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WHAT INFORMATION CAN WE EXTRACT FROM THE DOCUMENTATION OF STUDENT DESIGN PROJECTS?

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1. Introduction

Product development processes in industry can be enhanced by the application of systematic procedures and adequate methods. The body of knowledge concerning design methodology is growing continuously, but the focus has shifted to some degree. Still, a lot of new methods are being developed, but scientists nowadays are also concerned with a flexible and context-related deployment of procedures and methods. [Birkhofer et al. 2005] postulate the "ten commandments" of successful method transfer, the first of them being: "Meet the design situation!". The supply has to meet the demand, meaning e.g. that methods have to fit to the design situation.

This paper focuses on method transfer in academia, which traditionally takes place in lectures and tutorials. The Institute of Product Development at the Technische Universität München (TUM) offers students the possibility to apply and train these theoretical contents in the course of design projects where students deal with design tasks (often originating from an industrial background) and are coached by researchers from the Institute. Students have the possibility to receive academic credit for working on the project. For this purpose, they have to generate a report that is accredited as semester thesis respectively diploma thesis. The report represents a detailed project documentation.

During these projects, students gain experience concerning the solving of design problems, the application of procedures and methods, etc. This experience is valuable concerning two aspects: first, it may serve as feedback for the Institute because it shows how design education theory is put into practice by the students, and second, it may enable the transfer of this experience to new projects. The design situations (products, branches, involved partners etc.) vary from project to project, but certain general design tasks or problems and particular design methods recur in many projects.

This paper investigates the issue of what type of information can be extracted from the mentioned documentation of student design projects. In chapter 2 the variety of student design projects is depicted and the motivation to investigate the resulting project documentation is discussed. Chapter 3 deals with methods that enable the observation of design processes, the extraction of information from these processes that is relevant for further use, and the analysis of the information. Moreover, the particular method that was applied within the presented approach is described. In chapter 4, the results of a preliminary analysis of a small number of projects that lays the foundation for a broader research are presented. The focus lies on the analysis of procedures, tasks and methods. The implications and insights gained from the analysis are discussed in chapter 5, where also an outlook on future research activities is given. This includes the development of an approach towards transferring knowledge extracted from the documentation to new projects. Chapter 6 concludes this paper.

2. Motivation

The Institute of Product Development at the Technische Universität München (TUM) offers various lectures in its curriculum, where students are taught methods for product development and conceptual design. The contents are trained in tutorials and students have also the possibility to apply these procedures and methods in the course of semester projects. No project is the same, there are variations e.g. with respect to the motivation for the project, the number of students involved, the type of the product and the type of the task (see figure 1).

attribute	specifications, variations			
motivation (project origin)	industrial (company)	academic (institute)	personal (student)	
number of students involved	1 (single designer)	2-3 (small team)	4-8 (larger team)	
product type, branch	sports equipment	household appliance	automotive	…
type of task	new product development	…	product redesign	
overall project goals	innovation (functionality etc.)	…	optimization (cost, weight etc.)	
student method experience	novice (3rd year)	…	expert (5th year)	
…	…	…	…	

Figure 1. Characteristics of student design projects

The motivation for the project often originates from students themselves, when they have a passion for a certain topic (e.g. mountainbikes), identify problems in current products on the market and have ideas for innovative solutions. They can work on the topic in the context of a semester project while being coached by an Institute member. Sometimes, the design task is defined by the Institute. But very often, semester projects are being carried out in the context of an industrial cooperation, where the task relates to an actual industrial problem.

The number of students involved in the project also varies. Students either work as single designers on their own, or as a group of student designers, usually in pairs or groups of three. Another constellation is called product development seminar where a team of 4-8 students works on a task that is usually defined by a partner in industry. Depending on these specifications, the organization of the project (team meetings, meetings with Institute supervisors, meetings with partners, deadlines, presentations etc.) also varies.

The product types that are being worked show a great diversity, including the automotive sector, sports equipment, medical technology, household appliance and many more. The type of overall task is typically something in between totally new product development and product redesign, the overall goals range from the generation of innovative solutions and new customer features, the improvement of functionality to product optimization (such as cost and weight reduction).

A further aspect that characterizes the projects is the methodical experience of the involved students. Students usually start working on a semester project in their 3rd, 4th or 5th year. Students in the 4th or 5th year have typically followed the lectures on product development methods prior to taking on a semester project. Some have additionally trained the contents in lab excercises offered by the Institute. Others (especially 3rd year's students) are not as much "influenced by method theory" yet or work on the project in parallel to following the lecture. The level of methodical experience has a serious impact on the way the project is being worked on.

Another aspect with a certain influence on the project is the involvement of the Institute supervisors. Some researchers leave their students a lot of freedom and give them feedback from time to time. Other supervisors are more deeply involved in the project and place certain demands with respect to procedures and methods to be applied. Finally, in some projects the researcher/supervisor is part of the design team and actively participates in the design process and contributes to the results.

The results achieved within student design projects typically include the description of one ore several solutions to the technical task in the form of conceptual drawings, CAD models and/or hardware prototypes. In addition, some sort of validation or proof of concept is carried out, in the form of prototype tests or ratings, where the generated solution is e.g. compared to existing products.

The project documentation, which students create when working on the project in the course of a semester thesis or diploma thesis, typically contains details on goals, procedures, methods, results and evaluation. An important part is also the reflection on the process, the method application and the results, the derivation of lessons learned, potential for improvement of the methodology etc. Thus, the semester projects represent an application of procedures and methods that are taught in lectures and tutorials. Furthermore, this application experience is documented and available for further use.
The research question for this paper is: What conclusions can be drawn concerning overall procedure, the execution of particular tasks and the application of design methods in the projects, when trying to extract that kind of information from the semester and diploma theses? To be able to give an answer to this question, we will first generally explore methods that allow the extraction and analysis of information from design processes in the next chapter.

3. Method

The analysis of design processes in order to derive insights and understanding as well as to develop means of support and optimization is common practice in design research activities. Before it is possible to conduct the analysis, however, the data that is to be analyzed has to be created. Therefore it is necessary to observe and capture the process adequately. In this chapter, corresponding approaches and methods are discussed and compared at first. Secondly, the method developed and applied within the scope of this research activity is described in detail.

3.1 Discussion of methods for the capture and analysis of design process contents

There are various means of capturing and analyzing the contents of design processes. Schroda mentions methods such as “thinking aloud” and participating observation [Schroda 2000]. A major disadvantage here is the fact that the designer is influenced in his work to a significant degree. Less reactive methods, such as video recording, are only suitable for short periods of time (several hours on several days) in lab environments and setups involving a limited number of participants. Logfile recording is utilizable only in the computer supported execution of design tasks. A method of capturing the design process without any impacts or demands on the designer is hardly imaginable according to [Schroda 2000]. A self protocolling method for capturing the design process is suggested, called a map of conceptual design (“Konstruktionslandkarte”).
Robinson describes a new methodology to explore the variety of different activities that designers perform and the proportion of working time that each of these activities accounts for [Robinson 2005]. A work-sampling approach supported by the use of personal digital assistants (PDAs) is utilized. Advantages of this approach are e.g.: work activities can simultaneously be viewed from multiple perspectives (due to the layout of the data collection process) and the data is collected in ‘real time’. It is therefore more accurate in comparison to approaches relying on designers’ memories when recalling activities ex post in interviews.
A framework for capturing and indexing design information is presented by [Eris et al. 2005]. Here, design information consisting of video records and predominantly text-based design documents are stored in two information systems. The data is indexed and can therefore be retrieved e.g. by keyword search. The focus in this approach is rather placed on reuse than on analysis of the information. The possibilities for video protocols are, however, limited in design projects that are not studio based, that span over a larger period of time (e.g. 6 months) and that involve several actors working in distributed environments (which is most common in industrial projects). Text-based design documents (or reports) are referred to as traditional means of documenting design information. They are treated as formal accounts of what has taken place and been learned during a project and therefore resemble the type of student project documentation presented above. [Eris et al. 2005] underline the usefulness of text-based design documents for informing future projects and their strategic importance in establishing a knowledge base that can facilitate organizational learning.
Another type of text-based design document that is more informal, but widely used in industry is the engineer’s logbook. [Hicks et al. 2005] state that it represents a significant amount of design information and knowledge that could be of considerable benefit for supporting both current and future design activities. Again the focus lies on reuse of design contents. Still, in order to enable reuse

in the first place, a detailed study of the information content of variety of engineers' logbooks was carried out, e.g. resulting in the identification of key classes of information associated with logbooks [Hicks et al. 2005]. The analysis is seen as a prerequisite for the development of tools and strategies for improving the management of this important information resource.

[Wodehouse et al. 2004] describe the groupware product TikiWiki, which is used in student design projects as a digital repository and collaborative tool. Wiki pages represent a digital project logbook for students, utilized as a means of documentation of project contents. In addition, they enable the communication of relevant information between different teams. The retrieval is facilitated by linking the pages with each other, thus enabling a browsing of contents in addition to a keyword search.

3.2 Description of applied method for the analysis of student semester project documentation

Figure 2 contains a list of characteristics concerning methods for capturing and analyzing design process contents that was derived from the analysis of the literature described in the previous section. The focus of the hereby presented approach is highlighted in the darker cells.

attribute	specifications, variations		
main purpose	analysis of design contents		reuse of design contents
design process environment	"real" industrial practice	student projects	controlled lab experiment
observed time period	weeks – months (whole project)		hours – days (limited nr. of tasks)
information capture	real time (e.g. video protocol)		ex post (e.g. interview, report)
information captured by	observer (e.g. video protocol)		designer (e.g. report)
information volume	work samples (e.g. activity types)		extensive information (e.g. concepts)
type of information	formal (e.g. report, drawings)		informal (e.g. discussion)

Figure 2. Characteristics of design process capturing methods and focus of research

The **main purpose** in the context of this paper is the analysis of design process contents, whereas the reuse of contents as the long term research goal will be the content of further publications (see chapter 5). The **environment**, in which the investigated design processes are located, cannot be assigned strictly to either "real" industrial practice or to controlled lab experiments. They are rather found in between these two extremes, which needs some explanation. Design processes in industry can deliver insights on how practitioners in companies work and what problems occur in reality. These processes are hard to capture and to compare, statistical analysis is difficult because of the many influencing factors, and adequate documentation for analysis is hard to obtain, also because of secrecy issues. In a lab environment the number of influencing factors can be reduced to a certain degree, experiments can better be compared to each other. A capture of information in various formats is possible (videos, protocols etc.). Still, those experiments do not represent engineering reality and usually just cover a limited number of design tasks in the time frame of hours respectively days.

The student projects in focus of this research usually have a duration of 4-6 months, which is the **observed time period**. Tasks and boundary conditions (financial limits, deadlines etc.) resemble the industrial practice of product development to a certain extent. The documentation covers the whole design project and it practically comes as a requirement of the assignment (**information capture** by designer ex post). A disadvantage is that the design process is not captured "live" and in its entirety. Only those contents can be subjected to further analysis, that have been documented. Therefore, the real process is just represented to a small degree, sometimes the difference is huge. The report may communicate a systematic, well-planned proceeding according to the textbook, although the real project consisted of heavy iterations and short-term actions. Still, it is the authors' belief that, in spite of these shortcomings, valuable insight can be derived from the analysis of the available material nevertheless. The documentation in consideration tends towards a formal **type of information**: it represents a report of processes, methods and results. Contents are usually well elaborated, structured and reflected, because ultimately they are going to be reviewed and evaluated by the Institute staff. This stands in contrast to more informal types of documentation such as the engineer's logbook.

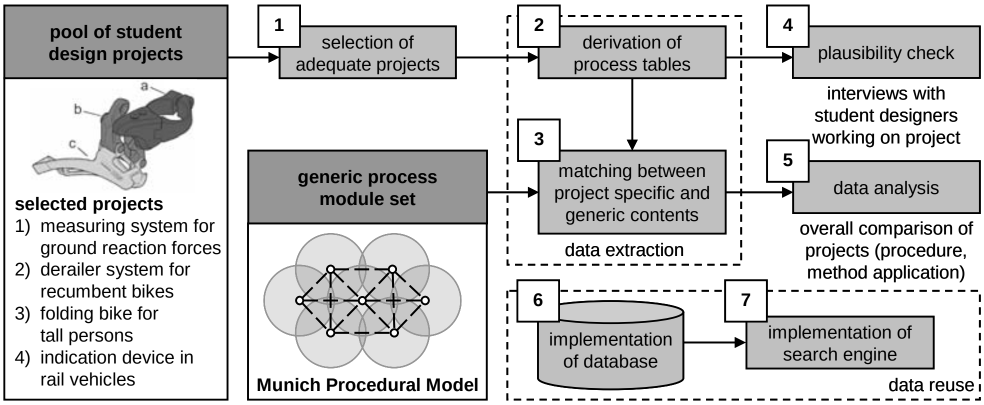
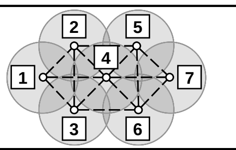


Figure 3. Procedure for analyzing student project documentation

The procedure for analyzing the student project documentation is displayed in figure 3. First, adequate projects were selected (#1). For a preliminary analysis only four projects were considered in order to enable quick representative results and derive insights for the optimization of the method with a justifiable effort. Projects had to meet some requirements in order to be suitable. They should deal with a design task resulting in a solution concept, the level of result concretization being at least a CAD model, better a prototype. As a second requirement, the documentation had to be exhaustive and of good quality, reflecting the contents of the project in a reasonable manner.

The projects were then analyzed according to the procedure described by [Ponn & Lindemann 2005, pp. 12-13]. The analysis was carried out by students (who had not been familiar with the analyzed projects before) in close collaboration with the main author of the paper. A process table was generated for each project (#2). The process tables contained individual process steps, the input and output artifacts of each process, applied methods and tools, and obtained insights. The process steps from the process tables were then matched with the contents of a generic set of process modules, i.e. each process step from the project was classified and assigned to a process module from the set if possible (#3). The process modules are listed in figure 4.



1. plan goal
2. analyze goal
3. structure task
4. generate solutions
5. assess properties
6. make decision
7. ensure goals achieved

1.1	Analyze the situation		
1.2	Condense and structure the results of the analysis		
1.3	Estimate future changes of individual characteristics		
1.4	Generate alternative scenarios for future situations		
1.5	Derive measures for product and process planning		
2.1	Identify requirements		
2.2	Identify correlations between requirements	5.1	Identify properties for analysis
2.3	Weight and structure requirements	5.2	Plan analysis of properties
2.4	Document requirements	5.3	Carry out analysis of properties
3.1	Relate important requirements to product properties	5.4	Evaluate results of the analysis of properties
3.2	Describe problem on an abstract level	6.1	Preselect adequate solutions
3.3	Identify strengths and weaknesses	6.2	Prepare evaluation of alternative solutions
3.4	Identify degrees of freedom for the design and development	6.3	Carry out evaluation of alternative solutions
3.5	Formulate further target-oriented proceeding	6.4	Interpret results of evaluation
4.1	Detect available solutions	6.5	Support the decision making
4.2	Create new solutions	7.1	Identify possible critical target deviations and their causes
4.3	Extend existing solution spectrum with additional solutions	7.2	Evaluate risks
4.4	Structure and combine alternative solutions	7.3	Reduce risks

Figure 4. List of process modules from generic set [Ponn & Lindemann 2005]

The set of process modules reflects the method theory that is taught at the Institute of Product Development. Each process module refers to a particular design task (e.g. 1.1: "analyze the situation"). Seven categories of process modules (respectively tasks) can be distinguished (e.g. 1: "plan goal"), which correspond to the seven elements of the Munich Procedural Model (MPM) [Lindemann 2005]. To each process module, a limited number of adequate methods had been assigned

that support the execution of the task. The methods included in the process module set represent a selection, which the Institute focusses on in lectures and tutorials. In general, there certainly exist more methods that are equally applicable. The process module set is described in more detail in [Ponn & Lindemann 2005, pp. 6-10]. (Sidenote: The term "process step" always refers to a part of the actual specific procedure within one of the student projects, whereas the term "process module" refers to a part of the generic set of processes/tasks that is used for classification and comparison purposes.)
In step #3 of the analysis procedure, methods were also matched, i.e. the methods that had actually been applied in the process steps were compared to the methods included in the corresponding process module. As a next step (#4), interviews were carried out with the student designers who had been working on the analyzed projects. This was done as a plausibility check, in order to guarantee that the results of the project analysis were valid. Since the students analyzing the projects had not been involved in the projects, they could only rely on the documentation. In the interviews questions were asked (among others) concerning details in the actual procedure during the projects, where these could not be extracted from the documentation. The difference between the actual procedure and results in the project compared to the ones documented in the thesis were also discussed.
The data obtained from the previous steps was then analyzed in MS Excel® (#5). The results from this analysis are presented in chapter 4. A database was implemented containing the generic process module set and the process specific contents for each analyzed project for a potential reuse (#6). In addition, a PDF document containing the section of the project documentation relevant for each specific process step was made available. A search engine (#7) facilitates the search for specific contents of the database that are relevant in a given design situation.

4. Results

The data generated in the described procedure allows the analysis on three distinct levels: procedures, tasks and methods. The findings are presented and discussed in the following.

4.1 Analysis of procedure in the projects (procedure level)

Figure 5 shows the results from the analysis of the procedure in two of the four projects that were regarded in the scope of the preliminary analysis. The rows represent the process steps of the project as they were derived from the documentation, the columns represent the process modules.

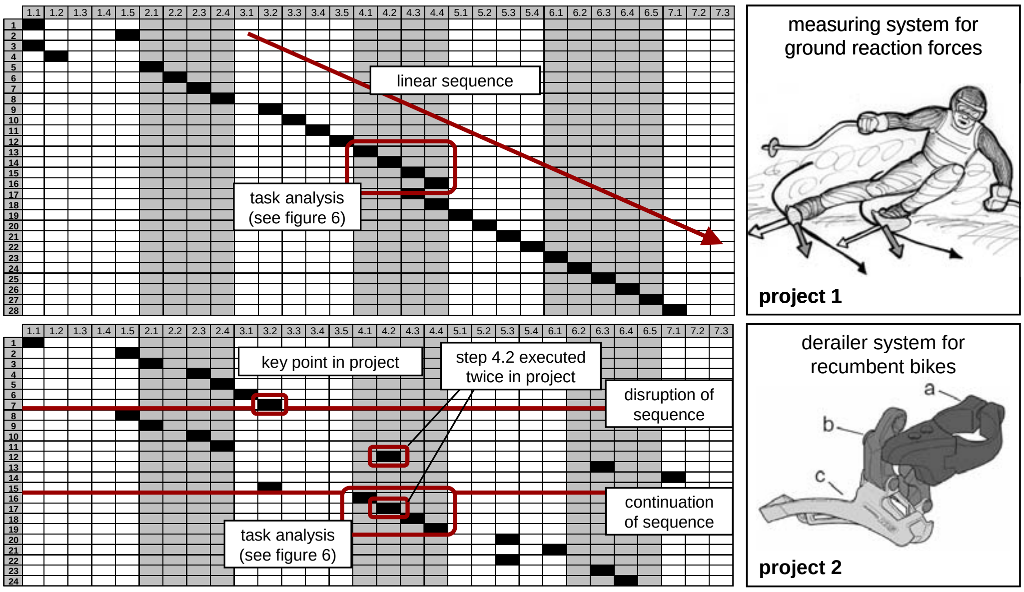


Figure 5. Analysis of project procedures (of two projects)

The seven elements of the Munich Procedural Model (MPM) can be distinguished in the diagrams as the alternating white and grey sections. The black cells indicate a match between process step and process module. Theoretically, the navigation through the procedural model in the course of the project can be visualized by this method, not only with respect to the seven MPM steps on a macro-level, but also on the more detailed level of the process modules.

In the diagram of project 1 (measuring system for ground reaction forces) an almost linear proceeding through all steps of the process module set is noticeable. This observation can be explained as follows: students tend to use the MPM for process planning, either by themselves after having followed the according lecture or encouraged by their Institute supervisor. Therefore it is no surprise that the steps in a project are carried out in such a sequence. The striking linearity of the sequence, which suggests an ideal process without any interruptions, results from the fact that the documentation does not adequately represent the real process. After all, the process steps in the process table were derived from the project documentation. Thus, the process is displayed as it has been documented, not as it has actually been carried out in reality.

In the diagram of project 2 a disruption in the sequence can be noticed. This is due to the fact, that the work on the actual product (a derailer system for recumbent bikes) had been interrupted in order to design a test stand. After the test stand had been conceptualized and built, the work on the derailer system was continued. In this case, the extracted process steps correspond better to the chronological process. The observation in the diagram of another project (not displayed here) was the fact, that at a certain point the procedure was disrupted, and that a new sequence through the MPM was started. From the project documentation it became clear that the student had given up the solution that he had been working on up to that moment and had completely started again from scratch.

This analysis of project procedure allows the identifiation of individual activities undertaken by student designers and their sequence. It also shows how students actually work with procedural models, in this case the MPM. The actual procedure in the project can be displayed to a certain degree, however this strongly depends on the way the process is documented: a chronological documentation is preferable. Certain points of interest during the project can be identified easily, i.e. where the general procedure is disrupted, indicating a decisive situation respectively a situation, where some sort of important decision had to be made. Such key points are also origins of iterations or recursions in the process. For researchers it might be interesting to investigate these particular key points in projects more in detail in order to find out, why certain decisions concerning the procedure were made. Therefore of course, it is reasonable to investigate a much larger number of projects.

4.2 Analysis of design tasks and method selection (task level)

An analysis that goes more into detail is the correlation of process steps ("What is done?") and the selected methods ("How it is done?"). The assumption here is that a process step correlates to a particular task. For this type of analysis there exist several possibilities (see figure 6).

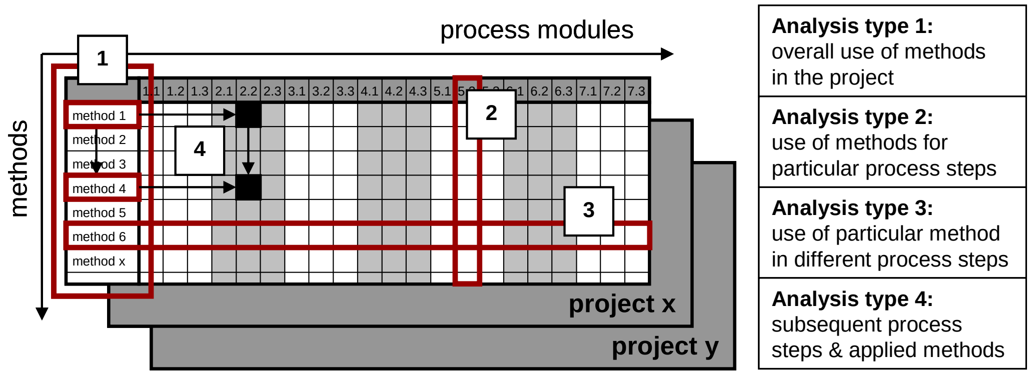


Figure 6. Analysis of correlation between process steps and selected methods

First, the overall number and type of methods that were applied throughout one design project can be regarded irrespectable of individual tasks (analysis type 1). The preliminary analysis of the four mentioned projects shows that quite a lot of methods were used (around 30 methods in average in each project). This comes not unexpectedly, but rather indicates that the students actually put the theory that is taught in lectures into action. Therefore, the fact is not surprising, that most of these methods are also content of the Institute's lectures and tutorials (such as requirements lists, functional modeling methods, creativity techniques, evaluation methods etc.).

A more interesting question is: which methods are actually used in particular process steps (analysis type 2)? And how does this project specific selection of methods correlate to the methods suggested in the lecture (i.e. the methods that are found in the corresponding process module). For instance, the process module number 4.2 ("create new solutions") contains the methods brainstorming, bionics and effect list (among others), which are proposed for the support of the task of creating new solutions. This particular task was carried out in a number of process steps in each of the analyzed projects, sometimes repeatedly in different project phases (see project 2 in figure 5). The methods applied for this task vary from project to project. To allow a comparison, the methods assigned to the process modules 4.1 to 4.4 (corresponding to the MPM element 4 "generate solutions") are displayed in figure 7, next to the methods applied in the related process steps in the four analyzed projects.

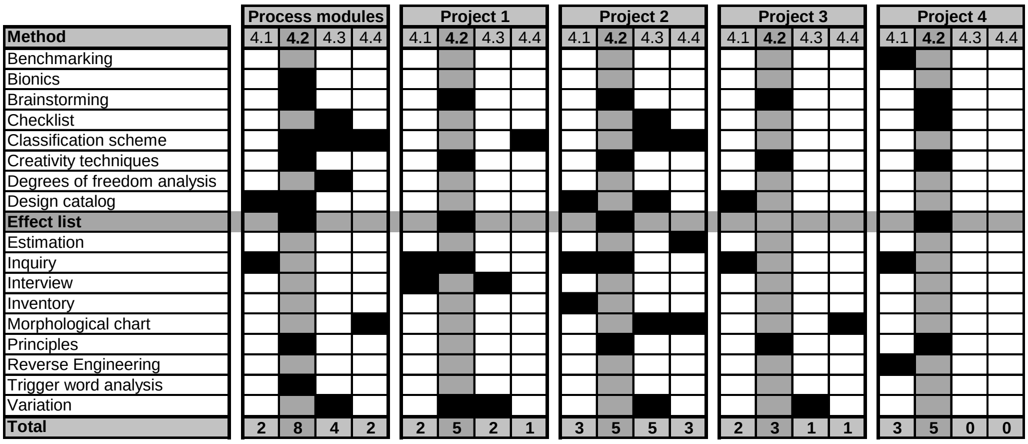


Figure 7. Method selection according to tasks (process modules) in four projects

It becomes apparent that some methods that are suggested in the process module set for the creation of new solutions (such as bionics) were not used, maybe indicating that these methods were considered unsuitable. However, other methods not included in the process modules had been applied for a certain task (e.g. benchmarking). The differences in choice of methods indicate that each project represented a different design situation and therefore different methods were rated suitable or preferred by the student designers. By analyzing a larger number of projects, a valuable feedback can be generated, e.g. indicating which methods have to be integrated into the process module set and also in corresponding lectures and tutorials. In addition, recommendations for the selection of methods according to particular design situations can potentially be derived.

A third type of analysis is also possible (figure 6, analysis type 3). Some methods are typically only suitable for a special kind of task (e.g. the method preselection for the task "preselect adequate solutions"). However, a lot of methods are applicable for several different tasks. A brainstorming can be applied for the creation of new solutions as well as for the identification of requirements or the analysis of the situation. Thus, this type of analysis allows insights on how particular methods are deployed with respect to the wide range of tasks that are carried out in design projects.

Finally, the interrelation between different methods within the whole process can be analyzed (figure 6, analysis type 4). Each process step is associated with applied methods. Therefore, the sequence of process steps also indicates which methods were deployed in which sequence.

4.3 Analysis of method application in particular situations (method level)

The last type of analysis presented here is the one going into most detail. Figure 7 shows that in three of four displayed projects a creation of new solutions (process module 4.2) was carried out by working with an effect list. A detailed comparison of these process steps is displayed in figure 8.

#	project	input, situation	procedure, methods	output, results
1	measuring system for ground reaction forces (team of 3)	• new ideas for measuring system aspired	• interdisciplinary workshop • method: brainstorming, effect list, variation • regular brainstorming session, effect list just supplement	• 21 principle solutions • form: table of solutions (just names, no graphical illustration)
2	derailer system for recumbent bikes (single designer)	• new ideas for function "move chain" aspired • requirements: no additional energy source	• single work • method: effect list • determination of suitable physical effects • creation of principle solutions	• 6 principle solutions • form: schematic illustrations
4	indication device in rail vehicles (team of 2)	• new ideas for indication device aspired	• interdisciplinary workshop • method: brainstorming, effect list • regular brainstorming session, effect list just supplement	• 10 principle solutions • form: paper sketches
process step: creation of new solution (= process module 4.2)				

Figure 8. Comparison of method application in three projects

All three projects used an effect list during the regarded process step. In project 2 (carried out in single work), it was the major method for this step. In project 1 and 3 the main method was brainstorming, since the process step was carried out in a workshop with participants from an interdisciplinary background. The problems or functions that served as input variables for the process step were quite different. Also the results differed, i.e. the number of solutions that were created and the form in which they were documented. The student designer in project 2 explicitely reflected on the method in his documentation (the way it was applied, the benefit it brought etc.). In the other projects, however, the only information mentioned was the fact that an effect list had been used.

5. Discussion

Some difficulties in the derivation of the process tables resulted from the problem of determining the right granularity of the processes. In the analyzed projects, around 20-30 individual process steps could be identified. A process step often corresponded to a sub-chapter of the documentation. In order to derive a realistic process sequence, the documentation has to represent the chronological process to a certain degree. Since most of the students were familiar with the Munich Procedural Model, they planned their steps and carried them out according to the model. The matching between project specific process steps and generic process modules turned out to require a high level of interpretation. The process modules represent activity categories. For a proper analysis, the categories have to be distinguishable, clear, exhaustive and mutually exclusive (according to Kirwan and Ainsworth, cited from [Robinson 2005]). In the preliminary analysis, these criteria were not met sufficiently. Sometimes it was hard to assign a corresponding process module, sometimes several process modules had to be assigned to one of the project specific process steps.

The extraction of methods for each process step was comparably easy, since there existed a list of common methods to choose from, and the student designers had named the selected methods in the documentation in most cases. Only sometimes, applied methods were not explicitely referred to and could therefore not be taken into consideration. In some cases, the identification of methods was difficult, since the terms deployed by the students did not correspond to the "official" or common names of the methods (e.g. effect list vs. effect catalog vs. effect matrix vs. physical effects). The level of detail, in which the method selection and application had been documented, varied to a considerable degree. More difficulties arose with the extraction of input artifacts, output artifacts and gained insights ("lessons learned") for each process step. The development of a concept for retrieving that kind of information from the documentation in a way, that a meaningful analysis and reuse is possible, is part of future research.

In summary, the derivation of process tables and the matching of project specific and generic contents required a certain level of expertise and was also often a matter of subjective interpretation. This type of manual analysis also represented a considerable effort (first of all it was necessary to read through 80-120 pages of project documentation). In the future, as a feasible way of extracting the relevant data from the projects, it is planned to develop precise guidelines and let the student designers create the process tables themselves parallel to the generation of the regular documentation (since they are the ones that are most familiar with the project contents and therefore predestined to carry out the process analysis). Hereby, a better relation of benefit and effort regarding this method of process analysis can be created. The extraction and analysis of data is just a first step. The next step will be the reuse of the created information, i.e. the transfer of knowledge and experience from the analyzed student design projects to new design situations. This is part of ongoing research, a corresponding methodological approach will be published seperately.

6. Conclusions

In the research presented in this paper, the documentation of student design projects was analyzed. The goal was to investigate, what information can be extracted from the documentation that allows for conclusions on the application of procedures and methods of product development. The motivation of this analysis was to gain valuable feedback for design education contents as well as to lay the foundation for a reuse of project specific information in new design projects. Several obstacles in the analysis were identified that resulted from the nature of the project documentation, which only represents the real process to a certain degree. As an outcome however, a view on the projects on three different levels of detail could be generated. The analysis on the procedure level allows e.g. the identification of key points in the procedure. The analysis on the task level highlights differences in method recommendation by academia vs. method application in practice. The investigation on the method level enables conclusions on situation specific method application and adaptation. From the preliminary analysis, important insights and guidelines for a larger investigation could be derived.

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