Project-Based Learning Intervention in Teaching Mathematics for Sustainable Development: Experiences of Secondary School Teachers and students in Uganda

ABSTRACT

The study explored secondary school mathematics teachers and students' experiences of Mathematics for Sustainable Development (MSD) teaching through Project-Based Learning (PjBL) in Wakiso -Kampala, Uganda. The study employed a mixed-methods approach, collecting data through survey questionnaires, lesson observations, interviews, and focus group discussions. The study adopted Sterling's theory of learning levels of accommodation, reformation, and transformation to evaluate teachers' SDGs integration in mathematics knowledge in modelling MSD tasks. Data was analyzed about: Teachers and students' perception about MSD teaching through PjBL, contextual factors that enhance MSD teaching through PjBL, teachers' practices in teaching MSD through PjBL, and the effect of MSD on students' acquisition of SD skills of critical thinking, creative thinking, communication, and collaboration using focus group discussion, lesson observations, interviews and survey questionnaire. The study findings revealed that contextual factors, such as ICT integration, availability of resources, and time constraints to have a significant influence on MSD teaching through PjBL. Regarding modelling MSD tasks, the teachers found the transformation learning level most challenging to attain, and most MSD tasks were aligned to the reformation level. In addition, the teachers were most comfortable with the teacher-led pedagogical modelling perspective; students were not involved in formulation or modifications in the given tasks.

The study further found that teachers found the assessment of students' project work challenging. Regarding the effect of MSD teaching through PjBL, students self-rated their perceived level of confidence high on the SD skills, with mean scores between 3 and 4, corresponding to confident and very confident. Regarding students' perceptions about MSD teaching through PjBL and how it affects students' acquisition of SD skills, the students' responses were found to correspond to 3 (agree) and 4 (strongly agree). In comparison between schools, School B had the highest mean scores on SD skills of collaboration (3.68), communication (3.57), creative thinking (3.5), and critical thinking (3.67), all corresponding to code 4 of strongly agree on the Likert point scale.

The study therefore recommends school administrators in conjunction with curriculum designers, to organize CPD trainings that focus on the integration of cross-cutting issues in mathematics teaching and use of learner-centred approaches such as PjBL. And further research in this area using topics unrelated to business mathematics.

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Your presence and participation will be highly appreciated as we support the student in this important academic milestone.