

Embedding Systems Thinking into EWB Project Planning and Development: Assessing the Utility of a Group Model Building Approach

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Keywords: group model building, project planning, sustainability, system dynamics modelling, systems thinking

1 TARGET AUDIENCE

This research is directed toward Engineers Without Borders (EWB) organisers and members, but can widely benefit humanitarian engineering organisations striving to create more sustainable and equitable international development projects.

2 BACKGROUND

Service learning organisations intend to provide opportunities to equitably benefit communities through technical projects. By participating in these activities, engineering students gain critical thinking tools and experiences and a greater sense of civic responsibility. However, with the common lack of project sustainability, two problematic outcomes arise: (1) the true impact of this work may exploit communities for the sole benefit of student learning and (2) engineering students do not carry new perspectives into their professional careers. Past research efforts have established that holistic, systems thinking approaches combat these challenges by allowing engineering students to address social, economic, cultural, and political implications of projects. Therefore, systems thinking could create more successful community-based projects and develop more holistic engineers.

3 PURPOSE

The purpose of this research is to assess a systems thinking method to supplement EWB project

planning and development, and to increase project sustainability and success.

4 METHOD

The established systems thinking methodology utilised for this research was systems dynamics modelling and group model building. This research engaged EWB practitioners in an introductory systems dynamics workshop at an EWB-USA regional conference. This conference is one of EWB-USA's largest annual, multi-chapter conferences, gathering EWB-USA staff, members, and professionals who are invested in the future direction of EWB projects. Over 30 workshop participants were involved, including EWB-USA staff, students, and professionals. Through the process, the group first created and analysed a diagram that modelled how factors such as *project affordability*, *community involvement*, and *government stability* influenced overall project sustainability, and then the group provided feedback about the effectiveness of the methodology.

5 RESULTS

From the workshop process and feedback, this research found that systems thinking allows EWB members to consider more social, economic, cultural, and political factors that influence their projects. Specifically, the system dynamics approach introduced through group model building provided a way for workshop participants to visually and quantitatively analyse these factors. Additionally, the process facilitated rich discussion of priorities and assumptions that affect project sustainability. Therefore, the authors recommend that this process be integrated into EWB project planning and development activities.

6 IMPLICATIONS FOR TARGET AUDIENCES

This research addresses the challenges facing service learning projects that seek to successfully build equitable, lasting change in both the engineering students and their partner communities. As service learning organisations increase their focus on non-technical systemic influences of factors that can impact project success, project impact becomes more holistic, equitable, and sustainable. Additionally, students more effectively engage in projects and gain perspectives on social and civic responsibility, thus equipping them with tools to tackle the complex challenges they will invariably face in their professional careers. For EWB, these benefits may be achieved by embedding this methodology into the EWB project planning and development.