can facilitate learning by creating dual pathways for encoding information" (Paivio, 1990). The auditory learners found value in discussions, verbal instructions, and listening exercises. For reading/writing learners, written handouts, model texts, and reflective journals helped them replicate language structures effectively. The kinesthetic learners were engaged through hands-on activities, such as sentence-building games and role-plays.

Graph 2 Average Comparison of writing score

The results of the pre and post test are literally shocking, because it shows significant improvement in post test. The pre test average is just 25.37 but the post test average is 43.83. This drastic increase shows the effectiveness of new intervention and how it affects the overall learning experience of the students. The VARK based differentiation model not only enhances writing skills but also foster a more inclusive classroom environment. It ensures all students are equally supported and challenged. This makes the students motivated and helps them to maximize their outputs.

Discussion

The analysis of the pre-test and post-test data on writing skills among the tribal students in Idukki district, Kerala, reveals significant improvements in student performance after the intervention using differentiated instruction using VARK theory. The paired t-test results show a mean difference of -18.37 between the pre- and post-test scores, indicating that students scored substantially higher after the teaching using VARK theory and differentiated instruction. The negative sign reflects the subtraction of post-test scores from pre-test scores, and in this context, a more negative value represents a greater improvement. The standard deviation of 3.73 suggests that although there was some variation in the level of improvement among students, the changes were generally consistent. The standard error of the mean, at 0.36, is quite low, signifying that the mean difference is a reliable estimate of the populations' mean difference. With a t-value of -50.512 and a p-value of 0.000, the results are statistically significant at any conventional level, confirming that the improvement in writing skills is not due to chance.

The 95% confidence interval for the mean difference ranges from -19.09 to -17.65, further underscoring the reliability of the results. This narrow interval suggests a high degree of certainty that the true mean difference lies within this range, indicating a substantial and consistent improvement in the writing skills across the student group. The number of degrees of freedom, 104, corresponds to the number of students in the sample minus one, indicating that the analysis was conducted on a group of 105 students. This sample size lends to additional weight to the findings, as it is large enough to yield statistically robust conclusions.

Perhaps the most compelling piece of evidence comes from the correlation coefficient, which is 0.852. This high positive correlation between pre-test and post-test scores suggests that while all the students improved, those who performed relatively better in the pre-test continued to do well in the post-test. This continuity implies that the intervention did not merely uplift the weaker students or focus only on low achievers but also enhanced the abilities of students who already demonstrated some level of proficiency. As Tomlinson states, "Differentiated instruction is the process of recognizing and then responding to students' varying readiness levels, learning preferences, and interests in order to maximize student engagement and achievement" (Tomlinson, 2014). The strong correlation also indicates that the improvement was built upon existing knowledge and skills, reflecting a reinforcement and deepening of previously acquired competencies.

The context in which this intervention was implemented adds further depth to the interpretation of the results. The students involved in the study are from tribal communities in Idukki, a region where access to quality education and individualized learning opportunities are limited. The traditional classroom teaching methods, which often rely heavily on lecture-based, one-size-fits-all approaches, are not well-suited to the diverse learning needs of these students. By introducing the differentiated instruction based on the VARK learning styles model catering to the visual, auditory, reading/writing, and kinesthetic learners the intervention provided multiple entry points the learning process, thereby enabling more students to engage with and internalize the material. Neil Fleming, the originator of the VARK model, explains, "VARK is designed to be a starting place for a conversation among teachers and learners about learning" (Fleming, 2001).

The improvements in writing skills observed here are not just quantitative changes; they reflect the qualitative transformations in the students' approach to writing. Writing is a complex cognitive activity that involves organization of ideas, vocabulary use, sentence structure, and grammatical accuracy. The VARK-based differentiated instruction provided varied strategies for understanding and practicing these components. For example, the visual learners benefited from

diagrams and visual organizers for planning essays, the auditory learners from discussions and oral storytelling, the kinesthetic learners from interactive and hands-on writing activities, and the reading/writing learners from traditional exercises and reflective journals. These tailored strategies allowed each student to engage with the writing process in a way that resonated with their preferred learning style, making the experience more meaningful and effective. As Gardner observes, "The human mind is not a single entity but rather a collection of relatively autonomous intelligences, each of which can be cultivated through appropriate instructional strategies" (Gardner, 2011).

Moreover, the improvement in writing skills is interpreted as a sign of increased confidence and motivation among the students. The students from marginalized communities like the tribal populations of Idukki struggle with self-esteem in the academic settings. The success in writing, a skill closely tied to academic achievement and expression, serve as a powerful motivator and confidence booster. The consistent and significant improvement observed in the data suggests that the students not only learned the mechanics of writing but also began to see themselves as capable writers. As Bandura notes, "Self-efficacy beliefs are key determinants of how people think, behave, and feel, and an increase in perceived capability can lead to enhanced motivation and achievement" (Bandura, 1997).

Another important dimension to consider is the potential for long-term impact. The writing skills are foundational to almost all the academic subjects and are essential for future educational and professional opportunities. By improving these skills through a differentiated approach, the intervention not only addressed immediate learning gaps but also equipped students with tools they can use across disciplines and over time. The long-term benefits include better performance in subjects that require written expression, enhanced critical thinking, and improved ability to communicate ideas effectively. As Vygotsky theorized, "Learning which is oriented toward developmental levels that have already been reached is ineffective from the viewpoint of the child's overall development. It does not aim for a new stage of the developmental process but rather lags behind this process" (Vygotsky, 1978). This approach to teach writing allowed the students to move forward beyond their current level and realize the new potential.

The data also invites reflection on the role of the teacher and the classroom environment. Implementing a differentiated instruction model requires a significant shift from traditional teaching philosophy. It demands that educators move away from uniform delivery methods and embrace a more flexible, student-centered approach. The success of this intervention suggests that the teacher or teachers involved were not only able to understand the diverse needs of their students but also adapt their teaching methods accordingly. This adaptability is crucial in settings where students face multiple barriers while learning. The teachers' role, therefore, is not merely to deliver the content but also to act as a facilitator who creates conditions for learning that are inclusive, responsive, and empowering. As Dewey asserted, "Education is not preparation for life; education is life itself" (Dewey, 1938), reminding that the teaching methods must be dynamic and responsive to the students' real contexts.

From a policy and administrative perspective, these findings offer a strong argument for the adoption of differentiated instruction in schools teaching tribal and other marginalized populations. The clear improvements in a key academic skill area, achieved through a relatively straightforward pedagogical change, demonstrate the potential for systemic impact. By investing in teacher training, providing appropriate materials, and fostering a culture of responsive teaching, educational authorities can replicate these results across other schools and districts.

The analysis of pre- and post-test data on writing skills among the tribal students in Idukki following a differentiated instruction intervention shows significant and meaningful improvements. The high t-value, low p-value, narrow confidence interval, and strong correlation collectively indicate that the improvement is not only statistically significant but also educationally impactful. The results reflect both cognitive gains in writing ability and affective gains in confidence and engagement. They point to the effectiveness of VARK-based differentiated instruction as a method for addressing diverse learning needs, especially in marginalized educational contexts. By recognizing and responding to individual learning preferences, this approach not only improves academic outcomes but also fosters a more inclusive, motivating, and empowering learning environment.

While the outcomes of the intervention are highly encouraging, it is important to acknowledge the study's limitations. The absence of a control group means that the influence of external variables such as access to supplementary resources or parallel learning experiences cannot be entirely discounted. Field explains, "Without a control group, the results of an intervention study may be affected by extraneous factors" (Field, 2024). Nonetheless, the scale of the improvement and the consistency across both qualitative and quantitative data suggest that the differentiated VARK-based approach played a major role in driving these outcomes. Tomlinson states that, "Differentiated instruction has been shown to lead to significant improvements in both engagement and achievement" (Tomlinson, 2014). Future research could strengthen these findings by incorporating a control group to more precisely measure the direct impact of the intervention.

Conclusion

The educational scenario in many tribal regions, including Idukki, is often marked by disparities. Students in such areas commonly face structural disadvantages including poverty, linguistic barriers, cultural marginalization, lack of access to quality educational materials, and undertrained teachers. These factors contribute to a chronic underperformance in standardized academic benchmarks when compared to their urban or non-tribal peers. Before implementing the instructional intervention, a pilot study was conducted which revealed that the tribal students in Idukki were performing significantly below average in English grammar and writing tasks. These findings clearly underscored the urgency of

adopting an inclusive and personalized educational method, prompting the design of a differentiated instruction model based on the VARK theory. The intervention spanned ten days and focused on key English grammar topics, including kinds of sentences, the use of articles, demonstratives, the first six tenses, and the formation of questions. The teaching strategy consciously integrated all four components of the VARK model. Visual learners benefitted from colorful grammar charts, sentence maps, and infographics. Auditory learners participated in storytelling sessions, group discussions, and teacher-read grammar explanations. For reading/writing learners, handouts, grammar workbooks, and essay writing tasks were provided. Kinesthetic learners, who learn best through movement and hands-on activity, engaged in role-play, sentence building with physical word cards, and group games that required constructing grammatically correct responses. The diversity of instructional methods ensured that every learner had access to content in a form that best suited their cognitive preferences. Prior to the instructional period, a written examination was administered to evaluate the students' initial grammar proficiency and writing skill. Following the differentiated instruction period, a post-test was conducted using the same tools. The results showed clear and statistically significant improvements across all variables. Statistical analysis was carried out using the paired t-test, a method suitable for comparing the means of two related groups in this case, the same group of students before and after the intervention. The most remarkable result was observed in writing skills. The t-value of 50.512 and a p-value of 0.000 indicated that the improvement in writing scores before and after the intervention was statistically significant. The correlation coefficient of 0.852 further revealed a strong positive relationship between the application of differentiated instruction and improvement in writing abilities. This is a noteworthy finding, as writing skills are a complex and integrative outcome of grammar comprehension, vocabulary acquisition, sentence structure understanding, and cognitive processing. The improvement suggests that when students are taught using methods that align with their learning styles, they are better able to internalize rules, express ideas, and articulate thoughts coherently. Freire states, "Education either functions as an instrument which is used to facilitate integration into the logic of the present system and bring about conformity, or it becomes the practice of freedom, the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world." (Freire, 2000). This growth in writing ability also reflects deeper cognitive engagement. Writing, especially in a second or third language, requires more than mechanical knowledge of grammar. It demands comprehension, sentence planning, and creative expression. That tribal students, who may have limited prior exposure to English, were able to make such strides in just ten days suggests that their underperformance was not due to intellectual incapacity, but rather to the limitations of traditional teaching methods. Differentiated instruction, by contrast, empowered them with tools tailored to their cognitive strengths. Gove notes, "It is literally the case that learning languages makes you smarter. The neural networks in the brain strengthen as a result of language learning." (Gove, *The Guardian*, 30 Sept. 2011).

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