

## REVIEWER'S REPORT

Manuscript No.: IJAR-52375

Date: 21-06-2025

**Title: Exploring the Impact of Using Intelligent Tutoring Systems (ITS) for Biology Learning on Higher Secondary Students' Learning Motivation and Academic Achievement in Biology.**

### Recommendation:

Accept as it is.....**YES**.....  
 Accept after minor revision.....  
 Accept after major revision .....  
 Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		√		
Techn. Quality		√		
Clarity			√	
Significance			√	

**Reviewer's Name:** Mir Tanveer

**Reviewer's Decision about Paper:** **Recommended for Publication.**

**Comments** (*Use additional pages, if required*)

### Reviewer's Comment / Report

#### General Overview:

The manuscript presents a timely and well-conceived study that examines the integration of Intelligent Tutoring Systems (ITS) in secondary Biology education. It explores how ITS impacts both the cognitive (academic achievement) and affective (learning motivation) dimensions of student learning. The topic is relevant, methodologically sound, and contributes to the growing discourse on educational technology and personalized learning.

#### Relevance and Originality:

The research addresses a critical intersection of AI-driven educational tools and science pedagogy. By focusing on Biology—a subject often characterized by abstract and complex content—the paper brings valuable insights into how ITS can bridge pedagogical gaps in traditional instruction. Its emphasis on motivation and achievement as dual outcomes provides a holistic view of learner development.

# International Journal of Advanced Research

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Additionally, the regional context of the study (southern districts of West Bengal) adds unique empirical relevance and local applicability to the findings.

### Structure and Clarity:

The manuscript is well-structured, beginning with a strong abstract that clearly summarizes the background, objectives, methodology, findings, and implications. The introduction is precise and informative, effectively contextualizing the significance of ITS in modern education. Terminology is used appropriately, and the language throughout is clear, academic, and accessible to a broad readership within the educational research community.

### Methodological Rigor:

The study design is methodologically sound. The use of a large sample (257 students), drawn from both CBSE and CISCE boards, ensures diversity and representativeness. The application of standardized tools to measure ITS usage, motivation, and academic performance reflects methodological precision. The use of both descriptive and inferential statistics, including correlation and t-tests, provides a solid foundation for interpreting the data.

### Findings and Interpretation:

The study finds a statistically significant and positive relationship between the use of ITS and both motivation and academic achievement in Biology. These results are well-aligned with existing literature that supports the value of personalized, adaptive instruction in enhancing student learning outcomes. The analysis of gender and board affiliation differences adds further depth, offering insight into how ITS might cater to diverse learning contexts and learner demographics.

### Scholarly Merit:

The research demonstrates high scholarly merit, balancing theoretical framing with empirical analysis. The study is grounded in contemporary educational theories of motivation, cognitive learning, and digital pedagogy, while also contributing new data and interpretations that are relevant for policymakers, educators, and ed-tech developers.

### Practical and Educational Implications:

The findings underscore the transformative potential of ITS in secondary science education. The results advocate for the thoughtful integration of AI-based educational tools into existing curricula to foster equitable, student-centered learning environments. The study also reinforces the role of technology in addressing individual learner needs and preparing students for a technologically advanced academic and professional landscape.

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### **Conclusion:**

This manuscript offers a comprehensive, data-driven exploration of how Intelligent Tutoring Systems influence Biology education among higher secondary students. It effectively captures the dual impact on learner motivation and achievement, affirming the value of intelligent digital tools in science education. The research makes a significant contribution to educational technology literature and presents actionable insights for enhancing pedagogical practices in secondary education.