

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Sabah Farshad

PhD Program: Engineering Systems

Title of Thesis: Improving collaborative engineering design and learning through feedback systems in the age of digitalization and AI

Supervisor: Professor Clement Fortin

Name of the Reviewer: Dr. Henni Ouerdane, Associate Professor

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	Date: 12-01-2024
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The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.

The doctoral thesis is composed of 6 chapters including Introduction and Conclusion. The structure is logic and allows for a rather good and informative reading throughout the chapters, which are well-balanced. The bibliography is quite rich and thorough. It provides useful references allowing the reader to have a good vision of the specialized doctoral work in the broader context of the scientific field. A noteworthy effort for clarity has been made to explain the theoretical framework of the research as well as the technical aspects, but the text can still be improved to better formulate the research questions and the different hypotheses formulated throughout the work. A useful glossary is provided after the Conclusion.

The candidate states that for up to 20% of the main text artificial intelligence tools were used to improve the reading of the thesis. That said, a proofreading by (ideally) a native speaker of English would be useful to polish the text.

- The relevance of the topic of dissertation work to its actual content

The research reported in the thesis concerns the development of a methodological framework to identify and address causes of poor cooperation in collaborative engineering design and learning and their detrimental effects on project management, possibly leading to failure. While modern technologies are meant to facilitate communication and provision of information, and hence active engagement in different settings (work fully performed on site, remotely, or partially remotely via internet), human-centered challenges remain. The doctoral work that addresses these issues is based on the research design methodology (DRM) and uses an artificial intelligence approach. The developed tools are applied to five case studies.

- The relevance of the methods used in the dissertation

The approach used in the doctoral work is that of DRM, which is perfectly relevant here. As regards the technologies: artificial intelligence, text classification, chatbots and natural language processing have been used appropriately for the case studies.

- The scientific significance of the results obtained and their compliance with the international level and current state of the art

The scientific significance of the results obtained during the doctoral work and how they comply with international standards and the state of the art is demonstrated by the publications of 2 articles in peer-reviewed journals and 3 presentations at international conferences, two of which with proceedings.

- The relevance of the obtained results to applications (if applicable)

As stated in the thesis, more work that would include a larger number of case studies could help further assess how the methodology developed and discussed can be generalized and possibly improved so that it can be applied in complex environments involving numerous stakeholders.

- The quality of publications

The quality of the publications is reflected by the journals where they are published and by the conferences where the work was presented. The most recent article in particular is published in one of the top Q1 journals in the field of education.

The summary of issues to be addressed before/during the thesis defense

Though 3 research questions were formulated from the outset in the Introduction, and were updated in the chapters, and discussed in chapter 5, a concise recap of the “updated” research questions would have been welcome in the Conclusion. Same comment applies for the research hypotheses which could have been stated in the Introduction. In fact, at the top of page 86, a hypothesis is stated, but its formulation is vague: what is “valuable information”? How should one understand “valuable” here? Is it quantitative and/or qualitative? Is this the overarching hypothesis of the work?

“hypothesis 2” is mentioned at the top of page 107 and later, page 117, we read three hypotheses listed and referred to hypothesis (1), hypothesis (2), etc. – while it is fairly clear that in page 107 it refers to the sentence written just before, such notation should not be introduced if it is not used elsewhere; further this can lead to confusion with other hypotheses formulated for the different case studies.

I recommend proofreading and polishing the text, possibly with tools that can check the syntax and why not the meaning in context. For instance, a sentence like:” Our hypothesis is that data logs that record collaborative activities can provide valuable information of active engagement of team members.” Is not clear to me, not only because it is vague, but also, I do not quite get what “activates” means here; should it be “activities” rather than “activates”?

The work itself can be recommended for defense but the thesis should be written with greater care.

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report

The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense