Understanding methods of assessing health intervention behavior through data-driven approaches

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The digital transformation has triggered a fundamental change in the delivery of healthcare and its services. Many of these services enable patients to be more involved in their treatment or healthcare, leading to higher patient satisfaction and measurable improvements in health outcomes [1], [2]. Patient access to electronic health records has been found to have further positive effects such as reassurance, reduced anxiety and increased awareness [5] and improved decision making for physicians [4]. To understand how patients use health interventions, engagement data can be a valuable source to explain usage behavior and detect individual preferences.

In previous work, I have conducted a systematic literature review [3] about quantitative models in research that aim to measure or predict usage behavior with digital health interventions. Furthermore, the identified models have been discussed in semi-structured interviews with experts in the digital health sector to evaluate them from an application development perspective. With this work I aim to contribute to a better understanding how to achieve a beneficial division of digital and analogue components in the therapy process, based on individual engagement needs. The results are visualized in an interactive web interface (called *eXhebe= 'explain health behavior'*), that displays findings from one single study, as well as a summary for all studies to a chosen variable.

The results from analyzing the literature to data-driven prediction models for health intervention engagement suggest that this research is still at the beginning. Most studies applied a type of regression analysis to detect correlations between an average of nine predictor variables and a target variable. Similarly, the interviewed experts showed to be at the beginning of including such evaluations into their health applications. Interview partners expressed doubts about transferring the content of single scientific publications about user engagement to their own work as they felt that this question was very multidimensional and could not be answered by a single study. Instead, experts were rather interested in overall recommendations from the conducted studies and would prefer to use scientific publications to gasp an overall picture of trends, study settings and theories. This leads to the following question of how to effectively measure engagement within research studies and translate this knowledge into a care process. Therefore, the web

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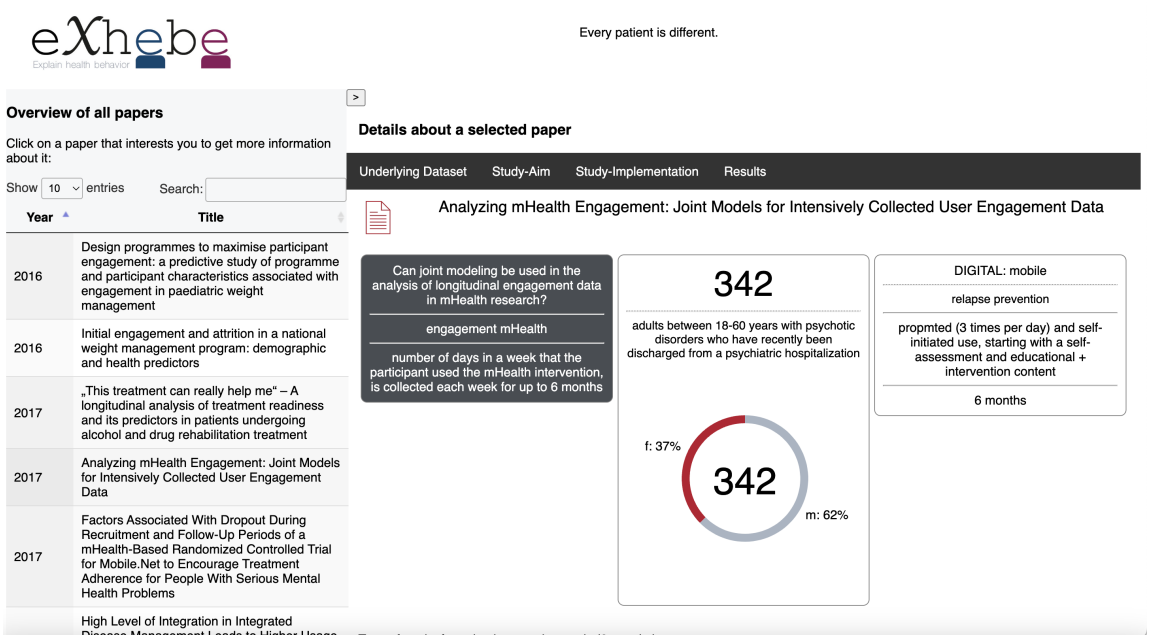

Fig. 1. Final screen view of the 'eXhebe' database interface. The left table shows all included publications included in the 'eXhebe' database. The box on the right-hand side shows a selected paper, that investigates 342 adults with psychotic disorders with a mobile application. The black top bar allows to summarize all publications based on a filter, such as the Study aim (e.g., target variable)

Interface *eXhebe*, which is displayed in Figure 1, is currently being developed with the aim to make empiric knowledge about health application engagement more accessible.

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