American Journal of Alternative Education
ISSN: 2997-3953 (Online)
Vol. 2, No. 8, Aug 2025,
Available online at: https://scientificbulletin.com/index.php/AJAE

Enhancing Student Engagement and Learning Outcomes Through Constructivist and Humanist Teaching Approaches in Secondary

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Article information:
Manuscript received: 02 Jun 2025; **Accepted:** 03 Jul 2025; **Published:** 21 Aug 2025

Abstract: This study explores the integration of constructivist, humanist, and growth mindset approaches in mathematics instruction for A-level students. Drawing on theories by Bruner, Rogers, Dweck, and Vygotsky, the research examines how tailored teaching strategies, collaborative learning, and formative assessment can enhance student motivation, engagement, and retention of knowledge. Classroom-based observations and reflective practice were used to evaluate the effectiveness of various instructional methods, including group work, pair work, kinaesthetic activities, and real-life contextualization. Findings suggest that adaptive teaching strategies and student-centered learning environments contribute to improved confidence, active participation, and conceptual understanding in mathematics.

1. Introduction

Learning has been defined in multiple ways by different scholars, but in this study, it is viewed as an active process of acquiring new information or skills and integrating them with prior knowledge through various means such as reading, listening, doing, and observing (Bruner, 1960). This constructivist perspective emphasizes learner engagement and meaning-making. However, not all learning methods are equally effective for all learners; some may struggle to retain information or apply it in real-life contexts. This reflects the humanist principle that learning should be individualized to meet each learner's needs (Rogers, 1983).

Mathematics, in particular, is often perceived as a challenging subject, and low confidence can hinder student progress. The growth mindset approach (Dweck, 2007) highlights the importance of fostering resilience and self-belief in learners. This paper investigates teaching strategies aimed at increasing engagement, confidence, and conceptual understanding in mathematics by combining constructivist and humanist methods with effective assessment practices.

2. Methods

This classroom-based qualitative study was conducted with A-level mathematics students at [School/Institution Name]. The instructional design incorporated:

- **Constructivist principles** (Bruner, 1960) by connecting new topics to prior knowledge through review tasks at the start of lessons.

- **Humanist elements** (Rogers, 1983) by adapting methods to individual student needs and preferences.
- **Growth mindset strategies** (Dweck, 2007) by creating opportunities for early success and building learner confidence.

Teaching Sequence:

1. **Engagement phase** – Introduction of the lesson with a short, achievable task related to previous topics (pair or group work with kinaesthetic elements such as matching activities or physical problem-solving).
2. **Exploration phase** – Introduction of the new concept via real-life contexts or interesting facts to stimulate curiosity.
3. **Collaborative learning** – Group and pair work followed by individual tasks, encouraging peer-to-peer teaching and independent practice (Vygotsky, 1978).
4. **Assessment** – Use of formative assessments (interactive games, small projects, or short quizzes) to identify learning gaps and guide subsequent instruction (Black & Wiliam, 1998). Summative assessments (unit tests, written assignments) were conducted to evaluate overall understanding and communicate progress to parents.

3. Results

Classroom observations indicated that:

- Starting lessons with review tasks from previous topics increased student participation and willingness to engage with new material.
- Real-life contextualization of mathematical concepts increased student curiosity and discussion.
- Structured group and pair work improved collaboration, although competitive activities sometimes shifted focus from content to winning.
- Formative assessments revealed immediate learning gaps, enabling targeted revision, while summative assessments provided a clear measure of topic mastery.
- Students showed increased confidence when early lesson activities were achievable and when they had opportunities to collaborate before individual assessment.

5. Discussion

The results of this classroom-based study support the premise that a combination of constructivist, humanist, and growth mindset approaches can substantially enhance student engagement, confidence, and conceptual understanding in mathematics. By beginning each lesson with short review tasks grounded in prior knowledge, students were able to connect new concepts with existing cognitive frameworks, confirming Bruner's (1960) assertion that learning is most effective when it builds on what is already known.

Collaborative activities such as pair and group work fostered peer-to-peer learning and social interaction, which align with Vygotsky's (1978) theory of the Zone of Proximal Development (ZPD). In this framework, learners can achieve more when supported by others than when working alone. These findings also highlight the motivational role of interpersonal interaction in learning mathematics, a subject that is often perceived as challenging or intimidating.

The integration of real-life contexts during the exploration phase helped to situate mathematical concepts in meaningful scenarios, which appeared to improve students' curiosity and willingness to engage. This is consistent with Rogers' (1983) humanist perspective, which emphasizes relevance and learner-centered approaches. However, one observed limitation was that competitive group tasks sometimes shifted focus away from the conceptual objective towards the extrinsic goal of winning. This

suggests that while competition can motivate, it requires careful structuring to ensure that learning remains central.

Formative assessment emerged as a powerful diagnostic tool for identifying misconceptions and guiding lesson adjustments, in line with Black and Wiliam's (1998) findings on assessment for learning. However, the observations also indicated that some questioning strategies could have been more effective if longer "think time" had been provided, allowing students to develop more thoughtful responses and deeper conceptual links.

6. Conclusion

This study reinforces the value of integrating multiple learning theories into classroom practice to enhance mathematics education. Constructivist principles (Bruner, 1960) provide the foundation for linking new learning to prior knowledge, while humanist approaches (Rogers, 1983) ensure that instruction addresses the individual needs, interests, and emotional well-being of learners. Growth mindset strategies (Dweck, 2007) help to build resilience, particularly in subjects where students may face anxiety or self-doubt.

The combination of collaborative learning, real-life application, and varied assessment strategies contributed to increased engagement and confidence among A-level mathematics students. Teachers who intentionally design lessons with these principles in mind can create an environment that supports deeper understanding and long-term retention.

Nevertheless, the study also reveals that certain methods—such as competition-based activities—require careful planning to avoid overshadowing the learning objectives. Moreover, the importance of pacing and allowing adequate reflection time during questioning cannot be overstated.

Future research might extend this approach to other subjects, age groups, or educational contexts, and investigate the long-term effects of such strategies on academic performance and learner motivation. By continuously refining instructional methods to align with both theoretical principles and practical realities, educators can better support students in developing both the skills and the mindset needed for lifelong learning.

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