

# The Information Fragmentation Problem Through Dimensions of Software, Time and Personal Projects

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## Thesis Summary

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*Abstract:* This paper is an extended abstract of the doctoral thesis [1]. It presents an overview of the research into the field of Personal Information Management (PIM) and a study of information fragmentation on the three axes: software, time and personal projects. These axes were investigated through three studies: (i) a preliminary investigative study by interviews and observation of project information management, (ii) the observed usage of the purpose-built project information management research prototype, and (iii) logging of the usage of the same prototype in the wild. The findings show (i) the extensive information fragmentation in each individual PIM tool besides cross-tool fragmentation, (ii) the information overload preventing focusing on the subset of fragmented project related information and changing focus over time, and (iii) the importance of support information (information scraps) and its integration into project flow.

*Povzetek:* Pričujoče delo je razširjen povzetek doktorske disertacije [1]. Predstavlja pregled raziskav na področju upravljanja zasebnih podatkov in študijo razdrobljenost podatkov na treh oseh: programski opremi, času in vodenju zasebnih projektov. Te osi smo raziskovali skozi tri študije: (i) uvodno študijo z intervjuji in opazovanjem upravljanja podatkov povezanih s posameznim projektom, (ii) opazovanjem uporabe namensko razvitega prototipa, in (iii) dnevnik istega prototipa, ki so ga uporabniki uporabljali v vsakdanjem življenju. Glavne značilnosti upravljanja projektnih podatkov so: (i) obsežna razdrobljenost podatkov ne samo med programsko opremo ampak tudi v posameznem PIM orodju, (ii) preobremenjenost s podatki, kar preprečuje osredotočenost na podmnožico trenutno pomembnih podatkov in spreminjanje fokusa skozi čas, in (iii) pomen podpornih podatkov in vključenost le-teh v tok projekta.

## 1 Introduction and problem statement

Personal projects are an undertaking made up of numerous tasks and sub-projects that may last for days, weeks, months or years. These projects may include official granted projects, projects ordered to be undertaken by someone else as well as undertakings initiated by an individual. They are personal in a sense that it is (most commonly) up to knowledge workers to decide on how to manage them, which marks the management with a personal touch.

The core resource to be managed is personal information – information that an individual manages to satisfy their needs, requirements and fulfil their roles. This process is studied in the field of Personal Information Management (PIM). The three most common personal information types are files, emails and web bookmarks. Studies have shown that information fragmentation is a severe hindrance to project flow. However, despite a considerable body of research and a handful of prototypes providing unification it is still not clear what are the characteristics of such

day-to-day, semi-formal and loosely planned projects, and how should unification be implemented. This thesis focuses on (tacit) knowledge behind personal project information management that is not captured by current PIM applications (for example the level of fragmentation, information importance, project stages, context recreation, etc.), and that could offer a solution to project information management.

## 2 Methodology

The research approach in this thesis follows the classical Human Computer Interaction (HCI) practice: (i) empirical analysis of user needs, (ii) design a solution to meet these needs, and (iii) evaluate the solution. The first step consisted of repeated semi-structured interviews over the course 4 months during which participants described their projects and related information management. This step formed the empirical conceptualisation of tacit knowledge of the project management process and the basis of the development of the Task Information Collection (TIC) proto-

type. The third step consisted of two studies. In addition to evaluate the prototype and observe its usage in the real life settings (repeated weekly observations of usage and interviews), the in-the-wild usage data (TIC is offered as an open source software to general public) was logged to confirm and further the findings of the exploratory study as well as evaluation study.

### 3 Results

Based on the studies and observations the thesis provides a definition of a personal project as “a self defined or given undertaking lasting from days to months that is (i) directed towards and defined by a specific goal in the form of information or/and a path to achieve it, (ii) managed (information, time, people, equipment, budget) by an individual on a day-to-day, semi-formal manner based on this individual’s ingenuity, past experiences, and knowledge (of technology and information), and (iii) made up of loosely planned tasks and sub-projects affected by planning fallacy and completed when remembered, when time permits or when approaching formal due-dates.”

Quantitative data provided additional insight into the problem and made several classifications, comparisons and listings possible: classification of factors behind information importance such as time spent and (mental and physical) effort invested, comparison of fragmentation patterns in the file hierarchy alone (between 2 or more folders in a file hierarchy), and comparison on how project information spaces evolve which shows how information focus changes when sub-projects are completed. The data also showed how projects overlap through information and how information is reused or recycled for different projects constituting to even greater fragmentation in the file hierarchy. In particular, the data revealed the importance of support information (web pages, information scraps) to the project flow, which has never been observed in the personal project context (e.g. its relation to other information types) and its unification (in TIC) with other information types proved very helpful at the beginning as well as through projects’ lifetime.

### 4 Discussion and further work

The main findings revealed (i) the preference over selective unification focusing on the subset of cross-tool project related information, (ii) the evolution of such unification over time, (iii) re-use of information in various projects, (iv) the extensive information fragmentation in each PIM tool due to different organisational needs and ease of information access, (v) the factors behind information value (time and effort spent), and (vi) the importance of support information in relation to project goals. Nevertheless, the studies presented form an initial in-the-wild study of project information unifications and further studies are needed to contribute towards even greater understanding of how to

support information unification in the project management context.

### References

- [1] M. Kljun, “The information fragmentation problem through dimensions of software, time and personal projects,” Ph.D. dissertation, Lancaster University, 2013.