

Preparing design students for the real world: Assessing the Interdisciplinary Group Project at the Salzburg University of Applied Sciences

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Abstract

Above all, students of applied sciences need to be well prepared for their professional life and thus we ask ourselves at the Salzburg University of Applied Sciences (FHS): “How adequately can a programme course simulate the challenges faced by a graduate designer or product manager?” One mandatory master course, the Interdisciplinary Group Project (IGP), aims to address just this and links companies and design talents with challenging tasks in the fields of industrial design, service design and marketing. The project requires students to:

- (1.) complete four independent and commercial design projects under time pressure
- (2.) know all important functions of an interdisciplinary design team hands-on
- (3.) learn to take on responsibility for certain tasks by slipping into four different roles
- (4.) form teams and handle complex human relations
- (5.) gain insight into different internal processes and structures of companies, depending on their organization, purpose and size.

To verify our assumption of the course’s effectiveness for preparing the student for professional life, alumni and partner companies participated in a qualitative assessment. Both graduates and project partners responded positively to the course topics and its accuracy as mirror of work life. Afterwards, the results were summarised and displayed in a SWOT analysis for a consolidated view on the course’s current status.

Keywords: Design education, roleplay, industry, interdisciplinary, teamwork

Introduction

Design education in the 21st century is extremely important as mankind seems to be undergoing a paradigmatic change. This might be the first generation that has the ability and responsibility to shape the future of all of mankind (Jakob v. Uexküll, in Kohr 2006). Perhaps the historians of tomorrow will look back at this point in time and realize that the means were there to change most current problems and it is up to the designers to use those means. At the Salzburg University of Applied Sciences (FHS), we believe - above all - that design students must first develop sensitivity to real problems and realize the absurdity of “modern” production cycles. Future problems will not be solved by individuals but teams and thus our students have to work similarly, dividing work according to individual skills. As a bottom line, we believe that design must move from being a selfish to a group endeavor; only then can it positively shape the future.

In an industry more and more dominated by design-thinking for the management of brand and innovation, a substantial amount of performance is lost at this interface due to different mentality and behavior patterns (Lackus et al., 2007). Because of such considerations, our students learn both the required skills for making products, launching them onto and keeping them in the marketplace.

The course

Modern designers usually work in teams, where each participant has a different focus of expertise. We are convinced that students must learn to slip into such roles of future coworkers and learn the different required challenges. At the Salzburg University of Applied Sciences (FHS) Master Students of Design and Product Management (DPM) must all pass a course called Interdisciplinary Group Project (IGP), where students actively cooperate with companies in the field. More than gathering experience in the field of multi-faceted design, it is a pedagogical exercise designed to prepare the students for dealing with different personality types in human hierarchies. As formulated in the theory section below, we regularly observe a main challenge to be the fact that students all behave differently under the pressure created by a study project.

During the semester-long course which was introduced in 2008, students are required to work as teams for four individual projects. There are usually five teams, each consisting of four students. Since the main goal is interdisciplinary learning, the students ought to experience different positions involved in product development. This hands-on role play is essential for understanding the different mindsets and viewpoints which can be found in heterogeneous teams. For example, engineers have to collaborate differently in organized projects under time constraints than the project manager, who arguably has stronger peaks of stress levels (Badke-Schaub et al., 1999). How can students be transmitted such variance in stress levels and responsibilities? It has to be known exactly what those factors are, how do they influence teamwork and when (in what situation) they are most important in the course of a design project. In short, they have to be experienced.

For the IGP course, we formulated the roles of (1.) the Designer, (2.) the Technician, (3.) the Product Manager and (4.) the Art Director. Their tasks and responsibilities are explained below:

(1.) The **Designer**'s job includes everything when it comes to form and style. Like any other product designer, he/she is responsible for shape, color, trim, usability, product semantics, hap-

tics and - if necessary - packaging. Most of these features must be developed in close cooperation with the other team members.

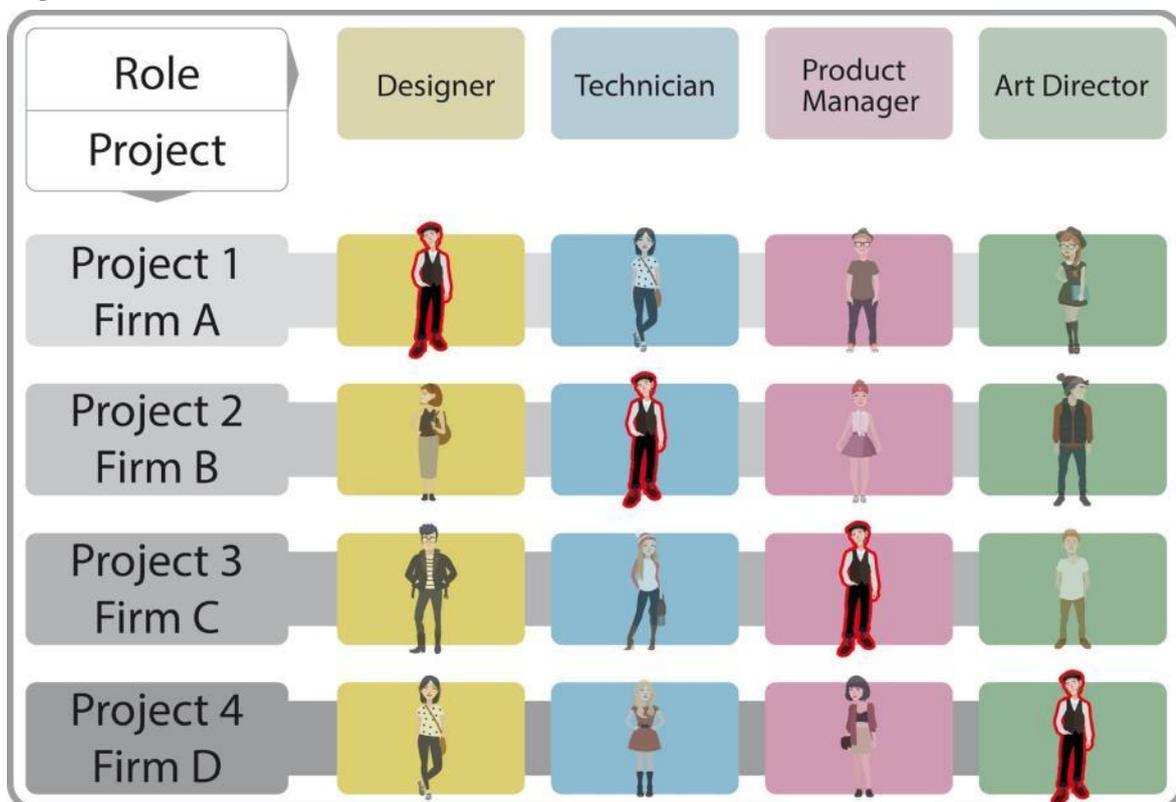
(2.) The **Technician** takes care of technical feasibility, materials, the package, ergonomic and legal specifications, new technologies and construction. He has to work closely with the Designer when it comes to creating a professional and realistic product.

(3.) The **Product Manager**'s duties include market analysis, definition of the target group and the market potential, merchandising, business strategy and cost calculation. He/she is the one in charge for the implementation of the product onto the market.

(4.) The **Art Director** is the team leader. He has to oversee all the work packages, implement a time schedule, author project documentation (workbook), wording, logos, graphics, advertising and trouble shooting. That last challenge does not only regard the work itself, but also the team member's interpersonal issues.

In the early days of the IGP, the teams lasted for the whole course. We experienced it as counter-productive for the project's final results when some groups spent most of their time arguing and quarreling. Their dedication, effort and working quality decreased constantly during the semester, leaving them dissatisfied and us - as well as our project partners - with disappointing outcomes. Thus, teams are now mixed up after each project and students are continuously forced to work in different groups, often with new characters and rank dynamics (see figure 1.). Of course the risk of incoherent groups can never fully go away but it was decreased. For their final presentations, students have to present inside their roles for each project and thus representatives of the project partners can address questions directly to the students responsible for each field.

Figure 1. Scheme of role allocation and team mixture.



The objectives of each team are wide spread then: Every year we find four firms or corporations providing projects or topics to be developed. Since the semester consists of around 16 working weeks, each project runs for about a month. They come consecutive and with a fix time frame, so the students know exactly when the time is up and the final presentation for each project has to be held. The project topics and contents can vary from pure industrial design to marketing, market analysis, design audits, usability and user experience case studies to exhibition or graphic design. We try to give each year a broad variation of the topics, meaning they have to deal with preferably many different types of work. Usually the project kick-off is combined with a factory tour or a lecture of the project partner. Representatives of these firms also attend mid and final presentations to give feedback from the company's view.

Over the past years we welcomed firms from many sectors and sizes from start-ups to global enterprises, such as BMW and Daimler (automobiles), Blizzard (skis), Kärcher (cleaning devices), Doka (formwork systems), ZF TRW Automotive (automotive industry supplier), AHT (commercial cooling devices) and many more. Often these collaborations arise from students doing internships or graduates who work in these companies. Sometimes students from the IGP stay in contact with the particular industry partner and do their master thesis and/or start their career there after graduation. Figures 2 and 3 show examples of finished projects from the past.

Figure 2. Outdoor tile stove for skiing resorts. Project Partner: Poli Keramik



Figure 3. Steering wheel for autonomous driving cars. Project partner: ZF TRW



Theory

On the most abstract level the (IGP) was originally influenced by Raoul Schindler's rank dynamics (Schindler, 1957). In that model, a group is defined by two or more people who unite to achieve a common goal through performing a common action. It usually has outer and inner structures, a dynamic hierarchy and an opponent O (usually the objective itself). Throughout the IGP students receive lectures from a certified team building coach on the complexities of group dynamics. Thus, each student learns about the four following personality types which they should witness during the entire project:

(1.) The **Alpha**: The team's head and representative to the environment. He/she is most focused on the group's goal (usually beating an opponent) and unites his fellow members within the meaning of identification. His/her goals match the group's goals, since he/she is fatefully connected to it. Alphas are not arguing, they are acting and are usually of three types:

- The group-oriented Alpha: Big on empathy, needs internal consensus and leads the team.
- The narcissistic Alpha: Only his/her goals are important. He/she acts completely independent, needs no consensus, doesn't care about conflicts and is not anxious. He/she provides a feeling of security for the team.

- The heroic Alpha: Acts against the Gammas, shows aggressive leadership, calls on a fateful connection between the team members and stands as a symbol for the group.

(2.) The **Beta**: These team members are advisors and experts in their field. They are independent, only loosely connected to the group and could become a threat to the Alpha. But unlike them, the Betas must achieve and perform. That is why they justify their position due to their work.

(3.) The **Gamma**: They can gain anonymity and hold no responsibility in a group. They can be either seen or disappear and act free of mentionable tension. Those in this position adopt Alpha's will and identify themselves with him/her. Gammas feel no stress in their work and turn affectively against Omegas.

(4.) The **Omega**: They reflect the team's ambivalence, are too weak or insecure to really change the common direction and goals, but often pull in the opposite way. Since the Omegas identify themselves with the group's opponent, they are important for the team's solidarity due to taking the role as punching bag. An Omega usually turns against the Alpha, who is perceived as threatening. There are three basic roles of this type:

- The laggard Omega: Follows slowly, gets tired quickly, but still wants to participate.
- The distant Omega: Sees the project critically, has many concerns, thinks of leaving.
- The rebel Omega: Visibly attacks the Alpha.

(5.) The **O-Position**: The opponent (=O-Position) represents the dynamic goal of the team's efforts and doesn't necessarily have to be understood in a negative way. Opponents show the group's functionality and show all the matters and obstacles they could face during their work. Since the O-Position is not part of the team, his/her representative inside the group is the Omega.

Schindler's theory being quite old, we consulted a brand new study from the University of California at Berkeley. Published in the Journal of Personality and Social Psychology, Hildreth and Anderson reported on a set of experiments to study the performance of groups of leaders exposed to stress-producing through creative tasks, decision making and finding agreement (Hildreth & Anderson, 2016). In one of the many studies, 174 college students had to work in pairs on a tower-building task; one person was assigned to a high-power role and the other to a low power role. The high-power person made all the decisions for the task, whereas the other had to report to him/her. However, this first task was simply a priming exercise for a second step in the experiment where the high-power individuals had to perform a strictly creative one. Hildreth and Cameron found that the outcome of that second creative objective was clearly lower than the same task performed by heterogeneous teams of both high and low power individuals. Interestingly, high-power individuals worked especially well on a similar creative aim when they were doing it alone. The researchers offered heightened competitiveness between high-powered individuals as an explanation for poor cooperation. It seems that energy is wasted by high-powered individuals to beat another team, rather than focusing on the task at hand. It is for this very reason that, we purposefully break up an overly hierarchical group dynamic by rotating roles.

Research suggests that projects are the traditional mode of teaching in design education (Knoll, 1997; Davies and Reid, 2000). However, the literature on project methods with a pedagogical

focus - asking why projects are desirable in a design curriculum - is relatively undeveloped (Dohn and Wagner, 1999; Helle et al., 2006). Thus, we have consulted several studies on group projects and university education. One of them (Colebeck et.al, 2000) explored the consequences of interdependence development where purposefully little guidance on how to work together effectively is given. Group projects contribute to student's problem-solving, communication, and conflict management skills. Although the professors of the IGP do dictate the distribution of roles, the students are left to themselves in their division of labor and accomplishment of tasks. In another paper, a rigorous study was undertaken on 261 students to measure student satisfaction of group projects (Gatfield, 1999). Here, high levels of student satisfaction with group work were confirmed. Interestingly, a significant difference in satisfaction of students with and without work experience - favoring those without - was found.

Empirical Study

Because of the above theoretical foundation, this project is an ideal practicing ground for students about to enter the industry. After completing the IGP, students should be better prepared for dealing with group-level complexities in their working life. In order to test these assumptions we have formulated the following hypothesis: "The interdisciplinary project with its various pedagogical aspects prepares design students by realistically practicing all roles required for the launch of a product." Our study started in the fall of 2015 and will be pursued with new interview partners (graduates and companies) after each future course.

Interview Situation

In order to confirm this hypothesis we conducted qualitative interviews with the companies that cooperated with us as well as alumni that have completed the IGP and are now working as designers, product managers or brand strategists in the field. All interview partners were asked the same questions (as mentioned below). All interviews were conducted with representatives in the headquarters of the industry partners. Interviews were recorded and transcribed. Due to being spread all over the world, the graduates wrote their answers down themselves and sent them to us. We qualitatively interviewed six alumni and five spokesmen representing the companies Doka, Grüne Erde, AHT, Salzburg AG and Kärcher. All the interview-partners were chosen because they have either partaken in the course as students or industry partners and could thus speak with retrospection.

Content Analysis

For the analysis of the transcribed material we chose the qualitative content analysis of Mayring (Mayring, 2000) since it represents a very complete package for the systemic analysis of qualitative interviews. Originally developed for a large scale study of the psychosocial effects of unemployment with data of close to 20,000 transcribed pages (Ulich et al., 1985), the method works well when several different interviews are analyzed along a standardized set of codes or tags. Thus, we broke the full transcripts into more manageable chunks, selected along five different themes. The results for these tags or codes are discussed below.

The questions we asked were:

- 1) How do you describe process and outcome of the IGP you participated in?

- 2) How can the assumption of a role and its resulting responsibility for the discipline prepare the students for a job in the private sector?
- 3) Why is building teams from different key personnel a didactical correct simulation for methods of operation after graduating?
- 4) If you compared our IGP in terms of time factors to a project in your company, which differences do you see?
- 5) Did you find that the gained insight to the project partner's/your processes and way of making decisions was adequate?
- 6) How did your participation in the IGP change your awareness of the importance of product designers and/or a product managers?

These interviews were followed by the analysis (as stated above) and are summarized below.

Representative of industry partner/alumni responds positively to pedagogical concept of IGP

Overall our interview partners responded very positively to the (IGP). Overwhelmingly the fact that we break the students into teams for each project was seen as pedagogically rich. Interestingly, the natural hierarchy found amongst all human groups was seen as an advantage for the outcome of the projects since the hierarchy can lead to more variation and a certain differential in the strength of each project. Both industry partners and ex-students responded that the IGP offered no hiding place for possible personality flaws in different roles and thus an ideal practice opportunity for all. Role playing does seem to be important in hierarchical groups (Schindler, 1957) and the downfall of limited creativity amongst leaders (Hildreth & Anderson, 2016) seems to be reduced. To take over different tasks in each project reveals different point of views for the students, making the other team partners better understandable and improving a productive communication. Furthermore, the students get in contact with industry partners, exploring various industry fields and corporate structures and possible cooperation partners for master theses or future employers.

Representative of industry partner/alumni responds negatively to pedagogical concept of IGP

“Were the roles really practiced?” was a very common question amongst our interview partners from the industry. It is indeed impossible to control if rules are obeyed in any role-playing game, and especially when there is limited contact with students between kick-off, mid-term presentation and final presentation. Furthermore, it was lamented that there exists little in-depth contact between the industrial partner and the students. Interestingly, in one project poor cooperation (amongst students in the different groups) was observed. This might be explained by the fact that until recently (2014) the projects were graded by groups and not individually. Thus, the incentive for all teammates to actively participate should now increase due to the separate assessment.

Representative of industry partner/alumni reports on similar processes in company as in IGP

Overall we observed that the IGP indeed mirrors the design process of the industry. There, just like in the simulacrum of the classroom, teams from different backgrounds bring distinct point of views into each and every design project. In design, just like in the real world, there are hierarchies that don't necessarily have to be overcome and instead can lead to positive outcomes.

Representative of industry partner/alumni reports on different processes in company as in IGP

Industrial partners seem to lack the neutral stance of our students and thus cannot be as agile, since companies are often - by definition - focused on achieving certain monetary goals. In order to copy what students do, much more time would be needed in the real world. In all fairness, it needs to be stated that the results of the (IGP) are only partially real and sometimes not even

close to being launched on the market. The design phase (marked by creativity) often comes too early in university life and much later in a real working environment, but this again might be explained by the different timeframes.

Representative of industry partner/alumni adds input to pedagogical concept of IGP

We received invaluable feedback and insights from our interview partners. Most items were constructive ways to improve the overall output of the (IGP) in both pedagogical and material ways. The roles that we assign for each project might be made more visible by perhaps introducing more rules or veto rights for some players and not others.

SWOT Analysis based on the qualitative research

This method was developed at the Stanford Research Institute (SRI) in the 1960s (<https://www.sri.com/sites/default/files/brochures/dec-05.pdf>, accessed 25/02/2016) Its purpose is to find important factors to achieve an objective such as products, projects, businesses, industries etc. These factors need to be revealed by internal and external views; from the position of the company/project team etc. as well as from its environment. SWOT stands for:

- Strengths: Which factors make us/the product/the project better than others?
- Weaknesses: Which factors make us/the product/the project worse than other?
- Opportunities: Which factors could make us/the product/the project even better?
- Threats: Which factors could lead to trouble?

According to the analyzed data, the performed SWOT Analysis is shown in figure 2.

Figure 2. SWOT Analysis for the IGP



The internal situation according to our work is the course itself (IGP). So the internal factors are based on the curriculum, considerations of the faculty staff and of course the content of the alumni's interviews. The environment in this case is formed by the industry partners, so its factors are defined by the information received from their representatives.

Conclusion and outlook

Time management must be required in each project. Students, just like in real life, must learn to estimate the time required for each chore in order to realistically and practically fulfill them. Failures as well as completion of such work packages will likely lead to a learning experience. Both the industrial partners as well as ex-students lamented that there is little or no contact with potential customers. Indeed, it would only be consequent to make the relationship of students with the industry complete by adding the relationship with those that buy from companies. It is, however unlikely that the average time frame of four weeks per project is sufficient to also include this extra task.

We are currently discussing an implementation of a strict hierarchy within the teams, providing the Art Director with a veto for the group's decisions. This could simulate the weight decisions of supervisor and/or project leader have. Therefore, the grade of the Art Director might be calculated from the other team member's grades, meaning that he/she is affected by possible wrong decisions as well as his/her subordinates.

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