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INNOWIZ: A GUIDING FRAMEWORK FOR PROJECTS IN INDUSTRIAL DESIGN EDUCATION

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ABSTRACT
This paper presents the concrete application of the INNOWIZ methodology in a design education context. This methodical philosophy is used as a structural backbone in teaching the product design process to students in industrial product design. Observations and teaching experience have shown that these students need a method to manage their creative processes, inspiration in the form of tools and techniques in order to open up their mindset for idea exploration, and a personal approach to tackle any specific situation and to deal with many different design briefs.

Keywords: Design methodology, creativity, teaching method, project approach

1 INTRODUCTION

Modelling product innovation and creative problem solving processes goes back to the design research movement in the UK in the sixties and seventies. Since then the aim was to help professionals to structure their work and to find better ways of teaching new design professionals. In 2003, Buijs [3] clearly described the search for convenient innovation models to be used by the Delft Design School. Based on this precedent, the statement was made that all design institutions have to seek for their own best way to deal with innovation models and the use of creativity tools. Since 2008 and after the completion of a 2-year lasting IWT applied research project, INNOWIZ (acronym for Innovation Wizard) has become a reference model for communicating an innovation process among the design educators at the product engineering department of Howest University.

As product design processes have a specifically iterative and quite abstract character, communicating and discussing on this process in a concrete and clear way is not self-evident. Students need practical guiding tools in how to execute these steps of the creative process. Specific creativity techniques and tools granted to a specific stage in the INNOWIZ process provide the students with the necessary assistance when needed.

2 METHOD

To set up innovation and manage creative processes from ideation to implementation, a dynamic working model rather than a descriptive model must be developed. This has led to a four-staged process of developing and implementing ideas. The four stages in INNOWIZ (Figure 1) are called ‘problem definition’, ‘idea generation’, ‘idea selection’ and ‘idea communication’. This last stage will often create the starting point for a new cycle in the creative process. With each of these iteration cycles the design project becomes less imaginary and more tangible. Each stage also requires its specific viewpoint and approach. By using this easily comprehensible and graphical presented model, students find it a lot easier to have a clear view on the stage of their process and the bottlenecks to be tackled in order to finish the design project. In the context of product design this four-staged philosophy complies with the conviction that an iterative development process fortified with prototypes and other tools of visual communication in the final stage, has a transparent and relatively easy structure to comprehend.

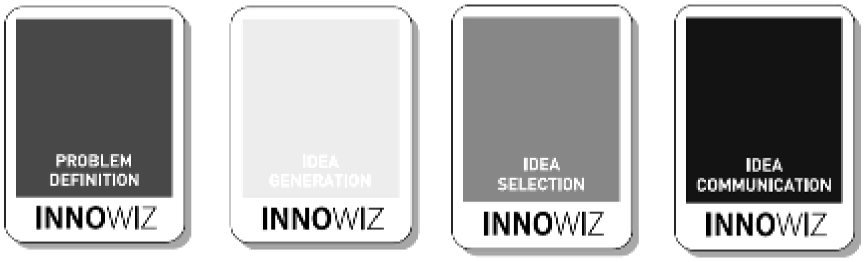

Figure 1. INNOWIZ four staged method

The INNOWIZ model can be compared with the model of Dan Couger [4] (Figure 2). Couger came up with a five-step creativity model in which you can freely jump from one activity to another.

- Opportunity delineation and problem definition
- Compiling relevant information
- Generating ideas
- Evaluating and prioritizing ideas
- Developing implementation plan

INNOWIZ rather sees the compilation of relevant information as a part of the problem definition stage and therefore ends up with only 4 clear steps.

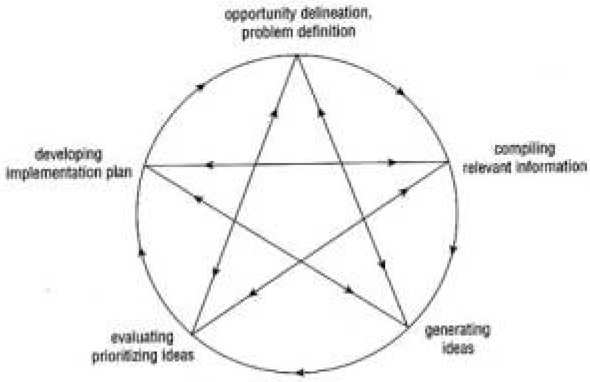

Figure 2. Couger's Creative Problem Solving Model [4]

Besides this and other similar models, TRIZ (Theory for Inventive Problem Solving) [1] was by far the most inspiring basis for the development of INNOWIZ. TRIZ states that 'specific creativity' is about finding general solutions that somebody in someplace has already applied on similar (abstract) problems (figure 3). Out of abstract solutions that already exist, it is quite easy to extract elements and apply them on your own specific challenge. INNOWIZ is thus a more dynamic re-interpretation of the descriptive TRIZ model [8].

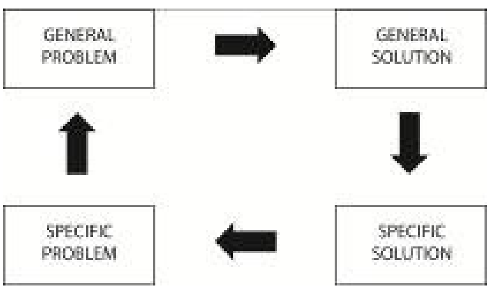

Figure 3. Basic model of TRIZ

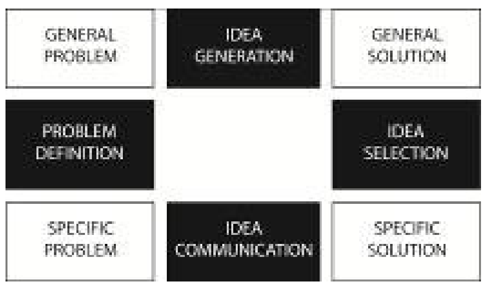

Figure 4. Focus on phase transitions by INNOWIZ

3 INSPIRATION

Many creativity techniques, found in literature and on the internet, have been classified in the INNOWIZ database[1]. Classic tools and techniques found in literature as well as new digital and web 2.0 applications have been gathered in an easily searchable online tool but also in a physical format (INNOWIZ card deck and the creativity tool library at Howest University). ‘Web 2.0 applications’ such as communities, databases, search robots … already carry a huge intelligence. They can be very powerful tools in one or more of the described design process stages.

4 PERSONAL APPROACH

Each innovation challenge is unique and requires a customized approach and, consequently, a made to measure set of creativity tools and techniques (figure 5). To tackle this, INNOWIZ enables the user to compose a specific set of creativity techniques based on a combination of criteria. One of these criteria links techniques to four different thinking types, based on an advanced (Ned Herrmann) brain model [10]. A user selects techniques, which suit his personal or the group’s general thinking preference. Available time, availability of an internet connection and the need for a group session are the other selection criteria. Also the stage of the creative process the project is in, has an impact on the selection of the tools.

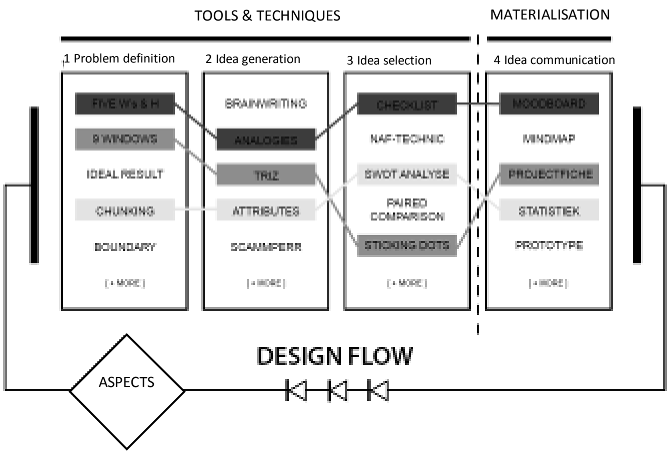

Figure 5. Contextual creativity paths

5 EXAMPLES OF INNOWIZ METHOD IN EDUCATIONAL PROJECTS

The INNOWIZ methodology is implemented in the master education program and the bachelor program in industrial design organised by HOWEST University College. The examples described below show how this methodology is practically implemented in the student design projects.

6 STUDENT PROJECTS

Each student project executed throughout the four years (including thesis’s) of the master industrial design program and the three years of the bachelor industrial product design program at HOWEST University is set up and arranged according to the INNOWIZ method. Students are expected to structure their process to the given four INNOWIZ stages and prove their insight in the driving forces behind a methodological design process. For every project a set of supportive, inspirational tools and techniques and matching templates are handed to the students. The amount and complexity of these tools and techniques depend on the year the students are in and on the level of complexity of the assignment. The design process’ focus is on closing each INNOWIZ cycle by a realization of the current state of the project for clear communication (e.g. a user group enquiry results, a simple sketch, a mood board, a prototype …), making conclusions and starting a new iteration. The more iterations in a development process, the bigger the chances for success after completion.

[1] Innowiz online method database [online] www.innowiz.be

7 INTENSIVE PROGRAM[2]

"*120 students of several disciplines - industrial (product) design engineering, electronic engineering and industrial management – and different nationalities are brought together every year for a two week Intensive Program at HOWEST University. During morning sessions, international experts instruct the students on Innovation Management Techniques and relevant presentations are given. The students apply these techniques to develop innovative product/process prototypes working intensively together in multidisciplinary and multinational groups during afternoon workshops. The products/processes to innovate are real-world cases defined by enterprises. The IP 2011 program trained future engineers and designers in innovation management techniques for a multidisciplinary approach to develop green products. The program wants to pull attention towards the importance of incorporating 'innovation management' in regular curricula for future engineers.*"

The students involved in this two week Intensive Program built up their development process according to the four INNOWIZ steps (figure 4). As each team is composed in an interdisciplinary way and thus contributes its own expertise, way of communicating and path through the development process. Finding a common language for easy communication on the design process is of crucial importance for an efficient project result over this very short period of two weeks.

Within these four INNOWIZ steps the students can make use of sufficient tools, techniques and matching templates. These have proved to provide them with the necessary support and guidance in tackling the design process in a structured and iterative way.

Figure 7. Intensive Program 2011

8 A DESIGN PLATFORM FOR TANGIBLE INTUITIVE INTERACTIVE INTERFACES [TIII]: CASE STUDIES

To address the challenging problems of an ever-growing digital world, the initiative was taken to start a design platform that focuses on Tangible Intuitive Interactive Interfaces (TIII). These interfaces should improve our way of communication via digital media.

The design of TIII is an interdisciplinary process (Figure 8) with a strong focus on interaction design. By use of iterative prototyping, evaluation of intuitive interactions is made possible. The design process will be based on the INNOWIZ method. This method structures a creative process and ensures that people tackle their project in a highly efficient manner. By consistently and iteratively running through the design cycle, chances for success are maximized. The 4th stage in the TIII is defined as the construction of a prototype that allows user interaction as part of the idea communication. State-of-the-art tools such as Arduino and Phidgets allow for rapid prototyping the use of any kind of sensors and actuators. The development of this design platform is a joint venture between industry and research partners, addressing both scientific and commercial aspects of the TIII design.

[2] Intensive Program, [Online] http://ip2011.howest.be

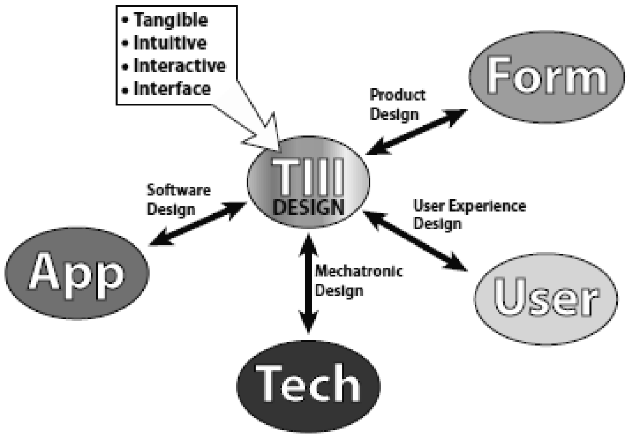

Figure 8. The interdisciplinary TIII design.

9 CASE STUDIES

The proposed platform is still in its infant stage. Nonetheless some proof-of-concepts are being developed based on the design processes that are used by students industrial design and mechanical engineering in their mechatronic projects. Examples of their explorations with Arduino can be viewed here: http://vimeo.com/19289102.

10 CONCLUSION

INNOWIZ as an innovation and creativity method has its origin in the basics of TRIZ and it equally connects to a model of Dan Couger from 1995. Out of many developed innovation methods and creativity models, it was INNOWIZ' ambition to be used as a backbone for educational projects with students, as well as for innovation services towards companies and for research projects initiated by the Industrial Design Centre at Howest University, Belgium.

INNOWIZ is unique in its kind as it combines an iterative creative problem solving method with the inventory and use of creativity tools and a personal, contextual approach. It is this combination that has been found very useful in an educational, project based context. Students claim to need a framework in order to structure their projects, but also respond to search for tools and techniques to execute the necessary stages in their development process.

INNOWIZ has proven its flexible application ways in education and the industry. One of the big differences between students and companies is that people in the industry preferably want one simple, easy-to-understand and easy-to-use model of the creative problem solving process, whereas students prefer a vast logical, linear and step-by-step plan [3]. INNOWIZ is positioned somewhere in the middle of this proposition. It is easy-to-understand because of the limitation of only four steps, but it is rich and endless in the combination of creativity tools (quartets) in order to solve varied problems in a logical way. The INNOWIZ model is thus continually enriched with creativity tools depending on the context: are you developing a product, a game or a business? Are you optimizing your communication or your consumer insights? Nowadays INNOWIZ is not only taught in the product design department of Howest University, but also in its gaming department, its communication and business management department, its educational theory department,….

Looking into the future, INNOWIZ can still evolve in many different application fields.

Dependent of the concrete situation, problem or challenge, one has to choose for a specific quartet of creativity tools. Design educators or innovation trainers make the INNOWIZ model less or more complex and detailed by the choice of creativity tools they put into the quartet. From our own experience, we can say that some combinations of creativity techniques put together sequentially in a quartet guarantee more success than other quartets. The contents of the innovation challenge and the personal thinking preferences of the project managers and his/her colleagues are as essential as the choice of the techniques. For every creative process, it is our advice to have some tools to fall back on if the quartet selected does not seem to meet the requirements.

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