



HUMANISE

Identification of the Effects of Human Aspects on the Requirements Engineering Process

A Systematic Literature Review

INVESTIGATORS

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Abstract

Background: Requirements Engineering (RE) is a critical phase of software engineering (SE), which requires the collaboration of various SE roles, such as requirements engineers, stakeholders and other developers. Thus, it is a highly human-dependent process, identifying how “human aspects” – such as personality, motivation, emotions, communication, gender, and culture– might impact the RE process and support successful RE.

Method: A systematic Literature Review (SLR) was conducted with 74 high-quality primary studies.

Conclusion: The human aspects were categorized into three areas - individual, technical and team, and identified that these aspects positively or negatively affect the RE process. Software practitioners can consider these aspects when forming and managing teams, conducting the RE process to improve it.

Implications: The SLR findings will be beneficial for the research community by focusing on specific under-researched human aspects, developing practical guidelines/tools, and conducting studies with industry to identify their impacts better and provide better solutions.

Background / Aims

RE is considered to be one of the most important and challenging parts of SE, as it impacts every stage of the software development process. Identification of the effect of different human aspects in SE is an emerging area of study. By systematically reviewing the primary studies, the following objectives are to be achieved;

- Identify and categorize various human aspects on RE that have been studied to date.
- Systematically analyze the work done to identify the effects of human aspects on RE.
- Provide a set of recommendations for future research into the effects of human aspects on RE.

Methods / What did we do?

The SLR was conducted based on following steps considering Kitchenham and Charters' guideline and Kitchenham's procedures.

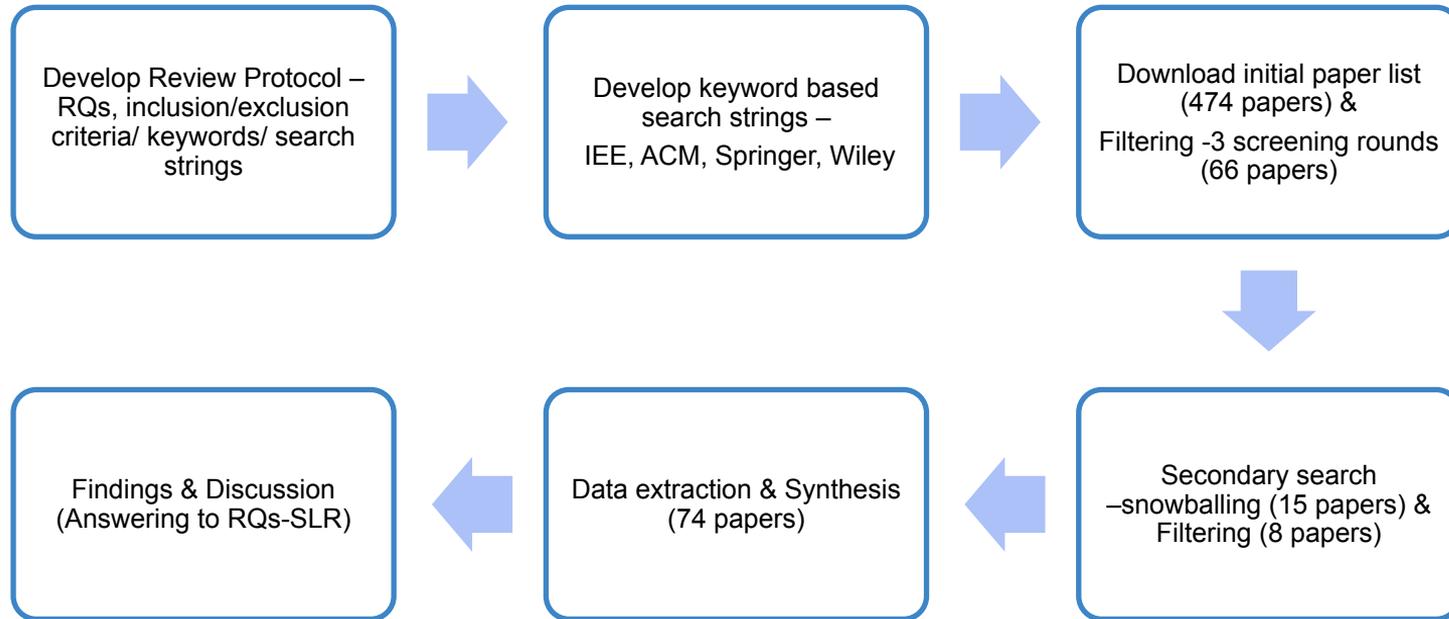


Figure 1: SLR process

Summary of findings

1. Identified set of human aspects related to RE that have been investigated to date –Human aspects were categorized into three groups.

- Individual-related human aspects -> **Personality (32.4%)**, Emotions (23%), Motivation (20.3%), Human values (17.6%) and culture (17.6%) are the highest.
- Team-related human aspects -> **Communication issues (33.8%)**, and Geographical distribution (8.1%) are the highest.
- Technical- related human aspects -> Majority was about **Domain knowledge (5.4%)**.

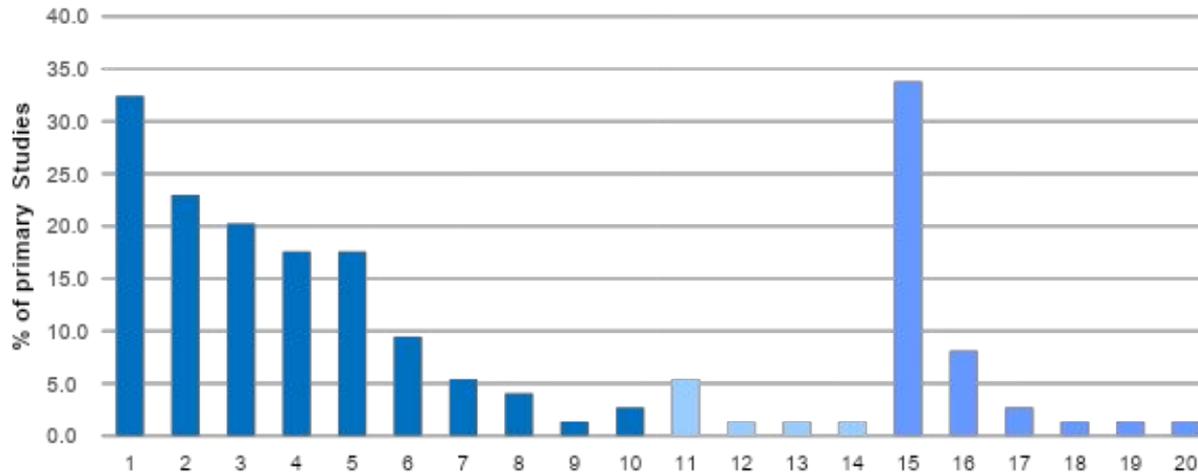


Figure 2: Categorization of the human aspects

Summary of findings

2. Identified the nature of the effect of human aspects in the RE process; Positive or Negative.

Negative emotions;

- >user rejection
- >conflicts
- >de-motivate individuals

Communication issues;

- >lack of understanding of req.
- >missing/incomplete req.
- >wrong collection of req.

Culture;

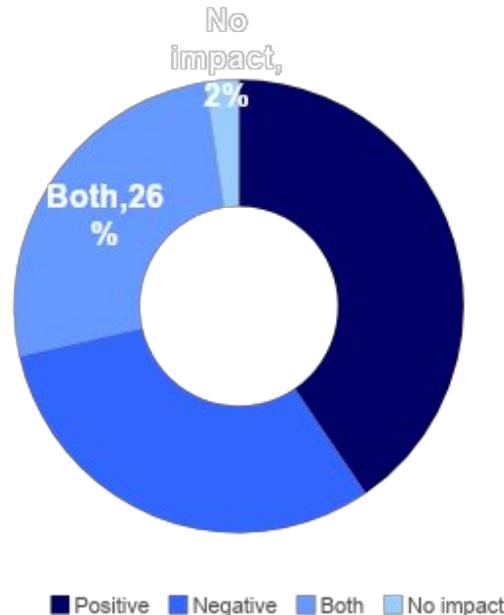
- >miscommunication
- >fear/mistrust/social issues

Geographic distribution;

- >difficulties in discussions
- >difficulties in handling information

Motivation;

- >risk of conflicts
- >efficiency



Improve;

- >overall RE process
- >quality of RE process
- >effectiveness of RE phases
- >decision-making
- >open-mindedness & confidence
- >novelty & creativity

Reduce errors in RE

Figure 3: Nature of the impact of human aspects on RE

Summary of findings

3. Discovered the most affected RE phase due to human aspects.

- **Requirements elicitation** has been shown to be the most affected RE phase.
- No studies focused on the effect of human aspects in the requirements management phase.

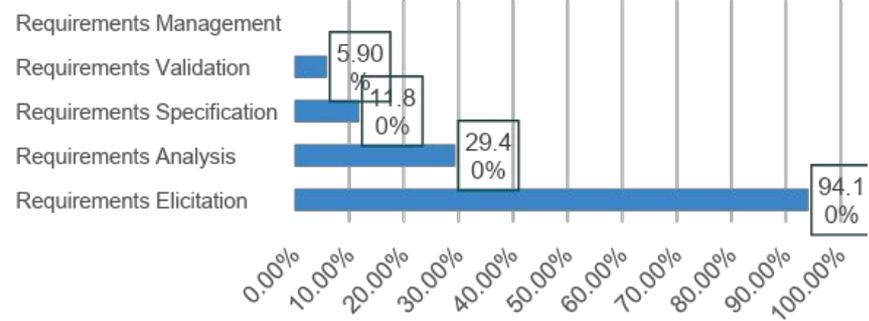


Figure 4: Research studies on how human aspects impact on different RE phases

4. Identified key gaps in the area of human aspects and RE

- Individually most studied aspect –communication issues
- Personality, Motivation, Gender –focused on the SE most including RE

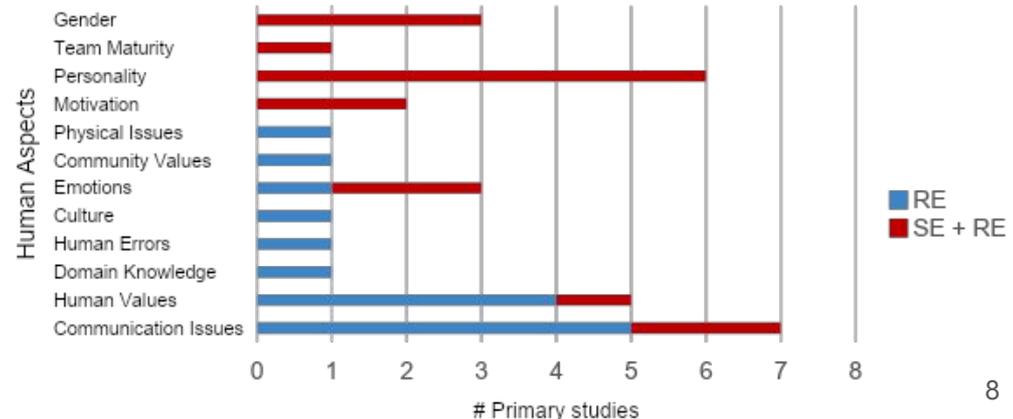


Figure 5: Individually considered Human aspects related to RE/ SE

Conclusions

- More studies are needed to directly focus on the effects of human aspects on RE – *currently working on Personality & Motivation effects on RE*
- More practical guidelines and recommendations are required based on real-world RE processes.
- Need of a more comprehensive and agreed taxonomy of human aspects - beneficial for the categorization of various human aspects in SE in general.

References

- D. Hidellaarachchi, J. Grundy, R. Hoda and K. Madampe, "The Effects of Human Aspects on the Requirements Engineering Process: A Systematic Literature Review," in IEEE Transactions on Software Engineering, doi: 10.1109/TSE.2021.3051898.

Student bio

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