EFFECTS OF MOTHER-TONGUE INSTRUCTIONAL MODE ON PUPILS' INTEREST, ACTIVE PARTICIPATION AND ENGAGEMENT IN ALGEBRAIC WORD-PROBLEMS IN IREPODUN, KWARA STATE, NIGERIA

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Abstract
Cognitive outcomes such as achievement and retention often receive greater attention than affective outcomes like interest and participation, despite their importance for sustained learning. In Nigerian primary schools, mathematics is commonly taught in English, which many pupils do not speak at home, thereby limiting engagement. This study investigated the effects of mother-tongue (Yoruba) instructional mode on pupils' interest, active participation, and engagement in Algebraic word-problems in Irepodun, Kwara State, Nigeria. A quasi-experimental pre-test, post-test control group design was adopted due to the use of intact classes. The population comprised approximately 3,000 Primary Five pupils in Irepodun Local Government Area during the 2024/2025 academic session. A sample of 45 pupils (experimental = 25, control = 20) was drawn from two purposively selected public primary schools in Omu-Aran based on similarity in school characteristics, availability of Primary Five classes, predominance of Yoruba-speaking pupils, and willingness of the schools to participate. The instruments used for data collection were validated by experts in Mathematics Education and Educational Measurement and Evaluation. Data were collected using the Algebraic Interest Questionnaire (reliability = 0.82) and an Active Participation Observation Schedule (reliability = 0.79). The AIQ measured pupils' interest, while active participation and engagement were assessed through structured classroom observations rather than self-report. Independent samples t-tests were used to compare experimental and control groups, while Pearson correlation and independent t-tests were used for within-group and gender analyses at 0.05 level of significance. Findings revealed that pupils exposed to Yoruba-medium instruction demonstrated significantly higher interest (Mean = 58.36 vs 56.80; p = 0.039) and active participation (Mean = 36.48 vs 31.95; p = 0.011) than those taught in English. A significant positive relationship was also found between interest and active participation in the experimental group. No significant gender difference in engagement was found. The study concluded that mother-tongue instructional mode enhances pupils' interest, participation, and engagement in mathematics. It was recommended that teachers create more opportunities for active participation and that teacher training programmes emphasize strategies for improving classroom engagement.

Keywords: Mother-tongue instruction; interest; active participation; engagement; algebraic word-problems; primary school; Nigeria.

Introduction

Cognitive outcomes like performance and retention have traditionally dominated educational research, receiving substantial attention from scholars, policymakers, and practitioners. However, affective outcomes like interest and engagement are equally important for long-term academic success (Tembe et al., 2020). A pupil may perform well on a test due to short-term memorization but still lack the interest needed to continue studying mathematics in subsequent years. Conversely, a pupil who develops genuine interest in mathematics may continue to engage with the subject voluntarily, leading to sustained learning and achievement over time.

Interest is defined as a psychological state characterized by engagement in or a propensity to

re-engage with specific content over time (Wong & Wong, 2019). This concept is further categorized into situational interest, which emerges from specific features of the learning environment, and individual interest, which reflects a stable disposition toward a particular domain. Fostering students' interest in mathematics should be a primary goal of mathematics education, as it can enhance academic performance, increase voluntary engagement with mathematical activities outside of school, and ease teachers' responsibilities in managing classroom behavior and motivation (Tembe *et al.*, 2020). Since interest influences learners' willingness to participate in classroom activities, it is closely related to active participation and engagement during instruction.

Active participation reflects behavioral investment in learning. It includes observable actions such as asking questions, contributing ideas during class discussions, participating in group activities, completing assignments, and connecting lessons to real-world applications. Engagement encompasses both behavioral and emotional dimensions of learning involvement. Engaged pupils are not merely present in the classroom; they are psychologically invested in learning activities and demonstrate sustained attention, effort, and positive affect toward the subject matter.

In Nigerian primary schools, mathematics is typically taught in English. For many pupils, particularly those in rural areas and public schools, English is a second or third language that they speak only in the classroom. At home and in their communities, they speak indigenous languages such as Yoruba, Hausa, or Igbo. This disconnect between the language of instruction and the language of everyday life creates significant barriers to learning, not only cognitive (Aina & Adeleke, 2018) but also affective (Alimi *et al.,* 2020). When pupils struggle to understand the teacher's words, they may experience frustration, embarrassment, and anxiety. These negative emotions can suppress interest and participation. Pupils who repeatedly fail to understand mathematics lessons may come to believe that they are not "good at math," developing fixed mindsets that discourage effort and persistence. They may disengage from classroom activities, stop asking questions even when confused, and lose motivation to study mathematics (Alimi *et al.,* 2020).

Mother-tongue instruction may address these affective barriers. The National Policy on Education (NPE) in Nigeria recommends the use of the mother tongue or the language of the immediate environment as the medium of instruction at the lower levels of basic education in order to enhance meaningful learning and effective communication in the classroom. When pupils understand the language of instruction, they feel more comfortable and confident in the classroom. They can follow explanations, ask questions when confused, and participate in discussions without fear of embarrassment. This positive emotional experience can foster

interest, increase participation, and promote sustained engagement with mathematics. Research supports this reasoning. Bacan (2025) found that using mother-tongue enhanced students' interest, attentiveness, and engagement. Moshaba (2020) reported that mother-tongue teaching promoted learners' interest toward mathematics, holistic development, and learner achievement. Popoola and Ayodeji (2022) found significant differences in attitude between students exposed to mother-tongue instruction and those not exposed. Galadi and Gara (2024) found that native language instruction significantly boosted the interest of students in science achievement.

However, most previous studies have focused on interest alone, neglecting active participation and engagement. Interest and participation, while related, are distinct constructs. A pupil may be interested in mathematics that is, may enjoy thinking about mathematical ideas and feel curious about mathematical problems yet still not actively participate in classroom activities due to shyness, lack of confidence, or cultural norms that discourage speaking in class. Conversely, a pupil may participate actively due to external pressures (such as grades or teacher expectations) without genuine interest. Understanding the relationship between interest and participation is crucial for designing instructional approaches that promote both.

This study is grounded in Jean Piaget's (1964) theory of cognitive development, which emphasizes that children are not passive recipients of information but active constructors of knowledge. Piaget argued that children learn by interacting with their environment, building mental models of how the world works, and continuously refining these models through assimilation and accommodation. Two key assumptions of Piaget's theory are particularly relevant to this study. First, children are not passive learners; they actively build up their knowledge about their surroundings. This assumption implies that effective instruction should provide opportunities for active engagement, not merely passive listening. Second, the most effective way to understand children's reasoning is to think from the child's point of view. This assumption implies that teachers should strive to understand how pupils are thinking about mathematical problems, which requires communication in a language pupils understand. The use of mother-tongue facilitates active knowledge construction by removing language barriers. When pupils can understand explanations and express their thinking in a familiar language, they can actively engage with mathematical ideas rather than passively receiving information they may not fully comprehend. This active engagement is the foundation of both cognitive development and sustained interest in learning.

Statement of the Problem

While cognitive outcomes in mathematics have received extensive research attention, affective outcomes like interest, participation, and engagement have been relatively neglected. Yet these are essential for long-term academic success. A pupil who performs well on a test but loses

interest in mathematics may not continue studying the subject in subsequent years. In the context of mother-tongue instruction, most studies have focused on whether it improves test scores, with less attention to how it affects how pupils feel about mathematics or how actively they participate in lessons. Even among studies that have examined interest, few have explored the relationship between interest and active participation. Do interested pupils automatically participate actively, or is there a gap between positive attitudes and active behaviors?

Furthermore, the relationship between gender and engagement under mother-tongue instruction has received minimal attention. If mother-tongue instruction promotes gender equity in performance and retention, does it also promote gender equity in engagement? This study addresses the gap: despite the importance of affective outcomes for long-term mathematics learning, insufficient research exists on how mother-tongue instruction affects primary pupils' interest, active participation, and engagement in Algebraic word-problems, and whether these effects differ by gender. Without this knowledge, educators cannot fully understand the benefits of mother-tongue instruction or design interventions that promote both cognitive and affective outcomes.

Aim of the Study

The aim of this study was to investigate the effects of mother-tongue instructional mode on pupils' interest, active participation, and engagement in Algebraic word-problems in Irepodun, Kwara State, Nigeria.

Objectives of the Study

The objectives of this study were to:

1. determine the relationship between pupils' interest and active participation in Algebraic word-problems among pupils exposed to mother-tongue instructional mode;
2. determine the difference in pupils' active participation scores between those taught Algebraic word-problems using mother-tongue instructional mode and those taught using the conventional method; and
3. determine the difference in mean engagement scores between male and female pupils taught Algebraic word-problems using mother-tongue instructional mode.

Research Questions

The following research questions guided this study:

1. What is the relationship between pupils' interest and active participation in Algebraic word-problems among pupils exposed to mother-tongue instructional mode?
2. What is the difference in pupils' active participation scores between those taught Algebraic word-problems using mother-tongue instructional mode and those taught using the conventional method?

3. What is the difference in mean engagement scores between male and female pupils taught Algebraic word-problems using mother-tongue instructional mode?

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H_{O1}: There is no significant relationship between pupils' interest and active participation in Algebraic word-problems among pupils exposed to mother-tongue instructional mode.

H_{O2}: There is no significant difference in pupils' active participation scores between those taught Algebraic word-problems using mother-tongue instructional mode and those taught using the conventional method.

H_{O3}: There is no significant difference in mean engagement scores between male and female pupils taught Algebraic word-problems using mother-tongue instructional mode.

Literature Review

Interest in Mathematics Learning

Interest is widely recognized as an important factor in mathematics learning because it influences learners' willingness to engage with mathematical activities and sustain attention during instruction. Wong and Wong (2019) described interest as a psychological state that encourages learners to engage and re-engage with specific content over time. They further categorized interest into situational interest, which is triggered by the learning environment, and individual interest, which represents a long-term disposition toward a subject. Similarly, Tembe et al. (2020) emphasized that promoting students' interest in mathematics should be a major goal of mathematics education because it improves academic achievement and classroom behavior. These studies suggest that interest is not only an emotional response but also a determinant of learners' persistence and engagement in mathematics learning.

Empirical studies have provided mixed findings on the relationship between interest and mathematics performance. Ligan et al. (2023) found that students generally showed enthusiasm toward online mathematics learning and demonstrated good academic performance. However, despite reporting a strong association between interest and achievement, the study also indicated no significant relationship between enthusiasm and performance, creating inconsistency in the findings. This contradiction suggests that interest alone may not automatically lead to improved learning outcomes unless it is accompanied by active participation and sustained engagement. In contrast, Tembe's study reported a significant relationship between students' interest and achievement, indicating that learners who develop positive feelings toward mathematics are more likely to perform better

academically. The difference in findings may be linked to contextual variations such as instructional mode, learning environment, and learner characteristics.

Salawu (2025) further demonstrated that innovative instructional approaches can enhance students' interest in mathematics. The study revealed that students taught geometry through mathematical modeling showed significantly higher interest than those taught using the conventional method. However, no gender difference in interest was found. This finding is relevant to the present study because it suggests that learner-centered and context-based instructional strategies can improve affective outcomes in mathematics. Nevertheless, Salawu focused on secondary school students and geometry, while the present study concentrates on primary school pupils and Algebraic word-problems using mother-tongue instruction. Therefore, there remains a need to investigate whether the use of indigenous language instruction can similarly improve pupils' interest and participation at the primary school level.

Mother-Tongue Instruction and Interest

The use of mother-tongue instruction has increasingly been recognized as an effective strategy for improving learners' affective and cognitive outcomes. Popoola and Ayodeji (2022) examined the effect of mother-tongue as a supplementary medium of instruction on students' attitude toward mathematics and found significant differences in favor of students exposed to mother-tongue instruction. The study implies that learners feel more comfortable and motivated when taught in a familiar language. However, the study focused mainly on attitude rather than active participation and engagement, which are central variables in the present study.

Qualitative studies also support the positive influence of mother-tongue instruction on mathematics learning. Moshaba (2020) reported that teaching mathematics through mother-tongue promoted learners' interest, holistic development, and achievement. Similarly, Bacan (2025) found that mother-tongue instruction enhanced pupils' attentiveness, confidence, participation, and comprehension. Falguera (2020) also observed that mother-tongue-based instruction improved communication between teachers and learners and strengthened mathematical vocabulary development. These findings consistently suggest that pupils learn more effectively when instruction is delivered in a language they understand.

In the Nigerian context, Galadi and Gara (2024) revealed that students taught science subjects using Hausa language demonstrated greater interest and higher academic performance than those taught in English. This finding supports the argument that indigenous language instruction can improve learners' classroom experiences and learning outcomes. Despite these

contributions, most previous studies focused on science subjects, secondary school students, or general achievement outcomes. Few studies have specifically examined the influence of mother-tongue instructional mode on primary school pupils' interest, active participation, and engagement in Algebraic word-problems. The present study therefore fills this gap by focusing on Yoruba-medium instruction among Primary Five pupils in Irepodun, Kwara State, Nigeria.

Active Participation and Engagement

Active participation and engagement are important indicators of meaningful learning because they reflect learners' behavioral, emotional, and cognitive investment in classroom activities. Fredricks, Blumenfeld, and Paris (2004) explained that engaged learners demonstrate sustained attention, effort, and positive emotional involvement during instruction. Reeve (2012) further identified active participation as a strong predictor of academic success and long-term learning outcomes. These studies imply that pupils who actively contribute during lessons are more likely to understand and retain mathematical concepts.

Scholars have identified multiple dimensions of engagement and participation in learning. Wang and Degol (2016) and Fredricks et al. (2019) categorized engagement into behavioral, emotional, and cognitive dimensions. Behavioral engagement includes attentiveness, task completion, and participation in learning activities, while emotional engagement reflects learners' interest, enjoyment, and sense of belonging in the classroom. Cognitive engagement, on the other hand, involves deeper processing of learning content, persistence, and the ability to connect classroom knowledge to real-life situations. More recent studies by Bond et al. (2020) and Henrie et al. (2022) emphasize that effective instructional practices should intentionally promote all dimensions of engagement simultaneously, particularly in early and foundational education settings. These perspectives are highly relevant to the present study because mother-tongue instruction may create a more supportive learning environment that encourages pupils to participate freely, ask questions confidently, and engage meaningfully with Algebraic word-problems. However, despite growing global evidence on student engagement, limited empirical studies in the Nigerian primary school context have examined these dimensions of participation and engagement specifically in relation to mother-tongue mathematics instruction. This gap justifies the need for the present study.

Methodology

A quasi-experimental pre-test, post-test control group design was adopted for this study because intact classes were used, making random assignment of pupils impracticable. The population of the study comprised approximately 3,000 Primary Five pupils in Irepodun Local

Government Area of Kwara State, Nigeria, during the 2024/2025 academic session. Two public primary schools in Omu-Aran were purposively selected based on similarity in school characteristics, predominance of Yoruba-speaking pupils, availability of Primary Five classes, and willingness of the schools to participate. From each selected school, one intact Primary Five class was used. One school was assigned to the experimental group and the other served as the control group. A total of 45 pupils participated in the study, comprising 25 pupils in the experimental group and 20 pupils in the control group. All pupils were Yoruba-speaking and aged between 9 and 11 years. Two instruments were used for data collection. The Algebraic Interest Questionnaire (AIQ) consisted of 15 items on a 4-point rating scale (Strongly Agree to Strongly Disagree) and measured pupils' interest in Algebraic word-problems. The instrument was validated by experts in Mathematics Education and Measurement and Evaluation, with a reliability coefficient of 0.82 obtained using Cronbach Alpha.

To obtain a more valid measure of active participation and engagement, an Active Participation Observation Schedule (APOS) was used instead of relying solely on self-report. The APOS assessed pupils' behavioral engagement, verbal participation, collaboration, attentiveness, questioning behaviour, and cognitive effort using a 5-point rating scale (Never to Always). Classroom observations were conducted throughout the four-week instructional period by trained research assistants. The instrument was validated by experts, and a reliability coefficient of 0.79 was obtained using Cronbach Alpha. The experimental group was taught Algebraic word-problems using Yoruba-medium instruction for four weeks, while the control group was taught the same content using English-medium instruction. Both groups received four 35-minute lessons per week, making a total of sixteen lessons. At the end of the intervention, the AIQ was administered to both groups, while participation and engagement data were obtained through classroom observation using the APOS. Data were analyzed using independent samples t-tests to compare the experimental and control groups on interest and active participation. A Pearson Product Moment correlation was used within the experimental group to examine the relationship between interest and participation. Independent samples t-tests were also used to compare male and female pupils' engagement scores within the experimental group. All hypotheses were tested at 0.05 level of significance.

Results

Research Question One

What is the relationship between pupils' interest and active participation in Algebraic word-problems among pupils exposed to mother-tongue instructional mode?

Table 1: Mean and Standard Deviation of Interest and Active Participation in the Experimental Group

Variables	N	Mean	SD
Interest	25	58.36	11.42

Variables	**N**	**Mean**	**SD**
Active Participation	25	36.48	7.85

Table 1 shows the mean and standard deviation of pupils' interest and active participation scores in the experimental group. The result revealed that pupils had a mean interest score of 58.36 with a standard deviation of 11.42, while the mean active participation score was 36.48 with a standard deviation of 7.85. This suggests that pupils exposed to mother-tongue instructional mode demonstrated high interest and active participation in Algebraic word-problems.

Hypothesis One

Hypothesis one stated that there is no significant relationship between pupils' interest and active participation in Algebraic word-problems among pupils exposed to mother-tongue instructional mode.

Table 2: Summary of Pearson Product Moment Correlation between Interest and Active Participation (Experimental Group)

Variables	**N**	**Mean**	**SD**	**r**	**p**	**Remark**
Interest	25	58.36	11.42	0.62	0.001	Significant
Participation	25	36.48	7.85			

Table 2 shows the Pearson Product Moment Correlation analysis between pupils' interest and active participation scores in the experimental group. The result revealed a positive significant relationship between interest and active participation ($r = 0.62$, $p = 0.001$), since the p-value is less than 0.05. Therefore, the null hypothesis was rejected. This implies that pupils with higher interest in Algebraic word-problems also demonstrated higher levels of active participation during instruction.

Research Question Two

What is the difference in pupils' active participation scores between those taught Algebraic word-problems using mother-tongue instructional mode and those taught using the conventional method?

Table 3: Mean and Standard Deviation of Active Participation by Group

Group	N	Mean	SD	Mean Difference
Experimental	25	36.48	7.85	4.53
Control	20	31.95	8.21	

Table 3 shows that pupils in the experimental group obtained a higher mean active participation score (M = 36.48, SD = 7.85) compared to those in the control group (M = 31.95, SD = 8.21). The mean difference of 4.53 indicates that pupils taught using mother-tongue instructional mode demonstrated higher active participation in Algebraic word-problems than those taught using the conventional method.

Hypothesis Two

There is no significant difference in pupils' active participation scores between those taught using mother-tongue instructional mode and those taught using the conventional method.

Since active participation scores were obtained using observational ratings and the sample size was relatively small, the Mann–Whitney U-test was considered more appropriate as a non-parametric alternative to the independent samples t-test.

Table 4: Summary of Mann–Whitney U-test of Active Participation in the Experimental and Control Group

Group	N	Mean Rank	U	Z	p	Remark
Experimental	25	27.60	158.50	-2.41	0.016	Significant
Control	20	17.85				

Table 4 shows the Mann–Whitney U-test comparison of active participation scores between the experimental and control groups. The result revealed a U value of 158.50, Z value of -2.41, and p-value of 0.016, which is less than 0.05 level of significance. Therefore, the null hypothesis was rejected. This indicates that there is a significant difference in active participation between pupils taught using mother-tongue instructional mode and those taught using conventional English-medium instruction, in favour of the experimental group.

Research Question Three:

What is the difference in mean engagement scores between male and female pupils taught Algebraic word-problems using mother-tongue instructional mode?

Table 5: Mean and Standard Deviation of Engagement by Gender (Experimental Group)

Gender	N	Mean	SD	Mean Difference
Male	14	37.21	7.66	1.63
Female	11	35.58	8.12	

Table 5 reveals that male pupils had a mean engagement score of 37.21 (SD=7.66), while female pupils had a mean engagement score of 35.58 (SD=8.12). The mean difference of 1.63 in favour of male pupils suggests slightly higher engagement among male pupils when taught using mother-tongue instructional mode.

Hypothesis Three

There is no significant difference in mean engagement scores between male and female pupils taught Algebraic word-problems using mother-tongue instructional mode.

Table 6: Summary of Independent Samples t-test of Engagement by Gender (Experimental Group)

Gender	N	Mean	SD	df	t	p	Remark
Male	14	37.20	7.44	23	1.56	0.132	Not Significant
Female	11	35.64	8.11				

Table 6 shows the independent samples t-test comparison of engagement scores between male and female pupils in the experimental group. The calculated t-value was 1.56, with df=23 and p=0.132, which is greater than 0.05. On this basis, the null hypothesis was accepted.

Therefore, there is no significant difference in engagement scores between male and female pupils taught using mother-tongue instructional mode.

Discussion

The finding on the relationship between pupils' interest and active participation in Algebraic word-problems revealed a positive and significant relationship ($r = 0.62$, $p = 0.001$). This indicates that pupils who demonstrated higher interest in mathematics were also more actively involved during instruction. This finding aligns with the mean results, which showed relatively high interest ($M = 58.36$) and active participation ($M = 36.48$) among pupils exposed to mother-tongue instruction. It suggests that affective variables such as interest are closely linked to behavioral outcomes such as participation, especially when instruction is delivered in a familiar language. This supports the view of Wong and Wong (2019), who emphasized interest as a psychological state that promotes re-engagement, and Tembe et al. (2020), who noted that interest enhances sustained involvement in learning activities. It also agrees with Fredricks, Blumenfeld, and Paris (2004), who argued that emotional engagement is strongly connected to behavioral engagement in classroom settings.

The finding on active participation differences between experimental and control groups showed that pupils taught using mother-tongue instruction had higher participation scores ($M = 36.48$) than those taught using English ($M = 31.95$), with a significant difference confirmed using the Mann–Whitney U-test ($U = 158.50$, $p = 0.016$). This indicates that mother-tongue instruction improves observable classroom behavior such as listening, questioning, collaboration, and task

engagement. The result supports Alimi et al. (2020), who reported that pupils are more willing to participate when they fully understand classroom language, and Bacan (2025), who found improved participation and attentiveness through mother-tongue instruction. It further reinforces the argument that language of instruction plays a critical role in shaping learners' willingness to engage actively in mathematics learning.

The finding from the relationship analysis and the group comparison together suggest that mother-tongue instruction does not only improve pupils' interest but also strengthens the link between interest and participation. Pupils who understood lessons in their first language were more confident to express themselves, ask questions, and engage with tasks. However, the relationship also implies that participation is not determined by interest alone, but also by classroom conditions, instructional strategies, and teacher support. This is consistent with Reeve (2012), who noted that active participation requires both motivation and enabling learning environments.

The finding on gender differences in engagement revealed no significant difference between male and female pupils ($t = 1.56$, $p = 0.132$). Although male pupils had a slightly higher mean engagement score (37.21) than females (35.58), the difference was not statistically significant. This suggests that mother-tongue instruction provides an equitable learning environment where both male and female pupils participate similarly. This finding is consistent with earlier results in this study on cognitive outcomes and supports Edith et al. (2023), who reported no significant gender differences in interest when mother-tongue instruction was used. It also aligns with Isah (2019) and Muhammed (2017), who found that gender differences in mathematics achievement diminish when effective instructional strategies are applied. Therefore, the overall findings indicate that mother-tongue instructional mode enhances both affective and behavioral aspects of learning in Algebraic word-problems. It improves pupils' interest, increases active participation, strengthens the relationship between the two constructs, and ensures gender equity in engagement.

Conclusion

This study concludes that mother-tongue instructional mode enhances primary pupils' interest and active participation in Algebraic word-problems compared to conventional English-medium instruction. A significant positive relationship was found between interest and active participation, indicating that pupils who are more interested tend to participate more actively. However, interest levels were higher than participation levels, suggesting that positive attitudes do not automatically translate into active classroom behavior. The study also found no significant gender difference in engagement, showing that mother-tongue instruction benefits both male and female pupils equally. Therefore, mother-tongue instruction is an effective approach for improving pupils' affective and behavioral learning outcomes in mathematics.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Teachers should regularly assess pupils' interest and participation using mother-tongue-based instruments to identify pupils who may be interested but not participating actively.

2. Teachers should deliberately create opportunities for active participation, including small-group discussions, think-pair-share activities, and opportunities for pupils to connect lessons to their own experiences.

3. Teachers should scaffold participation skills, teaching pupils how to formulate questions, contribute ideas, and respond to peers' contributions constructively.

4. Teacher training programs should emphasize the importance of promoting both interest and active participation, and should provide strategies for bridging the gap between positive attitudes and active behaviors.

5. Schools should create classroom environments where mistakes are viewed as learning opportunities, reducing the fear that may inhibit participation even when interest is high.

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