

AN INTERDISCIPLINARY EDUCATION MODEL FOR DESIGN EDUCATION AT THE SALZBURG UNIVERSITY OF APPLIED SCIENCES

Michael Ebner, Kurt Gaubinger, Alexander Petutschnigg, Bernhard Rothbucher

Keywords: global competition, design education, interdisciplinary collaboration, product development;

ABSTRACT

The design courses at the Salzburg University of Applied Sciences focus on the development of interdisciplinary education to prepare students for professional life and to enrich their curriculum with a wider knowledge of methods than is found in traditional design education. The concept described is based on the educational theories of Jerome Brunner. His concept of learning is based on representative steps. These steps are: enactive, iconic, and symbolic. When an issue relating to design is worked out with these steps, the design tasks can be defined, analysed, discussed and finally solved on different levels. As different fields of knowledge are involved in these processes, interdisciplinary working knowledge is taught.

1 INTRODUCING THE EDUCATIONAL CONCEPT

It can be observed that the increasing complexity and speed of practiced design work also affects those who are involved in design education. In order to prepare the students in the most accurate way for their working environment, it is necessary to evaluate the requirements of companies now and in the future as well as the requirements of society.

The solutions for companies should contain the economical, aesthetic, technological and branding aims and therefore the teams which are engaged with new product development consist of persons from different fields (e.g. marketing experts, technicians and designers). The long-term success of a designer is dependent on his/her ability to consider the needs of society and the environment as a social duty, if not as an absolute necessity. In order to integrate all these considerations in an educational concept, one possible approach was chosen at the Salzburg University of Applied Sciences (SUAS). The concept and initial reports are given in the following.

The first question concerned the contents that should be provided in the design course. According to curricula of existing courses as well as information derived from recent research studies (e.g. Kahn [1]), it is necessary to provide aesthetical, economical and technical knowledge to prepare the undergraduates for the requirements of professional life after university.

The following statement by Welsh [2] articulates the point of view of the design course at the SUAS in a very general way.

‘Guidelines for design ... Design has to go many and different ways. It has to value and articulate plurality. Design not only has to include social, national, local or business identities but also to form crystallisation points for new, transversal identities. Design has not only to include existing standards (local, national, social, ...), but also produce mixed (multivalent) designs, because our life – internal like external – will be more and more a “life in plural”, meaning a life within different social and cultural contexts’ [2].

Furthermore in the IDSA fundamental entry-level requirements for Industrial Designers we find a separation into ‘Area of Knowledge and Methods and Processes’ [3]. ‘If one idea could be found central in design studies, it most likely would be communication’ [4].

The second question to answer is how to transfer the contents to the students. The theoretical background for the concept chosen at the SUAS is based on the educational theories of Jerome Brunner [5]. His concept of learning is based on three representative steps. These steps are: enactive, iconic, and symbolic. By taking a given problem through these steps it can be analysed, discussed and finally solved on different levels. In the enactive step a problem is handled using a practical approach (doing). The same task can then be taken to the iconic level, where it is further processed in a graphical, iconic way (picturing). In the third, symbolic step, the solution is put into a more general policy to solve similar problems by using the same strategy (generalizing). So there is development towards the abstract. But this process then proceeds to form a spiral by bringing findings from the first three steps into a second round. So abstract findings have to be tested, proven and further refined until the solution satisfies the requirements. The aim of the educational concept is to improve efficiency at work. Problems are solved by students in the same way, but the steps are not carried out sequentially because the students are able to go through the different abstraction levels simultaneously, always using the most suitable level of abstraction.

This way of learning, which at the same time is a form of problem solving, is performed in all the design, marketing and technology fields at the University and also in the education and the research departments. At the same time it means that the University has developed into a centre of a local network for design and media. The University thereby plays the role of an academically-fuelled catalyst for innovation, providing an international standard in theory and transferring it through case studies into industry.

2. THE APPLICATION IN DESIGN EDUCATION

The principle of project management within this concept is shown in Figure 1. In addition, the main partners (the departments at the SUAS, the scientific partners e.g. other university departments and partners from industry e.g. companies) and their main competences during the project phases are shown. It can be seen that the importance of a certain partner can change depending on the step and phase of the whole project.

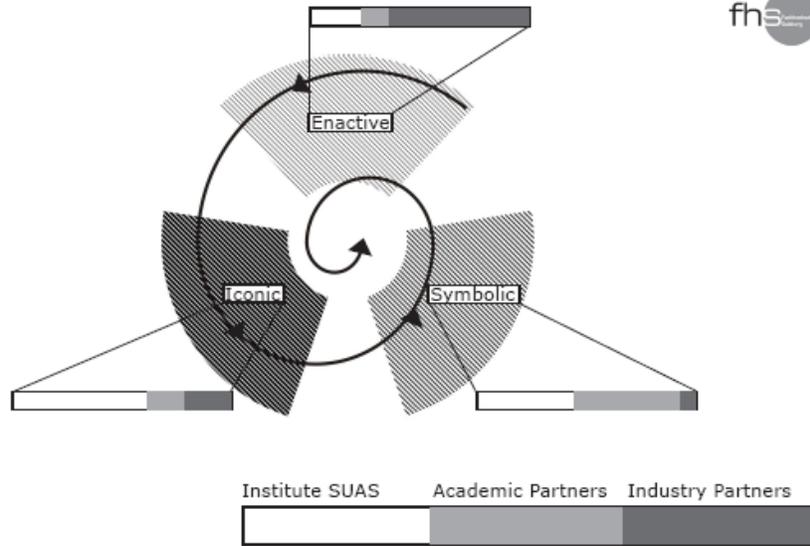


Figure 1. The framework for design education at the SUAS. The bars show the commitment of various partners in every step

So given tasks are realised as an interdisciplinary project work whereby students and staff from different disciplines go through all three levels of representation within the same project over a period of time. (For core competences see Tab.1).

Departments	Core Competency	Responsibilities
Design and Product Management (DPM)	design and product management	apl.design thinking, design process, marketing of prod.
Forest Products Technology (HTW)	technology	research of materials, technologies and production processes

Table 1. Resources in the different departments of the SUAS

Knowledge and experience from one level are used in a structured way by the team that performs in the next level. A study by Sherman, Berkowitz and Souder shows that the combined effects of R&D marketing, integration and knowledge management results are crucial factors for the success of a development process [6]. This result conforms with our experience in the application of the new framework and will be further evaluated in future.

3 AN EXAMPLE

To illustrate how the principle of Jerome Brunner is applied at the SUAS, a project for a toy production company is outlined. The toy market is characterised by a decreasing market share of wooden toys and there has been a drop in the number of companies producing wooden toys. One company which manufactures wooden toys recognized the necessity of redesigning the existing product range and approached the SUAS with this design project.

In the initial phase, the main aims of the design process were defined. This task led to the elaboration of important questions, especially concerning the existing materials and production processes. To carry out successful product development, it is necessary to include all general conditions concerning the market, the technologies and the design. If all general conditions are taken into account, the product development will have the highest probability of success.

This project, involved a well known toy production company called “Lorenz” which manufactures wooden toys at two different locations. The “BAUFIX” product, which was to be redesigned, is produced in Kötzing, a small village in the Bavarian Forests. Figure 2 gives an impression of the production facilities and the BAUFIX toy.



Figure 2.left: The production (left) and components (right) of BAUFIX

The project group decided to adhere to a multistage progress. The first step was to work out new ideas for the existing product. Second year undergraduates were instructed to use the existing parts to develop new arrangements, e.g. a big wheel which had not yet been built. This was the enactive phase of the project. The students presented the results to the project partners. Several developments are shown in Figure 3.

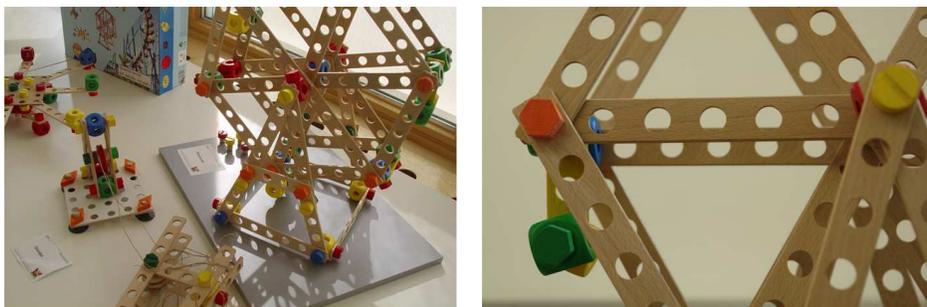


Figure 3. Examples of the enactive step

The contents for the iconic level of product development were defined based on these findings. On the one hand, the materials were analysed and new materials elaborated, and on the other hand, new products were sketched and developed for the construction of parts in addition to the existing ones. Students of the technical study program developed ideas for alternative materials such as thermally modified wood, as well as wood plastic composites, to create more functional toys. The product design students developed products with totally new design components. For example, curved wooden components were used to develop products with a more dynamic appearance. In Figure 4, an image of the analysed material and a new product idea are shown.



Figure 4. Left: toys made of natural and thermally modified wood. Right: a new toy with curved elements.

Based on these findings, two projects were defined to reach the highest level of abstraction, the symbolic step. From the perspective of the design students, the limits given by the companies involved in the project should be overruled and totally new concepts for wooden toys should be developed. The aim of this project is to determine potential and promising developments for the whole wooden toy industry. The second project is defined for the technical students. They will be asked to develop totally new production concepts for wooden toys. The findings of the design students have to be considered in these concepts. If some production processes do not actually exist, the students have to define the requirements of the processes. The results of these two projects could stimulate commercial industrial designers and design offices to gain new perspectives for further toy development. The integration of the project in the curriculum is shown in the following table.

Step in the educational concept	Course	Semester	Task
Enactive	DPM 2005	SS 2005	Play with toys Construct products out of the existing ones
Iconic	DPM 2005	SS 2005	Sketch new product ideas
	HTW 2004	WS 2006	Test new materials for BAUFIX
Symbolic	DPM 2004	SS 2006	Develop new products with new materials
	HTW 2003	SS 2006	Develop concepts for production lines for new wooden toys

Table 2. The project in the curriculum

The toy development period does not end with the planned cycle, however for teaching it is necessary to start a new cycle with a new product. For example, the development of lightweight panels could be a new product for consideration. In general, the partners of the Salzburg University of Applied Sciences define the new topics.

4 EXPERIENCE AND CONCLUSIONS

The results of this project show that alternating interdisciplinary education with the combination of theoretical and practical tasks performed according to the concept of “Jerome Brunner” motivates students to improve their capabilities in a holistic way (as students of different study programs work together on one main task). Furthermore, the experience gained during the product development phase led to crucial improvements in production processes. These findings are essential for the development of the University in the educational as well as in the research fields.

The expression ‘global village,’ as first used by Marshall McLuhan in the 1960ies, has become a reality not only for graduates in the field of design, but also for all SME in Central Europe. The Salzburg University of Applied Sciences developed an interdisciplinary and interorganisational model to better prepare students and local industry for this challenge. The latest evaluation of Design and Product Management degree course shows the high level of acceptance and relevance of the curriculum to both students and industry.

Through the structured approach towards education as well as collaboration, the degree course could establish a stable and long lasting relationship with local industries without any detrimental effects on its cooperation with local design agencies.

REFERENCES

- [1] Kahn K.B., *Department Status: An Exploratory Investigation of Direct and Indirect Effects on Product Development Performance*, Journal of Product Innovation Management. Vol. 22, Number 6, pp.515-526
- [2] Welsch W., *Ästhetisches Denken*, Philipp Reclam jun., Stuttgart 1998, pp.215
- [3] Weinstein C., *2000 Directory of Industrial Designers*, Industrial Designers Society of America, VA 2000, pp.15
- [4] Margolin V. and Buchanan R., *Design Discourse, History Theory Criticism*, The University of Chicago Press, Chicago and London 1989, pp.91
- [5] Brunner J., *Acts of Meaning*, Harvard University Press, Cambridge 1990, pp. 16
- [6] Sherman J.D., Berkowitz D. and Souder W.E., *New Product Development Performance and the Interaction of Cross-Functional Integration and Knowledge Management*, Journal of Product Innovation Management, Vol.22, Number 5, pp.399-411

Contact info

Prof. Dr. Bernhard Rothbucher, Salzburg University of Applied Sciences, Design and Product Management, Design Management Research Group DERESA, Markt 136a, A-5431 Kuchl/Salzburg, Austria, fon: ++43 (0) 50 2211 2015| fax: 2099, mob: +43 (0)699 153 72 153, bernhard.rothbucher@fh-salzburg.ac.at, web: www.fh-salzburg.ac.at