INTERNATIONAL CONFERENCE ON ENGINEERING DESIGN
ICED 01 GLASGOW, AUGUST 21-23, 2001

"INNOPLAN": AN ADAPTATION OF THE METAPLANTECHNIQUE FOR A NOVEL COMPUTER SUPPORTED METHOD OF TEAMWORK

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Keywords: Creativity and Innovation, innovation methods, psychology of creativity, computer supported cooperative work;

1 Abstract

The moderation-method (Metaplan-technique) is a popular and established method to create innovative ideas in a team session as well as to structure and evaluate them.
Although computer aided work is commonly used in lots of proximate development processes, there is hardly no use of information technology for creativity-techniques. Effective teamwork is hindered, because so far it is impossible to feed a computer simultaneously with multiple input-devices.

The development of a novel work environment as well as the use of modern in/output-devices) permits in combination with special software a new form of collective interaction and an adaptation of the Metaplan-technique. Scope of the paper is the further development (in the following named InnoPlan) of a known method and to describe the required infrastructure, as well as to present first results of an IT-based teamwork..

2 Introduction

The future success of a new product is based on the work in the early stages of product development processes. In this phase, ideas are created, problems and tasks are defined, solutions are searched, visualized and structured.
Shorter innovation cycles and increased market dynamics require efficient and flexible planning processes. Specially in the early stage of the product development process, the band width of the problem situation and the resulting essential knowledge necessitate both an interdisciplinary as well as a team based procedure.
One important part of the planning process is the moderation method (Metaplan-technique) that has been proved for more than 30 years. In moderated team sessions all members contribute with own written cards. Together all these cards are discussed, clustered and pinned on a board. The result are thematically structured visualizations on posters, which can be used for further discussion or photographed and attached to a journal of a Metaplan-session.
A complete Metaplan session consists of three to four steps an will take several days. This procedure can be varied under certain aspects. It depends on the composition of the group, on the tasks and on the creativity of the moderator. Since this method consists of independently combinable modules, it can be used very flexible. Using this method requires a lot of accessories, which are conventionally available (e.g. flipchart…)

Although the techniques and procedures of the moderation-method had been refined since their beginnings and are still an established manner, the handling is not comfortable at all. Transportation of posters and moderation equipment, pinning and gluing of cards on flipcharts, as well as photographing or scetching of the posters in order to take the protocol is not state of the art, bulky and has to be improved. However the method to write down ideas, to cluster them, to develop and structurize them, in order to get an overview of the processes still has lot of advantages

Previous attempts to support Metaplan technique and other moderated teamwork by means of the information technology were not successful. The touchsensitive whiteboards (Smartboard, Team-Board ...) are designed for presentation purposes and there vertical orientation forces a frontal interaction. Since only one input is possible per time interval , a parallel and simultaneous working is impossible and thus prohibits an effective teamwork. The seriel input of ideas is time consuming and blocks up all spontaneity which is elementarily important for the success of this method. A horizontal orientation of the touchsensitive boards together with an ergonomical handwriting causes quantisazion errors and is thus inapplicable. At the present time the advantages of the digitalized inputs do not compensate the disadvantages from the above. In addition formerly elaborated posters are only available by scrolling backwards and can not be compared and attached to the wall as a reminder.

3 Motivation

A time and cost efficient product development presumes that all relevant product data are available and accessable to all members of the team. All data that are collected during the lifecycle of a product fee the *Digital Product*. The usage of information technology in the early stages of the product development process enables the "birth" of the digital product already with the first ideas.
The adaptation of the well known Metaplan technique as well as their redesign in aspect to novel hard- and software allows an synenergetic usage of the information technology and the paperbased teamwork. An intuitive handling of the whole system should enable the users to be creative and innovative.
Working with new technology and functional software, together with an attractive user interface, increases the motivation of all team members and smooth the way for novel applications.
Nowadays the protocolling of team sessions is time consuming and needs additional technical equipment (cameras, scanners, copiers, digitizers...). Information technology simplifies protocolling, managing and distributing of elaborated work. Due to a automatic „history-function” the time flow of a team session can be browsed and thus creates a new quality of protocolling.

After a successful completion of the development the whole system, method and infrastructure will be used as an IT-based planningsystem for moderated teamwork in industrial applications. Further optimization and development will follow after first experimental results of this new system (project name: InnoPlan-System).

4 Contributions

Adaptation of the Metaplan-technique into an IT-environment:
A successful transformation of the Metaplan-technique into an IT-based surrounding requires a perfect combination of all functional parts. This are methodology, moderation equipment (conference room with integrated technical infrastructure) and moderation, which together form the novel InnoPlan-system.

Methodology:
The Metaplan-technique is subdivided in single steps, that are rebuild with means of information technology. Synenergy will result from the usage of novel technologies and the adaptation of the moderation technique. Several procedures are identical both in the InnoPlan and Metaplan technique, others are optimized to be technical supported. This will allow an easy and comfortable usage of the new system. The goal of the transformation and adaptation of this method is an simple and intuitive application as well as its transparency and reproducability.
One important aspect of the proposed work is the design of the software and of thus the man-machine-interface (MMI). For individual software designers and ergonomists commonly use the metapher of a desktop. Teambased applications ask for new metaphers. The combination of individual in/output devices (InnoPlan pads) together with collective workspaces and reminders requires a consistent design of the grafic user interface GUI in order to realize an intuitive usage by untrained persons. Tasks like writing or scetching on cards, exchanging them between InnoPlan-pads and publishing them on collective workspaces or reminders, teambased clustering or editing as well as new ways of taking a protocol should be easily handled after a short training. This enables the user to concentrate on his creative work.
An other important aspect of this work is the design of an ideal work environment. The architectual and interior design of the conference room under ergonomic and psychologic aspects as well as the optimal integration an combination of the needed IT-infrastructure, are the main focuses.

Conference room:
The maximum number of persons for moderated team sessions with the InnoPlan method is about 10 to 12. Larger groups need different techniques based on different interaction and teamwork. The conference room has to support a teamwork in plenum as well as in smaller subgroups. Therefore a flexible furnishing is needed and a room size of at least 40 m2. A fixed desk contains the central infrastructure (like server, printer, document camera, video tape recorder, wireless LAN-receiver ...). Other desks can be moved around an combined according to different team sizes. It has to be considered that the collective workspaces and reminders has to be visible from all positions. Relevant data are projected on two interactive boards (1,5m x 1,1m) and two reminders (equal size) by four data projectors mounted at the ceiling. The images can be randomly arranged and exchanged on the four projection screens. Also a simultaneous projection of an identical content on all screens is possible in order to avoid the shading by the presenter.
It has to keep in mind that architectural and interior Design (illumination, temperature, noise, smell...) affects the creative environment as well as the offer of refreshments (coffee, water, snacks...).

The "novel" characteristic of the moderation environment:
As a basic requirement the conference room has to provide a motivating environment to a temporarly gathered team. In addition the InnoPlan-system includes the complete technical infrastructure, allows the communication with distant teams or specialists, facilitates a spontaneous information requirement, protocolling and printing or plotting of meeting results. This functions are not possible in conventional conference rooms without additional equipment. In conclusion the new conference room is an elemtary functional element of he InnoPlan method.

Moderation:
Usually a Metaplan-session is moderated by two persons: one is moderating while the second one is visualizing and pinning cards. This roles can be changed. In exceptions (spontaneous moderations, short moderations) a single person can moderate. Also at InnoPlan meetings a moderation by two persons is recommended, because additional tasks like managing the technology and the moderation system. The co-moderator is responsible for arranging the projections to the different working and reminder screens, the handling of the peripherique equipment an the taking of the protocol, that can be distributed to the team members at any time. As an exception the InnoPlan session also can be done by a single trained moderator.

Handling and functionalities of the InnoPlan-system:

The individual in/output device (InnoPlan pad). During the session, every team member has an own InnoPlan pad as a multifunctional device (figure 1), that is personalized to him and logged in to the InnoPlan system. This enables or supports the automatical protocolling. Similar to a web-pad, the InnoPlan-pad consist of a touchsensitive display (apx. DIN A5) with an integrated computer, which can be operated by a pen. This allows handwriting, scetching, automatical recognition of handwriting as well as an input via a n onscreen keyboard. The pads communicate with each other an the server by wireless LAN or BlueTooth technology. The intuitive GUI of these pads, allow to generate cards, to edit and delete them. Within a next step these ideas can be classified and grouped or clustered. Also cards can be send from pad to pad or from the collective work area to a pad (e.g. when working in subgroups or when using the 6-3-5 method). The pads allow to publish cards in order to appear and to be progressed on the collective working area.

Figure 1. InnoPlan-Pad, the individual interaction unit of the InnoPlan-system

The collective work area corresponds to the Metaplan poster. Here, the published cards can be explained, discussed, reviewed or clustered .... Like on the InnoPlan pads the interaction on the digital Whiteboards can be done with a pen. In addition to moving, clustering and arranging, the cards can be supplemented with additional comments, headlines or labels. The GUI on he collective work area correspond to the pad GUI but is enhanced with additional collective functions. This allows for example to save and restore posters as well as to move them to other working areas or reminders. Posters or definable sections can be plotted or printed. From the collective work area the protocolling function can be controlled too. In particular the „history function" has to be mentioned, that allows to scroll by use of a time-slider, to any desired chronological position of a poster or even to play the evolution of a poster as a film.

The reminders are passive projection screens, and do not allow any interaction. They are used to visualize ellaborated posters or other important information (also multimedia) to the team. The contents of the reminders can be controlled by the collective work area or by the moderator system, e.g. arranged, exchanged or restored on an active work area.

The moderator system is the central element of the InnoPlan-system. Here all data from the wireless LAN are merged and prepared for visualization. The moderator system consists of a graphics workstation and a screen, that is controlled via mouse and keyboard. These possibilities are used to open a new session, to personalize the InnoPlan-pads and to aquire additional information for protocolling and to control the peripheral.

Peripheral functions. Acquiring additional information from slides or printed matters can be done by a document camera. With this camera it is also possible to visualize parts or details on a reminder area. As already mentioned, all intermediate results or finished posters ore definable sections can be printed. The printers and plotters can be accessed by the moderater system. Also additional information, which are important for the result of the InnoPlan session can be acquired from the intranet or internet by the moderator system. As default the pads don't have direct web-access in order to minimize any disturbance by private surfing. However this can be changed by the moderator system. In case of distributed team sessions, where one subgroup is physically distant but is working on the same theme or in case of involving external specialists into a session, a video-conferencing-system can be used for communication.

Differences InnoPlan /Metaplan:
Similiar to the Metaplan technique also the InnoPlan-technique presumes that all spontaneous ideas are noted individually on cards. This cards are published after a preselection, they are discussed and structured on the collective working area. Like in the Metaplan-technique elaborated Posters can be projectedon a separate screen as a reminder.
Unlike the metaplan technique within the InnoPlan technique cards can be grouped and the resulting clusters can be moved or simplyfied by the use of the level-of-detail-function (LOD). This functionality improves the clarity and the possibilities of organization. Cards can be edited at any time (size, color, shape, font type and size…). Each card is automatically appended with protocol data that can be added with individual annotations. These additional information can be viewed and edited at any time. The collective work area can be zoomed and scrolled in order to simplify the structuring of the cards.

Procedure of a team session:

Preparation of a session. The moderator starts the InnoPlan-system and enters all relevant data (topic, place, timetable, members...) to open a new session. The InnoPlan pads are personified for the following workshop, specially information about the pad user, further participants, subject... are entered, so that the pad can welcome the arriving participants with a friendly "Good morning Martin and a lot of fun at the workshop "new technologies in teamwork".

Opening of a session. After all participants found their pad and thus their seat, the subject is introduced by the moderator. For this task, the InnoPlan-system is used as a presentation-system and the moderator can inform about the topics, the goal of the meeting and the timetable by showing videos, powerpoint presentations, prepared graphics or also by writing on the touchsensitive boards. For firsttime-user of the InnoPlan-system a short instruction in the usage of this system (max. 5 minutes) can follow.

Writing on cards. The workshop can start now and all participants note their ideas and propositions on the virtual cards using the InnoPlan-pads .

Publishing cards. These cards can be clustered and grouped on the pad and be sent to the collective work area.

Clustering. On the collective work area the incoming cards appear as a symbol near the icon of the corresponding team member. From there, they can be moved, annotated and placed on the collective working area by the author or the moderator. In a next step, all inputs are clustered, sorted in logical structures and dependencies and grouped by the plenum.

Complementing and criticism. During the collective work, cards can be edited by the author on the collective work area or by returning them to the author's individual pad. Declarations and remarks can be added to every card in the drop-down-annotation-menu.

Evaluation. Titles, marks, references... can be added on the collective work area by the participants. The possibility to edit color, shape, size, font and design features of all elements allows a lucid visualization.

Posters. Processed work areas are stored as posters. By the use of icons on the collective work area all elaborated posters are shown and can be simply restored. Due to their digital form, the posters can be displaced onto reminder areas and processed with the computer in any known manner (plotting, printing, sending...).

Protocol. The system automatically generates a protocol of a session and stores any action in a log file with a time stamp and a person assignment. Thus, every card has an edition-history, which shows the evolution in the drop-down-annotation-menu. All publications and actions that are done on the collective work area, are recorded with the "history function". With a slide control (Timeslider) any chronological position of the evolution of a poster can be recalled. Also parts or whole posters can be viewed as memomotion study.

Specials of the InnoPlan-system:

The proved procedure of the Metaplan session is complemented with the efficient possibilities of the information technology. For presentation purposes the multimedia functionality can be used and the access to the Intranet/Internet allows an easy acquisition and distribution of information. The simple displacement and exchange of the contents of the collective work area and the reminder increases the clarity and simplify the presentation of earlier elaborated posters. The digital protocolling function facilitates the taking of a protocol and the history function gives the possibility to make a "time trip" to any desired evolution position of a poster by moving the time slider.

The direct communication between the individual InnoPlan-pads supports the work in small groups as well as the usage of other methods and techniques (e.g. 6-3-5-method). Therefore

the function of the collective work area or of the moderator system can be given to one InnoPlan-pad of this small group. In order to collect the results, the data of this pad will be sent back to the master moderator system to be worked out in plenum.

5 First Results

First series of experiments with a prototype of the InnoPlan system showed that the handling of the installed information technology is very simple and intuitive. A positive result was the good acceptance and the spontaneous and natural use of the novel system also by persons which are not used to work with computers. The usage of novel technologies, the fun factor and the combination with a well known and easy to understand method increases the motivation even with users that very often work with the Metaplan technique.

The equipment of conference rooms should include at least 4 projection areas from which in minimum one has to be interactive. The tests with the prototype showed, that the displacement and the new arrangement of the contents of working and reminder areas has to be redesigned for a simpler handling. A further result was, that the extension of the InnoPlan-system with interactive small teamwork places can increase the possible applications from information technology in the early stages of the product development process.

6 Conclusions

The experiments with the prototype showed that the usage of information technology is not only possible in early stages of the product development process, but an efficient and interesting alternative to the traditional techniques. The direct projection of the Metaplan technique in a technology supported environment as a first application for interactive teamwork in creative groups was successful. The multimedia possibilities, the fast availability of information via Intranet/Internet as well as the automatic protocolling and the fast distribution of the digital results and information are essential improvements of the traditional Metaplan-system. Nevertheless, the potential of the used technology allows the development of new and different methods and applications for interactive teamwork..

7 Future work

Because teamwork often requires flexible and spontaneous work in different constellations, the possibilities of an IT-supported environment also in these fields has to be expanded. In a first step a workplace for smaller groups is supposed to be developed. This interactive place will allow a subgroup of 4 to 6 persons to elaborate ideas and solutions that can be processed in plenum later on at the collective work areas of the InnoPlan system. A network of such small teamwork places enables a locally distributed work as well as the usage of new creativity and moderation techniques.
In a next step it is planned to network multiple InnoPlan systems, so that CSCW (ComputerSupportedCooperativeWork) and video conferencing will be enriched with new possibilities and qualities of interaction and communication.

In parallel with the technical development new methods and methodologies should be developed, tested and implemented, which use in an optimal form the expanded possibilities of the technology supported interactive teamwork.

8 Acknowledgements

The above project was funded by the Swiss research fund KTI 4475.1PMS. We thank in particular the IfAP (Institute for Work and Organization Psychology) and the HGKZ (University of Art and Design Zurich).

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