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Search in Conducting Intensive Student
Modules (Workshops)**

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Tactics for Stimulating the Creative Search in Conducting Intensive Student Modules (Workshops)

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Abstract

Design workshops are intensive modules which are increasingly used both in the students' training in design and in conducting various design related events. Their popularity is due mainly to the possibility of breaking the existing stereotypes and achieving a number of original solutions to a certain problem.

Due to the limited time to reach the final solution in the workshops, the proper selection of design methods, aimed at enhancing the rapid generation of many ideas, is essential. The large amount of ideas and their variety are preconditions for the successful accomplishment of the assigned task.

The present article is focused on the different stages of the idea generation phase and the possible tactics for their stimulation. Attention is drawn to the specifics of the design process in the different types of tasks.

The information, presented in this article, is aimed at supporting students and lecturers, taking part in such intensive modules, which are successfully applied in the team work of students from the designs specialities.

The aim of this article is to present tactics, successfully applied in the training of students from the speciality "Engineering Design" at the University of Forestry, as well as to assist the work of students and lecturers, taking part in such intensive courses.

Keywords: Design workshop, intensive training, methods of practical training, team work, education of design

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Introduction

Intensive practical Student teaching modules (workshops) or Team Project Based Learning (TPBL)¹ represent a commonly used method of training. The way this teaching method is designed makes it possible to put the students in a real-life working environment thus giving them the maximum preparation for the challenges that await after the completion of their studies. It has been called an intensive program because the time that is given for problem solving can range between 5 to 14 days. Students work in teams where the minimum count of participants is about 5-6. The specific nature of the intensive module provokes many fears in the participants.

The timing is the first thing that scares them, since they are not accustomed to the higher work intensity that their semestrial projects usually lack. The second major challenge is to achieve proper communication within the team. This is a very difficult task, given that the members of the team are randomly selected and are not a result of sympathy-based selection process. Therefore, a great amount of social skills are required: teamworking, sociability, listening and evaluating the other members' opinions etc. In addition to these requirements, all students are expected to drive all of their practical and theoretical skills into their work. However, often, instead of showing their potential they get a "creative block" at the very beginning of the teamwork or at a certain stage of the design process and they cannot go any further.

In order to overcome these fears and psychological blockages and to guide the creative process properly, we must establish a clear strategy for conducting the intensive module. The strategy is a sequence of steps which lead the process purposefully and tactics are techniques or tools that are used in different stages of this sequence.

The teachers involved in the intensive module, are responsible for the right conduct of the workshop and the adherence to the adopted strategy.

The specific type of methods and tactics involved in the strategy depends on the participants and the workshop's theme. Two approaches are possible for theme choice. First, the brief could be to solve a specific problem for a specific company with the limitation of defined conditions. Secondly, another approach would be a 'conceptual' one. The theme is not directly connected to a specific product, but more to a situation aiming at developing students' thinking beyond the limits of their present knowledge.

The creative process itself can be divided into 5 stages: preparation, concept, development, communication and implementation. Each one of these stages is characterized with specific tactics of conducting its own activities.

This report examines the potential methods and tactics for creative encouragement which are commonly applied in the first two stages of the design process.

¹Dym, C. L., Agogino, A. M., Eris, O., Frey D. D., Leifer L. J. 2005. *Engineering Design Thinking, Teaching, and Learning*, Journal of Engineering Education, January 2005, pp. 103-120

Stage 1 - Preparation

Stage 1 - Preparation (Assimilation) includes the following phases: introducing participants to the problem to be solved; assimilation and ranging general information on the problem; analysis of conditions, limitations, norms etc; search for more information; discovering social needs; forecasting; analysis of information. It begins with introducing the participants to the problem which has to be solved. The task is formulated with maximum clarity, avoiding specific terminology, because it limits creative thinking. It is desirable that task formulation and the goals are put down in writing and even graphically presented.

Stage 1 includes the time when the teachers introduce the possible working methods to the participants of the intensive program. This is crucial for most of the students are unfamiliar with the design methods used in a team working process. For example, most of them could have probably heard of the most popular idea-generation method- the brainstorming, but hardly half of them have put it into practice. Therefore it could be of great benefit for the students if they're given a brainstorming demonstration from the teaching staff.

After they have received the necessary information, students can continue with the research process as base for their project. The research stage includes a definition of the main problematic areas the team should go on working on. This is the time when everyone should agree on the character of the project-whether it should be a new product/concept or development, modification and modernization of an already existing one. This decision could also be taken later, for example in the beginning of the second stage of the teamwork. The research represents a way of finding the right information about already existing analogous ideas or objects, the manufacturing processes, the specific material properties, the consumers, the market, the competition, the social and economic trends etc. It is a good advice to share the work between all the members in the team so that each one is responsible for the research of a specific item.

Possible methods are Research of analogue products on the Internet, in specialized periodicals and catalogues; Mapping of Findings method, Quantity analysis etc.

Mapping methods are particularly useful for identifying areas of opportunity for developing new products, services and experiences, analyzing a competitive landscape, to understand trends and use real-time information to help identify potential problems. Another possible method is the *Quantity Analysis* which provides statistic data that shapes the direction the project should take.

The first stage ends with the systematization of the final results from each member's own research process. The proper analysis makes existing problems, gaps and necessities prominent, which speeds up the workflow.

Stage 2: Concept

Stage 2: Concept (General Study). It consists of the following phases: task introduction; determining the solutions field; choice of means to solve the task; search of possible solutions (idea generating).

Task Introduction

After the research phase, participants should go on with the next steps of the working process and take different views on the problem they need to solve. When faced with a difficult problem, one of the best ways of finding an effective solution is to organize a brainstorming session. There are many different brainstorming methods. Depending on the specific nature of the task, different brainstorming variations are applied.

Robert Curedale describes 50 different versions of the brainstorming technique in one of his books¹. Brainstorming remains today one of the most powerful methods available for developing original ideas. Brainstorming is a way of applying a collaborative approach to innovation. Different design practitioners can select different methods and apply them in different ways.

At this stage of the intensive program it is wise to *Brainstorm Through Writing* (Figure 1.). This method gives an opportunity to analyze the problem from all of its perspectives while at the same time it defines all of the initial conditions, expected results, strong and weak sides. It all starts with a clear definition of the problem and writing it down in a visible spot (blackboard, flipchart stand or a large piece of paper). After this first step, several branchings are made (arrows in different directions) - the words, explaining the problem. Once the “branches” are made, they can easily expand. The count of the branches depends on the type and the volume of the information, which is being illustrated on this specific “brain map”. This technique allows systematic presentation of the matter and makes it possible to display large amount of information which is available for everyone at all times. This is a very useful and effective trick. The only rule that should be followed in this task is to stick to the core of the brain map and to follow the branches. Anything else is up to the individual’s imagination. The purpose of this method is to consider as many aspects of the problem as possible. No specific design solutions are required at this stage of the workflow.

Figure 1. *Application of the Method Brainstorm Through Writing*



¹ Curedale, R. 2013. 50 Brainstorming Methods, For team and individual ideation, Design Community College Inc.

Determining the Solutions Field

After finalizing the “brain map” of the problem there comes a time to prepare detailed analysis and assessment of all the considered aspects. Here comes the time to define the guidelines for the next work phase. The solution comes when social need and problem situation is understood after the information is analyzed.

The formation of every industrial product or environment, having a social benefit character, requires great analytical work. It is crucial to address and analyze the problem from all the possible perspectives. Several different analyses are needed in order to achieve the best results: market opportunity analysis, technical and aesthetic properties analysis, ergonomics and functionality analysis.

The market opportunity analysis reveals the consumer preferences and their changing needs. The following methods can be used at this sub-step: Choosing a Model, Role-Playing, Story-Telling, Consumer Role-Switching, Target Groups, Consumer Types etc.

Choosing a Model represents a sociological research method. This is a method, which helps to identify a strategy for finding out the most appropriate or effective consumer group for experimenting for the shortest period of time and smallest budget. Similar methods are *Focus Groups* and *Consumer Types* which offer deeper understanding of the consumer reactions and ideas through typical consumer behavioral analysis. This stimulates the idea-generation processes and the final decision making. These techniques can also appear useful while explaining the innovative side of the concept or the design.

Another method that defines both the client’s and design team’s expectations in the beginning of a new project is the method of *Consumer Role-Switching*.

The application of the *Role Playing* method requires the physical setting of a situation which puts the consumers in contact with the product or the service. This technique is useful for both industrial product design and design of spaces and environments. Similar to it appears to be the *Story-Telling* method which helps us actually “see” the designed object. Applying the method, the participants need to connect all the basic features of the design of the product or the environment. The *Story Telling* is irreplaceable when it comes to shaping new environment concepts.

The Technical Properties Analysis includes: analysis and comparison of different structure solutions, basic construction elements and their features, basic materials and finishes, technology and manufacturing.

The Aesthetic Properties Analysis includes a composition-shape analysis, the principles of shape formation, the correlation between form and function, the ergonomics requirements etc.

The Ergonomics Analysis examines the dimensions of the individual elements that make up the shape. This is a method for visual analysis of the operational situation which is often applied in the furniture and interior design.

Functions Analysis is a method which examines the object as a sum of functions, rather than a material structure. Functions analysis is considered to

be the essence of the design process and aims to clarify which functions get the biggest share in the formation of the prime cost of the product and which can be taken away in case they appear insignificant or undesirable. Furthermore, laying down all the functions and arranging them together with all possible and conceptual “carriers” in a morphological block allows us to find out their optimal combination. This method is known for the thorough research of the best possible existing solutions that could be ‘redesigned’ or they can inspire a whole new product or service.

All the methods described above, except for the *Role Playing* and *Story Telling*, can also be applied individually with all the participants from the team making their own researches separately.

After all of the analysis is made it is possible to apply the method of *Morphologic Problem Matrix*. The Morphological Problem Matrix is a key methodology that can improve the effectiveness of the concept generation phase of the design process. It allows the solution of almost every type of problem through the combination of all the alternative parameters. It provides a structured or systematic way to generate a large number of possibilities including many unique or highly unusual options. Using a Morphological Matrix involves identifying three to five major dimensions (or “parameters”) of a task, identifying possible attributes each parameter might have, and then exploring random combinations of attributes (selecting one attribute from each parameter for each combination). The Morphological Matrix can yield a large number of new possibilities. Typically, this method is used to achieve new product applications, to specify all possible qualities of the product and their combinations in new correlations, to search for innovative ways to create new things, to analyze the compound parts of the object and to draw new conclusions and ideas. The morphological method rationalizes only one part of the creative process, namely the total combination of the parameters which naturally leads to the discovery of the problem and its structure.

The purpose of using the methods above is to draw out the borders of the general direction in the design process. The analysis serves as the foundation of the problem’s solution, the identification of the various parameters, limitations and requirements (technical and operational) etc. As a result, the analysis form the necessary amount of data that makes the design process effective.

After the analysis is made, it is advisable to apply the method of *Note Comparison*, which helps setting the right sequence of the design tasks and also speeds up the decision making process. The next step is the *Group and Vote* phase. It represents a method of identification of the problematic area or the series of ideas. It helps through the selection of the possible solutions and sets the guidelines of the next phase. However, the proper selection of the design solutions requires some *Evaluation Criteria*. This step marks the individual ideas according to the general criteria and makes it possible to select the best ones.

Search of Possible Solutions (Idea Generating)

The last phase of the second stage of the design process is the search of possible solutions (idea generating). At this stage we use heuristic techniques, such as Analogy, Associations, Control Questions, Change of Thought Direction, Eliminating Technical Contradictions, etc. They are part of many methods.

The easiest among all in this specific situation is the Brainstorming method, especially its variations, which do not require preliminary exclusive training and special guidance from the teacher's side. Good examples are Scribble-Say-Slap Brainstorming, Brainstorming by Sketching, Method 635.

Scribble-Say-Slap Brainstorming. This method of brainstorming includes having participants write their ideas on sticky notes (*scribble*), then shout them out loud (*say*), and post them on a brainstorming wall (*slap*). Use of sticky notes allows participants to quickly write down their ideas, shout them out, and put them up rather than having to wait for their turn under standard brainstorming (Figure 2.). Specifically, Scribble Say Slap Brainstorming is a group-based exercise that can take a wide range of opinions from a large amount of people with limited time constraints.

Figure 2. *Application of the Method Scribble Say Slap Brainstorming*



Another version of the 'Brainstorming' method, which is useful in a workshop-set working environment is *Brainstorming Through Sketching* (Figure 3.). This technique requires everyone to sketch out his individual ideas (each sketch on a separate sheet of paper) and putting them on a visible surface. The other members of the team need to use the sketches and develop their ideas or make brief annotations. Quick visual aids can be produced to aid brainstorming and focus attention, although this should not slow the proceedings down or amount to resolve. Visualization aims to provide feedback with which to stimulate further creativity and build upon suggested ideas and themes. The drawings don't need to be perfect: they only need to show enough detail to communicate the idea.

Similar to this method in terms of procedure and means of implementation are the methods Idea by Cards, Boards with Cards, Small Pieces of Paper Method, Crawford Slip Method.

Figure 3. *Application of the Method Brainstorming Through Sketching*



The *Method '635'* is a further developed version of the 'Brainstorming' and is applicable to design tasks. By applying this method, involving an optimal number of 6 participants, three initial ideas are produced, which are further associatively developed 5 times each from 5 different points of view. The participants work quickly, inspired by one another.

Those methods allow generating a great number of thoughts and ideas for a short period of time by uniting the efforts of session participants. Its psychological justification consists of building chains of associations by eliminating any criticism and restrictions of fantasy. The methods consist of two phases: generation of ideas and their subsequent evaluation.

In case the participants of the workshop are already familiar with the design methods and their mechanisms, they can use other methods in the idea-generation phase such as: Sinectics, Method of Focal Objects, Morphologic Analysis and Synthesis, Method of Control Questions, Reinforced Analogy; Bionics; Analogy and Metaphor; Free Associations, Chains Of Associations and Metaphor Method; Preparative Questions Method; 'Stair Movement' Method; 'Attributive Description' Method, SCAMPER Method etc.

Finally, to assess the ideas generated requires the need for criteria against which they can be assessed. Criteria can include cost, resources required, necessary resources available, time factors and fitness for purpose. A scoring system can be used for each criterion such as a scale rating (one to five, for example) or a simple yes/no about whether it has been met. This assessment allows the ideas to be ordered and prioritized for follow up and potential resolve.

After completing the second phase, the team must have a final clear concept for the following work process. It is the time to settle the initial conditions of the design process: designing a new product (environment) or development of an already existing one.

Concepts become a crucial part of the design process because they help the idea-generation process and create ways for their future development.

A very useful tool which is suitable for all phases of the workshop is *Keeping a work journal*, which allows you to keep an order of everything that has happened and lets you recall important ideas or suggestions during the

process. It also makes it possible to trace through the whole working phase from beginning to the end and help the team in a “blocking” moment.

Conclusion

Emerging technologies and processes have nowadays started to require more productive methods that would meet the needs of the complex growing consumer environment. In order to prepare the students for the challenging designer’s profession and the contemporary business world, it is necessary to implement innovative methods of education such as the Intensive practical Student teaching modules.

The methodology, described in the current report, aims to help the work of the participants in the first two phases of the intensive modules. It can be useful in several ways: make informed design decisions; identify areas of opportunity; analyzing a competitive landscape; to understand trends; to analyze complex, changing and ambiguous design problems; enable meaningful conversations about difficult design topics; use real-time information to help identify problems and make the best decisions; the possibility of breaking or not the existing stereotypes in order to draw out original solutions for the problem; create more successful design that has a better return on investment.

Because of the limited working time in the workshops, it is crucial to choose the right design strategy which would provide successful and quick design solutions.

Time allocation for each phase is also of great importance. The set time period may either encourage or eliminate creativity. There are methods and idea-generation techniques used in the initial design phases, such as the brainstorming technique which stimulates the creativity despite of the time limitation. However, in other cases, more time is needed to research new aspects of the problem and shape new solutions. If time limitations for the different creative phases are not set right, it is possible to impede the workflow.

Regardless of the chosen strategy and tactics, there are always the types of students who are not motivated enough and hide behind their team member’s active work. In order to make their count as less as possible, it is necessary to choose additional stimulation tools (prizes, individual evaluation of the students giving them extra credits etc.)

Teacher’s attitude towards the students’ work is also of great importance- especially their ability to estimate which methods and tactics are appropriate for the situation. Tutors should encourage creativity, teamwork and initiative through various challenges, internal debates, cheering mood, risk taking etc. They should be more motivating and if possible, an inspiration for new creative ideas.

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