

Collaborative Learning: A Phenomenographic Study of STEM Students

Collaborative Learning (CL) in the context of Project-based Learning (PjBL) can be interpreted as a learning method that allows students to share their knowledge and collaborate amongst themselves, while providing crucial elements of learning such as knowledge scaffolding, social interactions, and experience.

Introduction

STEM students are more familiar with the ideas of CL than other students. However, more STEM students drop out their classes or switch to non-STEM classes compared to other disciplines. Their individual characteristics may have an impact on this.

Objectives

- Investigating how STEM students operate and behave in a PjBL environment.
- Understanding how individual characteristics may have an impact on the outcome of the project, social interactions, and on their perspectives of CL.
- Understanding their experiences may produce a new dimension and add new knowledge to the area of CL.

Research Model

- Phenomenography, a methodology, focuses on the individuals' experiences and their conceptions of a certain phenomenon. Using this methodology will uncover the experience of an individual towards a phenomenon, which may be completely different from one another as the experiences may vary (Ornek, 2008).
- Scaffolding, a part of Sociocultural Theory, is described as the direction or supervision given by an expert to encourage students to climb the knowledge ladder (Sarmiento-Campos et al., 2022). The process of scaffolding also occurs when students learn from one another, especially in CL where students are encouraged to participate in groupwork and climb the knowledge ladder.
- TAM (Technology Acceptance Model) will help uncover the experience of using technology in a PjBL environment.

Conclusion

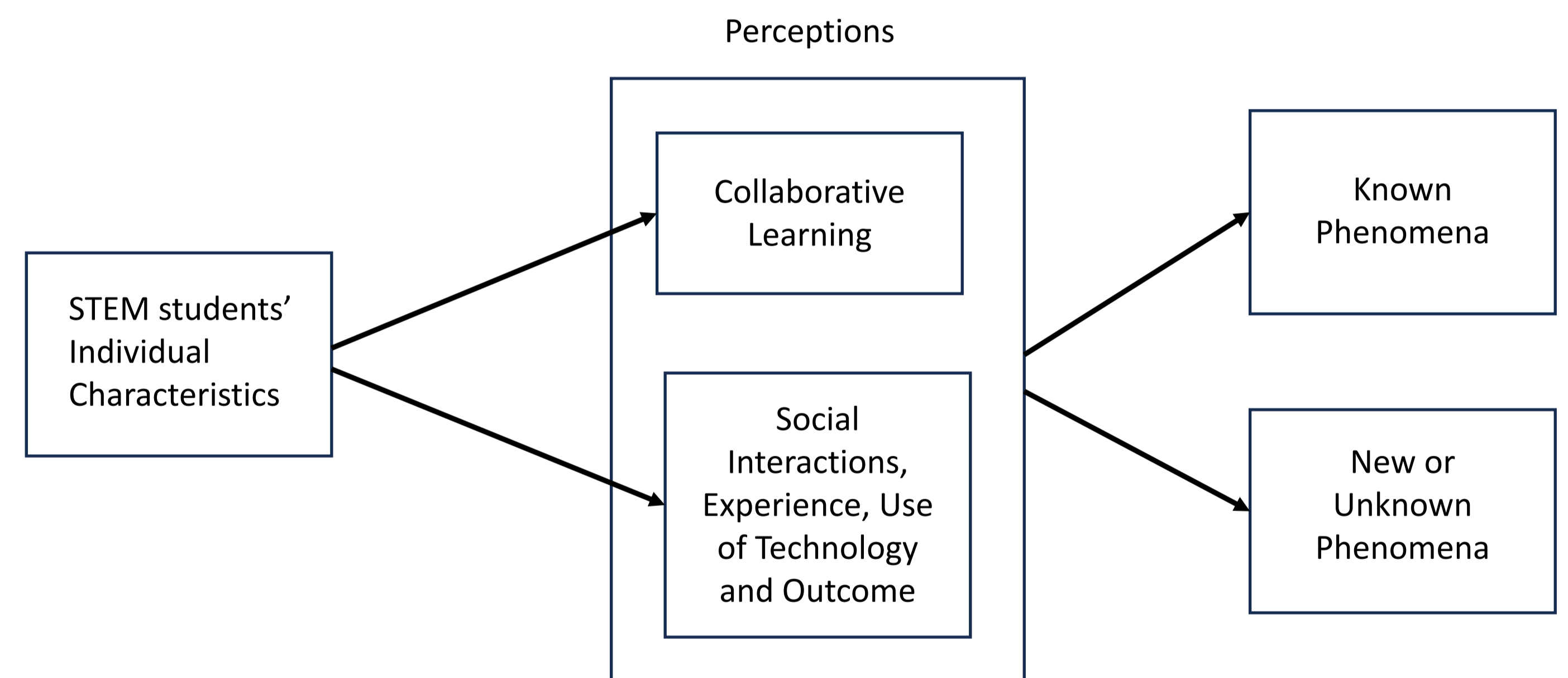
Studying the impact of STEM students' individual characteristics on CL in the context of social interactions, experience, and its impact outcome of the projects will add new dimensions to the knowledge areas of students' experience and conceptions of CL as well as new phenomena that might have been missed or overlooked in the previous research.

References:

Ornek, F. (2008). An overview of a theoretical framework of phenomenography in qualitative education research: An example from physics education research. *Asia-Pacific Forum on Science Learning and Teaching* 9(2).

Sarmiento-Campos, N.-V., Lázaro-Guillermo, J. C., Silvera-Alarcón, E.-N., Cuellar-Quispe, S., Huamán-Romaní, Y.-L., Apaza, O. A., & Sorkheh, A. (2022). A Look at Vygotsky's Sociocultural Theory (SCT): The Effectiveness of Scaffolding Method on EFL Learners' Speaking Achievement. *Education Research International*, 2022, 1–12. <https://doi.org/10.1155/2022/3514892>

Area of Study



The figure shows that STEM students' individual characteristics may have an impact on their perceptions of Collaborative Learning, their social interactions, experience, the use of technology, and the outcome of projects. Although research conducted on the students' perceptions have produced phenomena associated with students' perceptions, there are still many unknown in the context of PjBL as it is a complex learning method.

Presenter : Thar Htin Shar
Supervisors: Dr. Krassie Petrova and
Dr. Stephen Thorpe
Email: tharhtinshar@gmail.com