Chapter 1
Implementing STEAM Projects in Schools in Nepal Through Participatory Action Research Approach

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ABSTRACT

The first author conducted participatory action research (PAR) with schoolteachers to design STEAM-based pedagogical approaches in two of the schools in a rural part of Nepal. This study's initial objective was to investigate innovative pedagogy contributing to improved teacher and student performance. The authors collaborated with schoolteachers and to develop integrated projects for students. The entire endeavor went on for three cycles and took approximately three years on the research site to complete. The fieldwork was initiated prior to COVID-19, in February 2019, and proceeded throughout COVID-19 and beyond. In the first cycle, inquiry-based approaches were used, in the second cycle, integrated projects were developed and implemented, and in the third cycle, the STEAM approach was initiated through several real-world projects (such as save the species). This book chapter discusses how the authors devised and implemented the 'Save the Species' project in the third cycle with a short synopsis of the first and second cycles.

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INTRODUCTION

In school education in Nepal, there has been a recent reform that appears to be moving towards inter-and multidisciplinary approaches in curriculum integration among lower grades and projects-based learning in higher grades (Curriculum Development Center [CDC], 2020). As the implementation is in the initial stage, it is too early to argue about the effects of curriculum reforms in society. For many years, the Nepali education system was driven by content-focused subject matter and discipline-focused pedagogical practices. As per the arguments made by Schubert (1986), such curriculum is considered as curriculum as subject matter that considers content-driven curriculum by focusing on subject-centric knowledge and providing a limited set of disciplinary skills. It is expected that teachers teach the subject matter in an isolated context. Over the period, such practices created human resources who seem sufficient with the subject-specific knowledge but have inadequate levels of soft skills and interconnection of disciplinary knowledge across other subject matters and contexts (Luitel & Pant, 2021). Such practices do not aim to prepare creative and critical citizens, which is one of the major competencies mentioned in school education in Nepal (CDC, 2020).

For supporting to development of critical and creative human citizens, using innovative pedagogical practices (such as project-based learning, context-based learning, and integrated learning) to gain real-life experiences on authentic problems could be one of the approaches. In the recent curriculum reform in Nepal, the incorporation of soft skills has been one of the major departures. The ideas of soft skills were introduced to develop life skills (such as collaboration, leadership, and thinking skills) that are needed in daily life. Conventional pedagogical approaches (such as delivering lectures and focusing on procedural knowledge) do not necessarily support the development of such soft skills. The Curriculum Development Centre (CDC) of Nepal has recently emphasized the need for the incorporation of soft skills in school education with a broader explanation in the curriculum (CDC, 2020), the effects of which have yet to be investigated. This may be due to the realization of the importance of such soft skills in the formal school-level curriculum (Luitel & Pant, 2021).

Elsewhere, Nepali educators (Luitel, 2019; Pant, 2017, 2023) have argued the need for contextualization in school education. Nepal has multicultural and multiethnic societies. There are several local ways of knowing in different wisdom traditions, such as informal (i.e., non-standard, intuitive, non-algorithmic) (Taylor & Taylor, 2022; Jarrahi, & Sawyer, 2013)., communal (i.e., collective, shared) (Child, & Shumate, 2007), ethnic (traditional, religious, cultural, ritualistic) (Luitel, 2019), spiritual (empathic, healing-driven, holistic) (Willis, & Leone-Sheehan, 2019) and ecological (connected, Nature-driven, place-based) (Wagle, 2021). The local knowledge system is ignored in the name of "global" mathematics and science knowledge (Pradhan, 2017). The ideas of global have been misconstrued as scientific and modern systems that disregard implicit, local, interior, and artistic modes of knowing. D'Ambrosio (2015) argued that mathematics at the school level should integrate with the local cultural knowledge and practices. In doing so, students' cultural heritage is viewed as a significant link between their cultural and formal school mathematics. In the same way, the other school subjects also can be connected with their own cultural practices. Luitel and Taylor (2007, 2019) argued that such cultural practices could serve as a bridge that establishes a connection between school mathematics and mathematics in the communities. It holds that mathematical knowledge is also a cultural construction founded on culturally situated practices.

The recent report of the Education Review Office (ERO, 2022) demonstrated that Nepali students are struggling to acquire even minimum learning in school education. The majority of students are not