PD6 – an idea generation and evaluation method

M. T. Reinikainen¹ & T. A. Björklund²

¹Laboratory of Machine Design, Helsinki University of Technology, Puumiehenkuja 5 A (mikko.t.reinikainen@tkk.fi)
²Laboratory of Machine Design, Helsinki University of Technology, Puumiehenkuja 5 A (tua.bjorklund@tkk.fi)

Abstract

Conventional idea generation tools are often lacking in flexibility and in ease of communicating and critically evaluating the ideas. The amount of available techniques is abundant, but they are often complicated to apply. We have aimed to address the problems reported by the industry with a new method for effective idea generation and evaluation, Product Development project in 6 hours (PD6) workshop.

The main focus of the workshop is on the communication and evaluation of ideas. Instead of teaching any specific method, participants are encouraged to flexibly use multiple techniques and adapt them for the individual needs of the situation. Making the ideas concrete, evaluating them and presenting them is the core of the workshop. Concretisation of the suggested ideas is important for evaluating and presenting them. Many problems come apparent once you can visualize the idea and rough prototypes are easily understood by all stakeholders. Visualizations, mock-ups, stage plays and prototypes are typical techniques used.

Prototypes and presentations are seen as an efficient way to communicate the value of the idea and how it would solve the problem. PD6 is effective for idea generation and evaluation purposes. In many industrial cases PD6 has brought new ideas to the project.

Keywords: idea generation, prototyping, evaluation

1. INTRODUCTION

TKK has a long experience of international interdisciplinary product development projects which have been realized in cooperation with industry. The Future Lab of Product Design (FLPD) research aims to study and improve innovation environments, tools and methods, and to transfer the best practices to project partners [i]. The international and interdisciplinary PDP course is used as a platform for the research. Since 1997 over 120 working years have been done in cooperation with the university and the industry. Every year the PDP teams, consisting of students, seem to have repeatedly achieved better results than the industrial standards consider being possible. One motivation for the FLPD research is to better understand the phenomena.

The FLPD research has shown that the common denominator of the best teams and projects is the intelligent and simultaneous use of environments, tools and methods.[ii] This supports the teams’ ability to build team spirit and to use their inner potential. The FLPD project aims to develop flexible spatial and methodological arrangements for this purpose. E.g., the PD6 workshop [ii] is a flexible and generic method that is designed to meet research and industry requirements, to enable the simulation and intensification of the early and fuzzy phase of product design and to give a structured method to handle this phase. The PD6 workshop is used for educating students as well as experienced experts [iii] from the industry.

The purpose of developing a new idea generation and evaluation method was that the Finnish industry needs more efficient tools for generating and evaluating generated ideas and a tool for team building and communicating with project stakeholders. Studies [vi], [v] done at TKK and among FLPD partners show that basically the challenges are the same both at the university level and in the business. We took the best elements that we had good experience about and combined those to be a one day event, PD6.

Our hypothesis is that the new participatory method PD6 answers to those needs that students and industrial companies see as the most important in the field of product development.
2. PD6 - AN IDEA GENERATION AND EVALUATION METHOD

When PDP and PIP [iv] course students are starting their projects, they usually have only a short written description from sponsoring company. Descriptions usually include special company and field specific vocabulary and are so general that they are hardly give any information to the teams. Usually it has taken several months to organize kick-off meetings with sponsors, during which time the teams have usually been using most of their time in guessing what the sponsor wants them to do. Most of the teams do not proceed significantly during this phase. However, some of the teams did manage to create impressive results without further information than short written design brief from sponsors.

The hypothesis was that it could be possible to analyze those teams and identify the success factors and best practices. The common factor seems to be that instead of focusing on gathering all of the information and trying to proceed according to a linear generic product development process model, the most successful teams just started to do tasks simultaneously and they utilized different sources of information in an intelligent way [ii]. The best indicator was the day when the team started to work in the laboratory and doing physical objects, prototypes. After starting to build prototype they seems to found new ideas as well. We noticed that they have been using creativity techniques for several months but few teams did know what they are doing and what is their idea that they will design further.

The common factor was simultaneous activities and the activities that were related hands-on activities. Following chapters are clarifying how PD6 can be used as idea generation and evaluation tool.

2.1. A need for a new method

We studied further our hypothesis and identified the major challenges in PDP projects. We noticed that teams try to do the project in "the right way" and do all the development phases by the book were facing more challenges. The findings supported our own experiences for the PDP course. In (figure 1.) is presented the traditional process view that students follow in the PDP course.

We also noticed that teams who were doing things together with their sponsors instead of just sending emails were succeeding better than average teams. It was decided to do a survey [vi] among the student to identify how teams actually work, which resulted in support for our hypothesis and own experiences from the PDP course.

PDP course, students’ needs:
1. closer communication with sponsors
2. a tool for team building
3. getting enough information to get started

At the same time, FLPD partner companies’ needs related to product development in general were analyzed. Two Tuplatimi [vii] creativity exercises were carried out, where industrial partners named the most significant challenges related to product development. [viii]

FLPD industrial partners’ needs:
1. a new efficient idea generation and evaluation method
2. a tool for team building
3. a working method that makes working with other stakeholders more efficient

The result was that they need a more efficient idea generation method than traditional creativity methods.

2.2. An idea about a new way to do product development and a way to intensify the idea generation and evaluation process

As can be seen, the students and companies’ needs were basically the same, and related in the early phase of product design projects, where a need or an idea already exists but effective way to proceed did not. There clearly existed a need for an exercise that teams could do with their sponsoring companies in the very beginning of the project to intensify the early phase of their project.
The linear process model was restructured by taking the phases from the traditional product development process and placing them simultaneously instead of gate type doing. We call this activity a non-linear way to do design (presented in figure 2). The reason to put all the process phases in the same phase was that in product development, there is always a need of information from the other phases. The question mark was put in to the process as in every project there is a lot of information that just does not exist. Prototyping was also added to the center, as it seems to function as a communication tool between stakeholders and it makes it easier to understand user needs and requirements that are set for the product. As mentioned earlier the most important factor for successful project seems to be a day when they were starting to do hands-on activities and building prototypes.

![Figure 2. Non-linear way to do product development.](image)

As the project moves on and approaches the day when the product must be finished, the flexibility and freedom to change something will decrease. Our idea about non-linearity during the development process is presented in (figure 3).

![Figure 3. An idea about non-linearity in product development process.](image)

### 2.3. PD6 an idea generation and evaluation method

The non-linear process model was combined with the PDP course structure and then squeezed into a six hours event, presented in (figure 4). We saw that PD6 could be fruitfully used as an idea generation method, but what more importantly, also as a method that enables critical evaluation of the generated ideas.
3. USING PD6 AS AN IDEA GENERATION AND EVALUATION METHOD, PRACTICAL EXPERIENCES

PD6 is a productive method for idea generation purposes. We have learnt that it works for both preparative activities as well as ongoing projects. We believe that during PD6 there happens a positive chain reaction, where hands-on activities work as an impetus for idea generation and ideas work as an impetus for prototypes. Instead of focusing on generating as much ideas as possible, teams are allowed to take one idea that is good enough and start work with it - in the PD6 method quality is not measured through quantity of ideas, such as the number of post-it notes. The participants are guided and given materials for rough prototyping.

We believe that when a team is doing something concrete together and time limitations give them the freedom to stay with very simple solutions, it will release blocks from inside the team. PD6 gives an excuse to do things differently and in a non-controlled, non-linear way. Prototypes work as an idea platform where one is continuing ideas further immediately and getting feedback from the ideas’ functionality from both the prototype itself and team members.

Usually the product development tasks that we are dealing at TKK are related to usability and user centered issues. During the introduction and design brief it is easy to bring participants in the certain mood, especially presenting usability related problems with visual material, participants will get better picture about the problem and the human factors can be brought to the discussion. For example when presented with pictures from catastrophe area where little children and old people are trying to survive without any help, members easily become very motivated to help these individuals.

The competitive element is one of the most important factors in PD6. It is easy to raise a competitive atmosphere by telling that we are evaluating the participants by comparing the day to the previous workshops and that teams are competing against each other, the winner being rewarded based on the evaluation in the end of the day. Both the motivation to win and to solve users’ problem are motivating to gather information that feeds the new ideas generation process.

PD6 is continuously working as idea evaluation tool. Ideas are continuously evaluated through PD6 workshop, team members are able to understand others ideas more effectively through visual and physical objects, and they can bring their ideas and comments on-line in to idea generation process. The non-linearity approach allows them to jump from one point to another, such as doing a prototype and having idea generation at the same time. The structured day gives a freedom to do and act, and the limited time period and tight schedule gives them a possibility to do things differently without being worried about wasting resources - one day will be used for the workshop anyway. The final evaluation is done by trainers and other participants. Thus the ideas will be critically evaluated from many different perspectives.

3.1. Case 1: Student projects, starting PDP and PIP courses with PD6

Our hypothesis was that the student projects could be intensified with PD6, they could generate ideas with their sponsor and evaluate them during PD6. They will get familiar between team members and learn how they can utilize the environment. Students were doing the whole course during one day, so they did get a better understanding about course nature in the very beginning. Competitive atmosphere were also born.
Student comment: “After day we knew what sponsor wanted from us.” (Translated from Finnish to English.)

Sponsor comment 1: “This was a very good and effective way to start project, fixed time for whole team has usually been hard to organize.” (Translated from Finnish to English.)

Sponsor comment 2: “Many new ideas were generated and couple of good ones were chosen for further development.” (Translated from Finnish to English.)

3.2. Case 2: Industry, new ideas for ongoing project
The company was searching new ideas for a project that has been running for over two years. The previous designs that the company had achieved were too expensive to realize as commercial products and end users did not were satisfied with the end result. A PD6 was organized for the company, with three participating teams. The company achieved three totally new concepts for solving the problem and a combination of two of them were evaluated as worth further development. Users also participated to the PD6 workshop and they commented that in the previous development process they had been interviewed but not listened or understood at all. Now the users had a possibility to take apart in the design process in the very early phase and their needs and ideas were presented to the designers directly, not filtered by the interpretations of third parties like the user survey makers.

Participant comment:” We have done this project over two years and I didn’t expect new ideas from the team that have done the project together that long, PD6 seems to be effective method generating new ideas for ongoing project.” (Translated from Finnish to English.)

3.3. Case 3: New project, preparative activities
There is a major project in Finland where three universities, Helsinki University of Technology, University of Art and Design Helsinki, Helsinki School of Economics, will be merged as one world class university. Plenty of visions have been presented in the media and conferences, but only a few ideas about practical operative suggestions. FLPD research team organized a PD6 workshop for 18 persons, coming from the different organizations related to the ongoing process. Their task was to build the Innovation university in six hours, the main aims being to make clear the difference between the present and the future, in other words, how will the Innovation University will improve the present situation. Teams consisted of politics, students, business representatives and researchers. They were asked to think of the solution through the roles they were assigned by persona cards related to the upcoming Innovation University.

According to feedback, the participants saw that this kind of working methods should be used in the building process more actively. [ix] During one day, three practical solutions were presented, but the most fruitful were experienced that different actors in the upcoming university had individual-level discussion with each other.

Participant comment 1: “This is away to prepare Innovation University project that should be taken in use in many organizations.” (Translated from Finnish to English.)

Participant comment 2: “This workshop did show that Innovation University preparation project will be very challenging, so many different opinions and organizations, which have different opinions and goals.” (Translated from Finnish to English.)

3.4. Summary of results
The research shows that it is possible to develop a new and generic idea generation and evaluation method that answers to companies’ and students’ needs.

The non-linear process model is a more effective tool for a designer than the traditional product development process model, which works as a tool for managers.

With the PD6 method it is possible to generate ideas for several kinds of projects, e.g. projects in preparative phase, ongoing projects and intensify new projects. During PD6 ideas and results are on-line evaluated by different perspectives.

4. CONCLUSIONS
PD6 has been adapted to active use in various organizations in the field of product development. It has been modified for training and education purposes and it has successfully been used as an idea generation and evaluation method. Feedback has been positive and PD6 workshops are actively asked to be organized for different organizations and for different purposes. Our hypothesis is that it could be possible to use PD6 as an active and participatory method answering to the needs voiced by partners and students has been confirmed. PD6 will be included as a standard way to start PDP projects at TKK.
An unexpected result has been that PD6 does not seem to need more than just a basic infrastructure to be realized. We initially thought that a supportive workshop infrastructure with plenty of tools and materials would give rise to better results, but we noticed no drop in the outcome levels even though sometimes PD6 has been realized just with power point slides and post-it notes. The participants have used existing environment very intelligent way.

We have had such a positive experience about this participatory method that we are now developing a four days education module in cooperation with the Life Long Learning Institute Dipoli at TKK.

References

[i] Future lab of Product Design Project sponsoring companies and partner universities; Finland: Nokia, Kone, Konecranes, Metso Paper, ABB Drives, Enmac, Ruukki, Sweco, Holland; d-Switch, Estonia; Norcar, Finland: University of Art and Design Helsinki, Helsinki School of Economics, Austria: TU Graz, Estonia: Tallinn University of Technology
[vi] Survette questionnaire PDP course 2006 – 2007 there were 95 students in the course, from those students 49 answered to the Survette, n=49.
[vii] The structured brainstorming method used was a variant of the 'Tuplatiimi' method developed by Innotiimi Inc. in Finland.
[viii] Creativity exercises at (1); FLPD board meeting 13.11.2006, 5 industrial partners from Finland and 1 from Estonia and 1 from Tallinn University of Technology and (2); Product Development seminar in Estonia 28.2. – 1.3.2008, 15 Estonian industry partners and two partners from Tallinn University of Technology.
[ix] PD6 workshop, How to build Innovation university in 6 hours, 24.1.2008 at TKK, 18 participants.