

Original Article

## Formative Assessment and Its Role in Scientific Learning Behavior, and Strengthening Students' Motivational Beliefs

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### Introduction

This study delves into the critical role of formative assessment in enhancing students' science learning behaviours. By focusing on the process of learning rather than solely on the result, formative assessment provides valuable insights for both teachers and students to improve instruction and learning. The research emphasizes the interconnectedness of Formative Assessment, motivational beliefs, and science learning behaviors.

### Method

The study employed a quantitative, correlational research design using structural equation modeling. A sample of 469 Iranian secondary school students was selected to investigate the relationships among formative assessment, motivational beliefs, and science learning behaviors. Data was collected through online questionnaires.

### Results

The results of this research underscore the significant impact of formative assessment on students' science learning behaviors. Key findings include: Direct and Indirect Effects: Formative assessment exerts both direct and indirect influences on science learning behaviors, with motivational beliefs serving as a mediating variable. Teacher Feedback: Timely and specific teacher feedback plays a pivotal role in strengthening students' motivational beliefs, such as self-efficacy and value placed on the subject. Motivational Beliefs: Students with stronger motivational beliefs are more likely to be engaged in learning, exert greater effort, and perform better in science.

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**Formative Assessment Techniques:** The use of various formative assessment techniques, including questioning, short quizzes, and projects, contributes to students' awareness of their progress and enables them to adjust their learning strategies. **Combination of Strategies:** Combining formative assessment strategies with efforts to strengthen motivational beliefs can create a more effective science learning environment.

### **Conclusion**

The research highlights the importance of teacher training in providing effective feedback. By equipping teachers with the skills to offer timely and specific feedback, educators can significantly enhance student learning outcomes. Additionally, the study emphasizes the need for a balance between teacher-centered and student-centered approaches. While adaptive teaching can be beneficial, it is crucial to ensure that instructional strategies align with students' individual needs and learning styles. **Teacher Training:** Educators should receive training on effective formative assessment strategies, including providing timely and specific feedback. **Curriculum Development:** Curricula should be designed to incorporate formative assessment as an integral component of instruction. **Educational Policy:** Educational policies should support the implementation of formative assessment practices in schools. While the study provides valuable insights, it is essential to acknowledge its limitations. The study was conducted with a specific population in Iran, and the findings may not be generalizable to other contexts. Future research could explore the impact of formative assessment in different cultural and educational settings. Additionally, longitudinal studies could provide more in-depth insights into the long-term effects of formative assessment on student outcomes. This research underscores the pivotal role of formative assessment in enhancing science learning behaviors. By implementing effective formative assessment practices, educators can create more engaging and effective learning environments for their students. Future research should continue to investigate the complexities of formative assessment and its impact on student learning.

**Keywords:** Science Education, Teacher Feedback, Academic Self-Efficacy, Learning Behavior

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