GENERAL INFORMATION

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Dataset Title: Analysis of engineering education interventions using the Framework for Identifying the Embedding of TheorieS (FIETS)

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DESCRIPTION

General description of the dataset:

The dataset is a literature review which was obtained in a qualitative content analysis of papers of engineering education interventions in their use of educational theories in abstract, background, intervention design and intervention analysis. It was used to validate the Framework for Identifying the Embedding of TheorieS (FIETS). FIETS is a literature analysis approach that focuses on (1) identify what - if any - theories and or subsequent frameworks are mentioned in a research article on engineering education practice and (2) analyse how the theories mentioned were used.

The dataset includes the underlying usage and demonstrate its usefulness for analysing the theoretical embedding of a given body of literature on educational interventions. It supports the results of the journal article van Helden et al. (2025): FIETS: A Tool for Assessing the Embedding of Theory in Engineering Education Intervention Research.

In addition to that, the dataset contains a template file of the framework (template.xlsx) to allow other researchers to run the same type of analysis.

Keywords:

Educational theory, educational interventions, learning theories, instructional design, qualitative content analysis

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VERSIONING AND PROVENANCE

Last modification date (YYYY-MM-DD):

2024-03-01 - Published initial version

2025-07-05 - Minor changes after review

METHODOLOGICAL INFORMATION

Description of data collection methods:

\* Paper Selection. A subset of 18 papers was randomly selected from a previously conducted systematic literature review on educational interventions in collaborative engineering design education (van Helden et al., 2023). Firstly, three papers were used to design a first version of FIETS. Secondly, three other papers were used to refine FIETS. Finally, the remaining 12 papers were coded using the refined version of FIETS.

\* Coding protocol. Each paper was coded using FIETS by two individual authors. The first phase of the coding protocol involved identifying all educational theories mentioned in a given paper. Both coders compared their results and any disagreements were solved through discussion until consensus was found. In instances where no consensus was reached, a third coder would be asked for their perception and based on this information a decision would be made.

The second phase of the coding process involved evaluating the embedding of all identified theories on three aspects: (1) Background, (2) Design of the intervention, and (3) Analysis of the intervention. Each aspect is evaluated using the validated scale that can be found in the ‘encoding’ tab of raw.xlsx file. Again, both coders compared their results and resolved any disagreements through discussions until consensus was found.

\*Software for data interpretation. The data can be used and viewed using any tabular data processing software, e.g. Excel or LibreOffice.

FILE OVERVIEW

Directory structure:

This repository contains the following files:

\* README.docx (this file)

\* data/raw.xlsx - contains the coded data of an analysis of 12 papers as well as an explanation of the codes

\* `data/template.xlsx` - contains an empty version of the framework for further use in analysis

REFERENCES

van Helden, G., Zandbergen, B. T. C., Specht, M. M., & Gill, E. K. A. (2023). Collaborative Learning in Engineering Design Education: A Systematic Literature Review. *IEEE Transactions on Education*, 1–13. <https://doi.org/10.1109/TE.2023.3283609>

van Helden, G., van der Werf, V., Schleiss, J., Saunders-Smits, G. (2025). FIETS: A Tool for Assessing the Embedding of Theory in Engineering Education Intervention Research. *European Journal of Engineering Education,* [*https://doi.org/10.1080/03043797.2025.2532589*](https://doi.org/10.1080/03043797.2025.2532589)

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