

## ABSTRACT

**Rio Madani Putra Pascasah Sitompul, NIM. 4173141058 (2024). Biology Education Pre-Service Teacher Perception and Understanding on Technological Pedagogical and Content Knowledge (TPACK) Framework.**

The purpose of this study is to determine the perceptions and understanding of pre-service biology teachers regarding the Technological Pedagogical and Content Knowledge (TPACK) framework, and to evaluate the implementation of TPACK in their lesson plans. This study uses a descriptive method with a quantitative approach. The population consisted of all students in the 2022 Biology Education study program at Universitas Negeri Medan, with a sample size of 112 students chosen using purposive sampling. The instruments used were questionnaires and multiple-choice tests, supplemented by a document study of lesson plans. The results showed that 78% of students had basic technological knowledge, but 65% struggled to integrate this knowledge with pedagogical and content strategies. Only 40% of the students adequately incorporated TPACK into their lesson plans. Despite 85% of students having a positive perception of TPACK, this did not consistently translate into practice. The document study revealed that while 45% of the lesson plans demonstrated technological content knowledge, only 30% effectively combined all TPACK components. Furthermore, significant correlations were found between students' perceptions and their implementation of TPACK. Students with higher TPACK understanding were more likely to integrate it effectively into their lesson plans. These findings highlight the need for enhanced training and professional development focused on practical applications of TPACK. This research underscores the importance of a robust TPACK framework in teacher education programs and advocates for curriculum improvements to ensure pre-service teachers are well-prepared to integrate technology in their teaching, ultimately improving the quality of education in Indonesia.

**Keywords :** TPACK, Perception, Understanding, Pre-Service Teacher, Biology Education