

RISK IDENTIFICATION AND PROPOSAL OF PREVENTIVE MEASURES IN THE MANAGEMENT OF STUDENT PROJECTS IN AN ACADEMIC ENVIRONMENT

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Abstract

The implementation of student projects at the university level represents not only an opportunity for the development of students' professional and soft skills but also brings a number of risks that can affect the quality of outcomes, the effectiveness of teaching, and the educational process itself. This paper focuses on the identification and analysis of risks associated with managing student projects in an academic environment. To systematically examine the causes of potential problems, the Ishikawa diagram (also known as the fishbone diagram) is used, enabling the visualization of key factors influencing the success of project-based learning. The analysis includes technical, human, organizational, and methodological aspects, and based on the identified risks, preventive measures are proposed to minimize their impact. The research also involved brainstorming sessions with students and educators, which contributed to a deeper understanding of the practical challenges in project implementation. The results of this analysis serve as a foundation for teaching the course Projects and Construction Materials at the Faculty of Education, with particular regard to the needs of technical education teacher training. They may also serve as inspiration for educators in planning and implementing student activities.

Keywords: *Risk identification, proposal of preventive measures, management of student projects, Ishikawa diagram, brainstorming with students and educators.*

1. Introduction

The university environment presents a number of specific challenges, e.g. heterogeneous student groups (Schuetze & Slowey (2001); Petrjánošová & Lásticová (2011); Beseda & Machát (2012); Bačová (2022); Civitillo, Campbell-Bethancourt, & Jugert (2025); Smith, Foster, & Li, (2025)), varying levels of motivation (Ahsan, Ali, & Alam (2024); (Almulla et al. (2025); (Ambarkutuk & Jones (2025); Yan (2025)), limited time (Kolari et al. (2006); (Hall (2010); Aune et al. (2025); Schmickler et al. (2025)) and assignment tasks whose aims or requirements are not always clearly articulated (Mulliner & Tucker (2017); Chang et al. (2024); Muftah & Alhazmi (2024); (Sharma et al. (2024)). In the context of implementing student projects, additional factors also come into play, such as varying levels of prior knowledge and practical skills, students' lack of experience with teamwork and project management, the difficult coordination of work among multiple team members who often have different expectations, low levels of autonomy and responsibility among some students, teacher overload, and limited opportunities for ongoing consultation. The primary objective of this paper is to identify the main risks associated with managing student projects in an academic environment and to propose preventive measures that can contribute to improving the quality of project-based teaching, particularly within the subject Projects and Construction Materials at the Department of Mathematics, Physics, and Technical Education of the Faculty of Education. The secondary objective is to provide the results of the analysis as inspiration for educators in planning, implementing, and innovating student activities, thereby supporting the wider use of effective project management methods in higher education practice.

2. Methodology

This study applies to a combination of qualitative research methods aimed at comprehensively identifying and analysing risks that occur during the implementation of student projects in higher education. The methodological approach includes three complementary components: the construction of an Ishikawa

diagram, facilitated brainstorming sessions with students and teachers, and an analysis of documentation from previous student projects (Tomaskova, Krotky, & Honzikova (2025); Tomášková (2025)).

2.1. Brainstorming with students and teachers

Brainstorming represented the first phase of data collection and was conducted separately in two groups: students of technical education teacher training and teachers involved in leading project-based instruction. Both groups participated in facilitated discussions focused on their personal experiences with the implementation of student projects, recurring problems, cooperation barriers, ambiguities in the organization of work, and factors influencing motivation, task progression, and project completion. The aim was to gather unfiltered insights into the practical difficulties that arise during the planning, implementation, and evaluation of project tasks (see Figure 1).

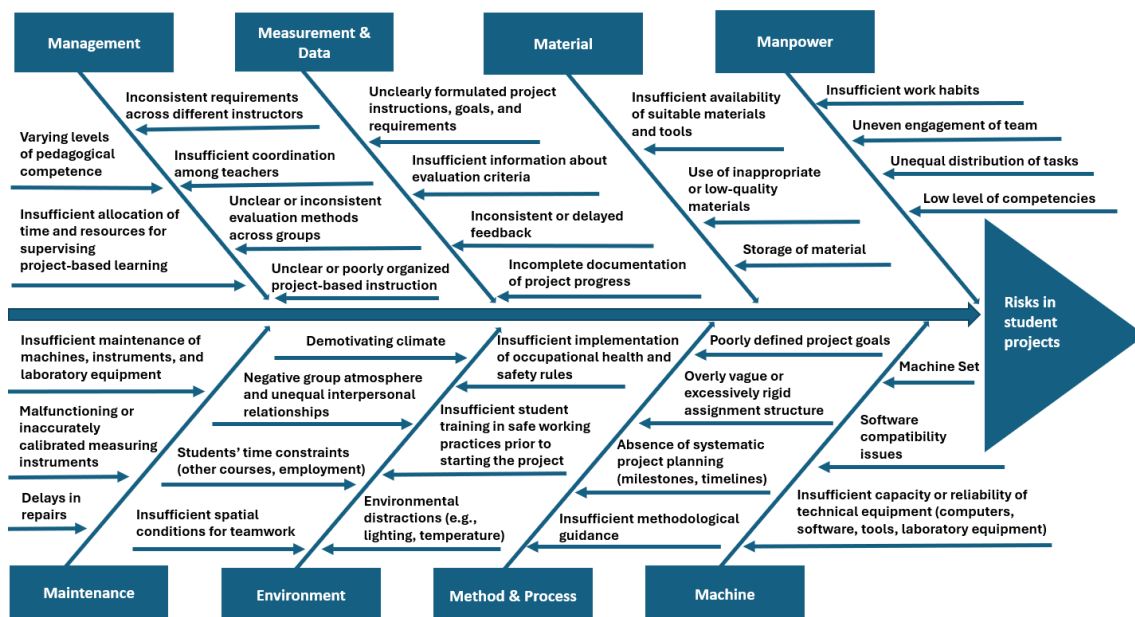
2.2. Ishikawa diagram

Based on the data obtained through brainstorming and the analysis of project documentation, an Ishikawa diagram (fishbone diagram see Figure 1) was constructed as a tool for systematically mapping the causes of the problems identified in the implementation of student projects. In the first step, the central problem area was defined as: “Risks in the implementation of student projects”. Subsequently, individual causes were classified into predefined analytical categories corresponding to the extended 5M+ model: Manpower, Material, Measurement & Data, Machine, Maintenance, Method & Process, Management, Environment.

3. Results of the risk analysis

The Ishikawa diagram (see Figure 1) thus served as a visual synthesis of all collected data and provided a foundation for developing subsequent preventive measures.

Figure 1. Ishikawa Diagram.



4. Conclusion

The analysis revealed that the successful implementation of student projects is significantly influenced by interconnected human, technical, organizational, and methodological factors. Identifying these risks through brainstorming, documentation review, and the Ishikawa diagram enabled a clearer understanding of their causes.

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