CLASSIFICATION OF USERS IN THE CONTEXT OF KNOWLEDGE TRANSFER IN PRODUCT DEVELOPMENT

Lenhart M., Birkhofer H. - *Darmstadt University of Technology (DEU)* 1187

In this paper an approach for user classification in the context of an integrated learning, teaching and application system in product development is introduced. An appropriate classification is essential to meet the user's individual needs. The approach is based on a general scale of expertise, which reflects the development from a nocive to an expert. As the system is mainly made to support knowledge transfer in the regarded domain, the scale of expertise reflects the amount of domain-specific knowledge. In addition, different user environments are integrated. As a result a user is classified by both his level of expertise and the user context, which reflects his function in the process of knowledge transfer.

TEACHNING "COUPLING COMPETENCE" BY MEANS OF INTERDISCIPLINARY PROJECTS

Stetter R., Paczynski A., Voos H., Bäuerle P. - *Hochschule Ravensburg-Weingarten (DEU)* 1267

The paper describes two interdisciplinary student projects aimed at the improvement of a decisive key competency called "coupling competence". In these projects senior students and master students of mechanical engineering, mechatronics, and applied physics were collaborating in order to develop mobile robots for different purposes. The students were jointly advised by professors of design in mechanical engineering, economics, applied computer science, and technology management. In the paper, the importance of project based learning (PBL) for the mediation of design capabilities as well as key competencies is highlighted and the student projects, their outcome, and observations in the projects are described.

REFLECTION AND ANALYSIS IN DESIGN STUDENT BLOGS

Shaheed N., Dong A. - *Key Centre of Design Computing and Cognition (AUS)* 1251

The article raises the question whether stylistic differences in the ways that design students write about designing and their designed work may indicate differences in the way that the students are orientated to the practice of design. The aim of this article is to describe how to apply the theory of systemic-functional linguistics to design students' texts as the basis for exposing the way that students describe designing and the way that they orientate themselves to design praxis. Through the analysis of design students' blogs, the research reveals the existence of two specific styles, analytical and reflective, for expressing the realities of designing. The differences in styles of expression of ostensibly the same 'content' (designing) indicate differences in approach (style) to designing. Second, the style of blogging signals the student's preferred style of feedback.

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

Ponn J., Lindemann U. - *Technical University Munich (DEU)* 1211

The paper presents research on the analysis of student design project documentation. The goal was to investigate, what information can be extracted in order to allow for conclusions on the application of procedures and product development methods. The motivation was to gain feedback for design education and enable information reuse in new design projects. Several obstacles were identified resulting 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: procedure, task and method level. From the preliminary analysis, important insights and guidelines for a larger investigation were derived.

A DIFFICULT CASE: BRINGING PRODUCT DESIGN METHODS TO NASA ENGINEERS

Gill C.L., Lilly B.W., Forsgren R.C. - *The Ohio State University (USA)* 1143

The paper offers a critical look at the authors' efforts to introduce product design methodologies into an organization that is very much "task–centered" rather than "user–centered" – the U.S. National Aeronautics and Space Administration. Here we describe our work over the past three years in developing a successful course in idea generation methods for the NASA Engineering Training Program. The course itself is an on–going exercise in design as we work to adapt it to the very specialized demands of a renowned organization that faces unique constraints in achieving success.

THE KARLSRUHE EDUCATION MODEL FOR PRODUCT DEVELOPMENT "KALEP", IN HIGHER EDUCATION

Albers A., Burkardt N., Meboldt M. - *Karlsruhe University (DEU)* 1049

Product development is one of the most complex and important stages in the value creation chain. The objective of the university education of mechanical engineers is to impart the complex knowledge necessary for efficient product development in an industrial environment and to teach the students the key abilities required for their professional life. Engineers have to be "team players", they have to be skilled in technical know-how and business management and they have to be capable of reaching decisions and implement them. In order to meet these requirements in the university education, KaLeP (Karlsruhe Education Model for Product Development) was developed at the IPEK (Institute for Product Development, University of Karlsruhe).

DESIGN WITH X IS NEW IN PRODUCT DESIGN EDUCATION

Langeveld L.H. - *Delft University of Technology (NLD)* 1179

Design with X is a method what can be used in design education for shortening course or improving quality of product design. Saving time is reached by avoiding irrelevance product concepts or design. The designer learns to focus on the design task with method. He is looking in an early stage of the design process to material, manufacturing process or geometry. Embodiment design is the base for Design with X and opens new insights for an efficient design process. The used work method is not forced but strongly advised. The results of two projects give insight how the quality improvement is achieved by using Design with Material and Design with Manufacturing.

APPLICATION OF SITUATED LEARNING FOR REALIZING DESIGN ETHICS

Wakabayashi N., Hasumi T. - *University of Tsukuba (JPN)* 1285

As problem solving capabilities of designers for social problems are more and more realized, the expectation and responsibilities a designer has to take are increasing. However, on the other hand, the method for design ethics education hasn't been established enough yet possibly because of the difficulty in applying ethics to practical design situation. In this paper, we propose an approach that incorporates the idea of "sensitizing for realization", by applying an idea drawn from Situated Learning as a basic learning ground for the development of design ethics in sustainable design. The method of Situated Learning is also introduced in parallel with an example of the principles used in Sadou (traditional Japanese tea ceremony).

TOWARDS A DESIGN METHOD-SUITABLE, COMPUTER-SUPPORTED LEARNING ENVIRONMENT

Jänsch J., Weiss S., Birkhofer H. - *Darmstadt University of Technology (DEU)* 1163

There is the need for a design method-suitable learning concept and environment. The pinngate project of the department product development and machine elements at the Darmstadt University of Technology offers an approach to set up a flexible product development system that represents product development contents in a modular shape, in order to provide user-suitable product development knowledge for teaching, training and applying design methods. This paper aims to give an overview of the possibilities of this system to provide a suitable environment to learn design methods with a cognitive learning process. Cognitive processes play an essential role in designing and applying design methods and need to be considered when teaching designing.

SEMANTIC ANNOTATION TO SUPPORT AUTOMATIC TAXONOMY CLASSIFICATION

Kim S., Bracewell R.H., Ahmed S., Wallace K.M. - *University of Cambridge (GBR)* 1171

The paper presents a new taxonomy classification method that generates classification criteria from a small number of important sentences identified through semantic annotations. Rhetorical Structure Theory (RST) is used to discover the semantics. The annotations identify which parts of a text are more important for understanding its contents. The extraction of salient sentences is a major issue in text summarisation. Statistical analysis is commonly used, but for subject-matter type texts, linguistically motivated natural language processing techniques, e.g. semantic annotations, are preferred. An experiment to test the method using documents collected from industry demonstrated that classification accuracy can be improved by up to 16%.

PRODUCT AND PROCESS IMPROVEMENTS BASED ON DATA MINING OF SHOP-FLOOR INFORMATION

Wuenscher T., Feldmann D.G., Krause D. - *Technical University Hamburg (DEU)* 1319

To succeed in a competitive market, companies are permanently forced to exploit improvement potential within their products and processes. To do so, shop-floor information, including information about disturbances, customer claims and suggestions of improvement, has to be used systematically. In our paper, the reasons for not using this information effectively are explained. Following this, we describe our concept, which is to systematically collect shop-floor information, consolidate it and make it useable either for immediate, corrective actions or during product customisation. Key element of our approach is to use data mining methods to discover hidden improvement areas, especially within the assembly of customised, complex products.

ASSESSING RELEVANCE: DESIGNERS' PERCEPTION OF INFORMATION USEFULNESS

Restrepo J. - *Technical University of Denmark (DNK)* 1235

The paper studies relevance as perceived by designers when interacting with information systems. It proposes that relevance judgments depend on the designers' previous knowledge and understanding of the situation, on the particular information needs and change as they progress on the information seeking process. An empirical study shows how these relevance criteria are used in the assessement of information usefulness. The results show that whilst the perceived relevance of documents change, only some of the criteria used in the assessement does. They also suggest that the information the designers accessed was used more as a means to underpin decisions or to back up their own knowledge rather than to learn new things.

PRODUCT DEVELOPMENT ONTOLOGY IN TRACEABILITY IMPLEMENTATION FRAMEWORK

PavkoviĹ N., Štorga M. - *University of Zagreb (HRV)* 1195

We argue a need for a design projects' repository as the core for supporting, sharing and reuse of design knowledge. Such software system should enable reusing the knowledge of a given domain, and be able to guide inexperienced designers. A formalization of a domain knowledge structure is proposed by building the design ontology. The proposed traceability and knowledge management implementation architecture is founded on three layers: application, description and source. The proposed design process workflow model rely on design plan - the structure that should represent, collect and organize every type of knowledge and data that is or should be known prior to start of a new design project.

THE CHALLENGE FOR PRODUCT INNOVATION IN MEDIUM SIZED ENTERPRISES IN CROATIA

Christiaans H.H.C.M., Diehl J.C., Kuipers H., Boschloo R. - *Delft University of Technology (NLD)* 1093

Croatian medium sized enterprises represent a new wave of progress. All of these enterprises have the same problems regarding getting loans, lack of managerial knowledge and experience and inadequate or indefinite corporate strategies. The Dutch and Croatian Ministries of Economic Affairs launched a capacity building project in Croatia to improve the competitiveness of SMEs and to prepare them for the competition of the European Market. Three in-company projects with regard to product development and innovation took place. A thorough evaluation was conducted by monitoring the whole project. The opinions of the companies' management about are very positive, although a change in attitude among the employees couldn't observed yet.

INNOVATIVE LIGHTWEIGHT AIRCRAFT DESIGN – A STUDENT COMPETITION

Deubel T., Köhler C., Wanke S., Weber C. - *Saarland University (DEU)* 1101

University education often focuses on a sound theoretical education at the expense of practical experience due to time limitations. Nevertheless it is important to train essential technical problem solving skills in practice too. This paper describes the experiences of the authors with a student competition between four German universities called "Stahl fliegt" (Steal can fly), which provides a practical team-work project for en¬gin¬eering (design) students that nearly spans the whole life-cycle from brainstorming for product ideas to manufacturing and usage of the product. The development task is an aircraft or flight device totally made of steel which satisfies several lightweight restrictions.

TEACHING SYSTEM INTEGRATION OF MECHATRONIC SYSTEMS

Fan Z., Detlef M., Andreasen M.M., Hein L. - *Technical University of Denmark (DNK)* 1133

Mechatronics has been an emerging subject in industry with the introduction of a large volume of mechatronics product to the market. In addition, it gives rise to tremendous challenge for education of mechatronic engineering, because mechatronics is an area encompassing multidisciplinary knowledge of mechanical engineering, electrical/electronics engineering, and information technology. This paper explains the efforts of the Technical University of Denmark (DTU) to embed the education of mechatronics in its educational program of 'Design and Innovation', and the use of a special type of Unified Modeling Language (UML), statechart, to teach the topic of system integration in the course of 'Design of Mechatronic Systems'.

DESIGN EDUCATION VIA MULTI-DISCIPLINARY TEAM PROJECTS SUPPORTED BY AN INTERNATIONAL COACHING NETWORK AND DIGITAL LIBRARIES

Elspass W.J., Holliger C. - *ETH Zürich (CHE)* 1115

The design and development of products for the global marketplace require engineers to perform in internationally situated teams, utilizing cutting edge information and collaboration technologies. The implications of the Bologna reform and the situation in industry call for appropriate courses on the master's level with students learning and working on real world problems in multi-disciplinary, distributed international teams. Effective design engineering teams need a different learning scenario with the pedagogical paradigm shift from classical teaching to coaching. Information and factual knowledge arranged in digital libraries serve for a scenario of consulting learning. Digital libraries are enriched with video sequences about the collaboration process, thus allowing for the reflection on the learning process itself.

TEACHING THEORY AND PRACTICE IN MECHATRONICAL ENGINEERING

Welp E.G., Labenda P., Jansen S. - *Ruhr-University Bochum (DEU)* 1301

The today's engineer needs consolidated technical and methodological knowledge as well as a multitude of "metadisciplinary" or soft skills. The shift to team work and crossfunctional and multidisciplinary projects actually requires an appropriate consideration and response in education. The objective of the paper is to describe an education model developed and implemented at the Institute of Engineering Design at the Ruhr-University Bochum which is fitted on the specific field of mechatronics and the product and processes complexity involved. Insights and experiences with the model employed are presented and illustrated by referring to representative case studies. Two different forms of projects are described and discussed respectively.

INTEGRAL BUILDING DESIGN APPROACH IN MULTIDISCIPLINARY TEAMS

SavanoviæP., Zeiler W., Trum H.M.G.J. - *Eindhoven University of Technology (NLD)* 1243

Design methodology to support integration of sustainable comfort systems during conceptual phase of building design processes is needed. In order to develop support for integral design within a team configuration, a designers' working environment in form of 'learning by doing' workshops was created. Methodical design, and morphological overviews as one of its specific features, was used as the framework for structuring knowledge of different design disciplines. Design teams, consisting of professionals from different disciplines who applied via their branch organisations, were observed during two workshop series. This paper presents initial results, focusing on communication between design team members and on use of methodical design tools.

IDRAK: SUPPORTING DIGITAL SOCIALIZATION IN ENGINEERING DESIGN PROJECTS

El-Tayeh A.N., Gil N. - *University of Manchester (GBR)* 1125

Engineering design projects are delivered by temporary organizations that bring together a group of firms from the early design stages. Exchanges of tacit knowledge across firms' boundaries through processes of socialization are important. However, physical cross-firm socialization opportunities are limited. Our research investigates digital socialization opportunities that could facilitate cross-firm transfer of tacit knowledge at the early engineering design stages. Here, we first summarize the theoretical underpinnings of digital socialization. Then, we present IDRAK, a proof-of-concept of a digital platform for supporting cross-firm socialization in engineering design projects. Finally, we discuss our strategy to validate IDRAK.

KNOWLEDGE SHARING OBSERVATION AND MODELLING IN DISTRIBUTED DESIGN TEAMS

Horrigue A.H., Choulier D., Boudouh T. - *University of Technology of Belfort-Montbéliard (FRA)* 1155

Knowledge sharing is a critical factor for collaborative design process. The effectiveness of interactions between agents in collaborative design teams depends on the effectiveness of knowledge sharing process. However, this process is not yet clearly understood. In this paper, the knowledge sharing process between agents in a distributed design team is investigated using design protocol method. Through such an investigation, a model of knowledge sharing in design is suggested. Some examples of knowledge sharing situations observed in the protocol are described on the basis of this model. The discussion shows the dynamic characteristic and the diversity of this process.

ARCHITECTURES FOR MECHATRONIC PRODUCT DATA INTEGRATION IN PLM SYSTEMS

Bergsjö D., Malmqvist J., Ström M. - *Chalmers University of Technology (SWE)* 1065

In this paper four generic architectures for PLM implementations in complex product development settings are presented and analysed. The focus has been on the information integration problems relating to mechanical, electrical, and software product data. The purpose of the study has been to identify basic needs and challenges and to propose principal solutions for data integration. The conclusions involve strengths and weaknesses regarding each PLM integration approach. The results are based on a case study performed in an automotive company.

TOWARDS A METHOD FOR PROFILING ENGINEERING DOCUMENTATION

Wild P.J., Culley S.J., McMahon C.A., Darlington M.J., Liu S. - *University of Bath (GBR)* 1309

Recent years have seen a lot of interest in how people use, generate, save, and search, paper and electronic documents. We build on this and related work to develop a method for profiling engineering documentation. Profiling provides information about: 1) the varieties and types of engineering documents; 2) the strengths and weakness of document manifestations; 3) the patterns of document use within different 'types' of engineering company. The method is composed of two elements. A set of facets for describing documents, and a framework with which to contextualize documents.

CIDAD - A METHOD PORTAL FOR PRODUCT DEVELOPMENT

Ponn J., Lindemann U. - *Technical University Munich (DEU)* 1221

The paper investigates motivation and requirements for a web-based method portal for product development. Characteristics of the CiDaD method portal, developed by the Institute of Product Development (TUM), are presented and discussed. The system contains state-of-the-art contents on methods of product development. According to the requirements of different types of users and situations, it offers adequate access to method knowledge in two environments (courses, methods). Methods can be selected according to their fit to processes and tasks or considering their attributes. The system is addressed to students as well as practitioners in industry. For their assistance, CiDaD offers innovative mechanisms for selecting and applying methods.

CHARACTERISING THE INFORMATION REQUESTS OF ENGINEERING DESIGNERS

Aurisicchio M., Bracewell R., Wallace K.M. - *University of Cambridge (GBR)* 1057

Information acquisition is an essential part of engineering design processes. However, the nature of information requests is still not well understood. Hence, a research project was carried out in collaboration with the aerospace group of a major power systems company, with the aim of characterising the requests formed when designing that make engineering designers search through external sources. In this project, information requests were studied using an ethnographic participation, a diary study and observations with shadowing. This paper presents the research undertaken to characterise information requests based on their objective, subject and response process. An information request can be considered as a speech act or conscious thought expressing a need related to the design task in hand.

PROMPTING DESIGNERS TO DESIGN

Ahmed S. - *Technical University of Denmark (DNK)* 1041

Recent research suggests that engineering designers need assistance in formulating their queries and also to understand what information is relevant for them. This paper presents an approach to prompt designers with their design queries. The method can be implemented as part of knowledge management system and the relationships are automatically extracted from documents that are indexed within the system. The distinctive features of this approach is that all the concepts are elicited from the minds of engineering designers, and the system builds up knowledge as more documents enter the system. The approach is based on an understanding obtained from a number of empirical studies and also from literature related to: 1) an understanding of how engineering designers search for information and 2) an understanding of the nature of experience in engineering design.

SUPPORTING THE DESIGN OF ELECTRONIC DEVICES FOR SENIORS

Bruder C., Wandke H., Blessing L. - *Technical University Berlin (DEU)* 673

In general, the user interface of multifunctional devices has not been designed with seniors in mind. Consequently, it is usually difficult for them to use these devices. This research project investigates how training interfaces for multifunctional devices, such as mobile phones, can be designed to support their daily use by seniors. Starting from findings about age-related changes, a preliminary interview study with 20 senior users of mobile phones was conducted. Furthermore, the participants are observed while handling their mobile phone. The results give a first insight in first contact with and usage of mobile phones. Finally, conclusions for an appropriate training application and further research are derived.

INVESTIGATION ON THE OPTIMAL ARRANGEMENT OF THE HUMAN-MACHINE INTERFACE OF AUTOMATIC LATHES

Maier T., Dudic I., Schmid M. - *University of Stuttgart (DEU)* 749

This investigation examines indicators and controls with regard to their arrangement and their relation to a process and whose use by different operators is related to a complex sequence of operations. As an example, the human-machine interface of a modern automatic lathe was chosen to determine its optimal arrangement. By means of the criterion time an objective evaluation and selection of interface arrangement variants for different operators was carried out. The underlying modelling of the sequence of operations in the Petrinet representation considers central aspects of the human-machine-interaction. Exact data regarding the time needed by the operation variants could be provided by transmitting Methods Time Measurement time standards.

A DESIGN STUDIO EXPERIMENT ON SITE AND BUILDING INTEGRATIONS TOWARDS PLACEMAKING

Deviren A.S. - *Eastern Mediterranean University (TUR)* 1109

Architectural profession is increasingly being subordinated by fashionable image and object production to meet the desires of today's consumer society, instead of making buildings to dwell and places to live in. Taking place as the primary concern of architectural design is a challenging and intricate task. This paper describes an experimental design project in a beginning design studio focusing on fundamentals of placemaking. The main goal of the project has been determined as to introduce students with contextual thinking that would help them to explore and understand the nature of site and building integrations which necessitates ecological adoptions and different responsibilities than that of object and image production.

INNOVATIVE INTERFACE FOR HUMAN-COMPUTER INTERACTION

Rolshofen W., Dietz P., Schäfer G. - *Technical University of Clausthal (DEU)* 611

A challenge for the future is to develop new interfaces for the interaction between man and computer. Meanwhile, numerous solutions exist, however an optimum out of different approaches has to be realised. Aim of the project "Tangible Acous-tic Interfaces for Computer-Human Interaction (TAI-CHI)" is to investigate acoustic source localisation methods. When touching a physical object acoustic waves are generated of which the propagation can be traced back to the source. In this article, an approach based on Acoustic Holography in solid objects is presented by experimental results. Moreover, the possibilities for such interactive interfaces as innovative products are given.

SOME CONSIDERATIONS ABOUT THE INTERACTION MAN-INDUSTRIAL PRODUCT: THE INSTRUCTIONS FOR USE OF THE INDUSTRIAL PRODUCT

Rovida E., Vigano R. - *Politecnico di Milano (ITA)* 767

Today it is necessary to furnish the right information about the product. These supports include manuals for the use and the maintenance of the product that must be translated in the language of the customer. This translation is expensive and often contains errors that are source of misunderstandings. So, the design of the product must be now strongly oriented to satisfy the integration between product functionality, service support and communication. Take account of this consideration during the process of definition and designing of new products is very important. This paper is devoted to explain some considerations about the use and the selection of pictorial signs to reduce the text quantity in the instruction manuals for the products.

DESIGNING COMPLEX SOCIO-TECHNICAL SYSTEMS - EXPERIENCES WITH STUDENT PROJECTS …

Bockstael-Blok W., Herder P.M. - *Delft University of Technology (NLD)* 1077

In the SEPAM-design project our students apply their acquired theoretical knowledge on designing complex socio-technical systems in a real life case. After running the project for two years we felt the need to evaluate the course: how do students deal with the synthesis of the three major design perspectives in the project (technical, institutional and decision-making)? And how do they perceive the project? For the evaluation, we have analyzed the project reports of 4 groups on one topic in more detail and we have set out a survey among all the students that participated. We conclude that the project successfully serves as a capstone project, in which students indeed learn how to synthesize the three design perspectives in systems' design.

COMMUNICATION IN INTERNATIONAL ACADEMIC VIRTUAL ENTERPRISES

Chan F., Kamminga R., Van de Langkruis A.S., Lankhaar J., Pastoor J.L., Zeedijk W., Moes N.C.C.M. - *Delft University of Technology (NLD)* 1085

Using long distance communication tools are considered a potential fast and efficient alternative when knowledge and resources are not available in one place. This paper is written by, and concerns the experiences of students from TU Delft who participated in a product design project in an international virtual setting. This was realised trough collaboration with other students from different European universities using only long distance communication tools. At the end of the term, the interdisciplinary student teams personally met each other in a workshop where they assembled and presented their products. This paper aims to focus on the students practical experiences in intercultural and interdisciplinary virtual enterprises.

RAPID PRODUCT DESIGN IN THE CURRICULUM - FROM CONCEPT TO INTERACTIVE MODEL IN 24 HOURS

Griffiths R., Johnson P. - *University of Wales Institute Cardiff (GBR)* 1149

The paper examines how two independent academic working groups consisting of the National Centre for Product Design Research (PDR) based at the University of Wales Institute, Cardiff, (UWIC) in partnership with Nottingham Trent University, Audi Design Foundation and two leading consultancies met the challenge of creating, developing and prototyping a model from a client brief in just 24 hours. This paper describes the activities of each team, individual skills, design strategies, team dynamics, project management and virtual tools and in particular, the use of design and prototyping systems. The project and design process are described in detail, how barriers were overcome and how the project has contributed to the design curriculum.

DESIGN IN ENGINEERING EDUCATION AS A CONTRIBUTION IN HUMAN "REAL PROBLEMS" SOLVING

Pons L. - *Technical University of Catalonia (ESP)* 1229

The paper is on the potential of Art and Design in Engineering Education and has the objective to argument in favor of enlarging the scope of Engineering Education programs. Engineering students' skills are traditionally specific and their task is primarily oriented to understand or apply different structures of predictable problem spaces. Perception and personality variables are seldom studied, knowledge and skills that artists and designers have. Real world requires enough flexibility as it is increasingly becoming unpredictable. The main conclusion is that the adaptive and imaginative strengths of Design must be part of the academic profile of engineering students.

PROJECT GUIDE: A TOOL TO SUPPORT THE REALIZATION OF INDUSTRIAL WORKSHOPS IN THE EARLY PHASES OF DESIGN ENGINEERING

Weiss S., Birkhofer H. - *Darmstadt University of Technology (DEU)* 1293

The paper presents a tool called 'project guide'. It is about an information platform which supports the workshop moderator on its course with regard to various views. This approach bases on extensive work done in the context of the pinngate project. Particularly, the dependency of contents within design processes is pointed out. The scientific bases, the generic approach and the supported contents and processes are introduced. Multiple views are analyzed. The supply of different content types for moderation is discussed, e. g. theory, examples, literature, records, geometric modells, requirements lists, functional structures or morphological boxes. This tools allows an access to contents based on the context of design methodology.