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ABSTRACT

This study employed an explanatory sequential mixed-methods design. It explored how an inverted learning approach affected the direct and deferred conceptual understanding, as well as self-efficacy of STEM students enrolled in a biology course. It also sought to understand the experiences of students who were taught using the Inverted Learning Approach (ILA). A total of 225 STEM students were involved in the study. Findings revealed that students who were exposed to ILA had higher normalized gains in both posttest and retention test scores than those who were taught using the expository online teaching (EOT). Likewise, there was also a significant difference on the self-efficacy level between ILA and EOT groups. It therefore showed that ILA improved students' direct and deferred conceptual understanding, and self-efficacy levels than their counterparts. Reflexive thematic analysis was applied to elucidate the qualitative information gathered. Four (4) themes emerged from the researcher's engagement with the participants exposed to ILA, which include: 1) Developing into active and reflective learners; 2) Enabling students to engage and collaborate more freely; 3) Establishing a flexible, seamless, and nonpressuring space for learning; and, 4) Becoming disciplined and responsible for one’s own learning. Even though there was a significant increment in the levels of direct and deferred conceptual understanding and self-efficacy among students taught using ILA, it was indicated that conceptual understanding is not highly related or associated with self-efficacy. Given the paucity of research in this area, further study is still needed to elucidate the complex relationships between self-efficacy, and direct and deferred conceptual understanding.

Keywords: Inverted Learning Approach, Conceptual Understanding, Self-Efficacy, STEM, Biology Education, Mixed-Methods Study