

## **PRACTICAL TRAINING AS PART OF INDUSTRIAL DESIGN EDUCATION – PRACTICES AND ATTITUDES IN FINLAND**

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### **Abstract**

This paper discusses the implementation of practical training among undergraduate students of industrial design. The number of in-house industrial designers in manufacturing companies is rather low in Finland, and many of the other product developers lack insight in working together with designers. Based on the authors' experience, the practical summer training of industrial design students is not very systematic or organized, and many students face difficulties in finding places of work for practical training. There are some other disciplines, e.g. engineering, that have their representatives in almost every industrial organization, and also seem to have much more advanced training culture. The main research question is, how well the existing training culture supports the industrial design students' growth from novice to expert, enabling interrelationships to their coming clients or employers in industry. The second question is what practical improvements, if any, could be suggested.

The authors analyzed the current situation by interviewing students, university authorities, and industrial employers. We used semi-structured interviews and analysis of transcribed interviews and discussions. In addition, two electronic questionnaires (one for students and one for industry) were developed for collecting quantitative data and written comments.

This study covers industrial design study program only on university level. The research includes both quantitative and qualitative aspects, considering the summer 2004 and the ongoing academic year. Employers were asked about, e.g., how many trainees they have hired, why to hire or why not, what kind of expectations they have, what are typical tasks for trainees, and how they see the future. From students we asked, if they have managed to get a traineeship, how easy or how difficult that was, and how they actually search for employment. From university authorities we asked about training guidelines and instructions given in study manuals or by personal tutoring, and about the underlying philosophy behind it.

Based on the interviews and analyses we have concluded that there are interesting possibilities to increase productivity in product development in manufacturing industry by introducing a better organized training program for industrial design students. The existing training practices do not encourage the students to search actively for training employment. The companies don't fully understand the capabilities of industrial design students, or are unnecessarily afraid of not finding proper tasks for them. By starting an advanced training program, we could generate a positive spin: first some pioneer companies join the program – then the first summer trainees join as well - students learn from other students' experiences – both sides become more aware of the needs and offerings – more companies join the program – etc. We also suggest a new 'integrated design' model for practical training, in which the training period is carried out in a two-person team, consisting of both technology and industrial design students. These pioneering 'guerilla duos' were introduced to the Finnish industry during the winter 2005.

## 1. Introduction

The number of in-house industrial designers in manufacturing companies is rather low in Finland, and many of the other product developers lack insight in working together with designers. Based on the authors' experience, the practical summer training of industrial design (ID) students is not very systematic or organized, and many students face difficulties in finding places of employment for practical training. There are some other disciplines, e.g. engineering, that have their representatives in almost every industrial organization, and also seem to have much more advanced training culture.

No specific studies have been conducted in this field of research. In 1994 Sari Karttunen published a survey on the students of the University of Art and Design Helsinki with the topic "Art and Design Training and the Labour Market". The goal of this study was to survey student's conceptions of the content of candidate degree and working life opportunities as well as to survey graduates adapting in working life [6]. Based on the survey concerning the employment situation of industrial designers in Finland, 37.8% of them were labour, 20.7% entrepreneurs, 0% freelancers, 28% had several work places and for 13.4% the situation was different [10]. Based on the survey made in 2003, the biggest need of industrial designers for Finnish industry will focus on university level students between years 2005-2010 [5]. For this progression the research tries to find out reasons and factors for change.

The authors of this article believe that by connecting firmly the practical training and its practices to industrial life, a directive effect for transmitting industrial design students to working life can be created. According to the research made by The Finnish Association of Graduate Engineers (TEK) 2003, 25.7% of Master of Science students in technology considered the earlier employment in the company as one of three most significant factors of getting summer job [8]. In the study made during year 2002 the comparable value was 26.9% [7].

This paper discusses the implementation of practical training among undergraduate students of ID. The main research question is how well the existing training culture supports the ID students' growth from novice to expert, enabling interrelationships to their future clients or employers in industry. The second question is what practical improvements, if any, could be suggested.

The authors of this article derive practical training to working environment- or occupation training. Working environment training means training work done as 'factory floor'. Occupation training includes training covered as the 'office' work.

The study covers ID study program only on university level. The study compares practical training practices of ID and machine design in:

- University of Arts and Design Helsinki (UIAH), The School of Design, Product and Strategic Design,
- University of Lapland (UL), Faculty of Art and Design, Department of Industrial Design and
- Helsinki University of Technology (TKK), Machine Design.

The authors compare training practices between ID and engineering to find if some practices could be equalized. The research includes both quantitative and qualitative aspects, considering the summer 2004 and the ongoing study year.

## 2. Methods

The authors analyzed the current situation by interviewing university authorities, and industrial employers. We used semi-structured interviews and analysis of transcribed interviews and discussions. Total number of 10 interviews were done for this study. In addition, two electronic questionnaires (one for students and one for the industry) were developed for collecting quantitative data and written comments. Similar questions with TEK query [7, 8] were used to get comparable results. The response rate of electronic queries was remarkably low. Therefore, students were also personally asked to fill the questionnaire at the university facilities.

We asked employers, e.g., how many trainees they have hired, why to hire or why not, what kind of expectations they have, what are typical tasks for trainees, and how they see the future. From students we asked, if they have managed to get a place for training, how easy or how difficult that was, and how they actually search for employment. From university authorities we asked about training guidelines and instructions given in study manuals or by personal tutoring, and what is the underlying philosophy.

## 3. Practical training in the Finnish universities act and in its regulations

The government of universities is set by the Finnish Universities Act (645/1997) and its regulations. According to Section 2 of the Finnish Universities Act the universities shall have autonomy. The Universities Act does not include comments of practical training relating to the education of ID or engineering.

The University of Arts and Design Helsinki and University of Lapland – Faculty of Art and Design comes with the territory of decree (440/1994) on the universities teaching the industrial arts. According to Chapter 1 Section 3 of the decree a studies leading to a degree may include practical training.

Helsinki University of Technology is affected by the Finnish decree of scientific degree (215/1995). According to Chapter 2, Section 6 of the decree:

6 §

### **The composition of training program**

The composition of training program is consist of basic studies, which includes also language and communication studies, basic studies, intermediate studies and practical training, which will be scheduled in the way that they will be in useful interaction with between.

In addition, Chapter 2, Section 8 defines: To complete the degree student have to proceed education and practical training comes with the territory of the study program. In TKK there are detailed instructions for practical training on department level and training is compulsory.

### 3.2 Bologna Process

The new decree will cause some changes to the practical training practices. In Chapter 2 Section 9 of the Finnish Government Decree on University Degrees (794/2004) defines Lower university degree as follows: A studies leading to a lower university degree may include work practice for professional development. In the Chapter 2 Section 15 the higher university degree is defined as

follows: studies leading to a higher university degree may include internship to improve expertise.

### **3.3 Practical Training as Part of Current Industrial Design Education at UIAH**

The studies in UIAH in current system are divided into two detached degrees; triennial bachelor's degree of arts and Master's of Arts degree for which the turnaround time is five years. In addition is possible perform doctoral degree in arts.

The existing training culture at UIAH does not strongly encourage students to choose training as an option for their personal curriculum. This in part reflects the fact that there are no mentions of practical training in the standing orders of University of UIAH. There are only random comments of practical training in the study guide. The instructions for practical training are also limited. So far there is a possibility to perform practical training during the candidate period. In some specific cases like in the Destratus-program, students can perform training in a Master's program. This convention is so far exceptional. Student could achieve at most 4 credits from practical training. Recommended time to perform practical training is during summer between 2<sup>nd</sup> and 3<sup>rd</sup> years of bachelor's degree. There is no factory floor training culture in the ID education at UIAH.

The goal and content of practical training is not defined in public guidebooks. Students can discuss about their practical training with the Head of Program. To get credits from practical training students need to create one A4 page training report, testimonial and show references about the works done during training (portfolio) to the Head of Program.

### **3.4 Practical Training as Part of Current Industrial Design Education at University of Lapland**

The current system at UL is structured similarly as at UIAH. In the ID study program is not included practical training in the bachelor's degree. ID students in the master's degree can carry out practical training as elective subject of 2 to 6 credit units. One month of practical training with training report together will authorize for 2 credits.

Practical training at UL is normally situated in the study guide of educational structure at 4<sup>th</sup> year. It is often done during the summer between 4<sup>th</sup> and 5<sup>th</sup> year (Lipiäinen, L. personal notification 24.5.2005). For practical training in the study guide are produced for instructions only ¼ page of compact text. The additional information on web pages helps students quite well in the process of finding training place and funding it.

The goal of training is to familiarize students with job description of vocational area and field as well as professional operations model of the one in question. The student will get subjective experience from the realistic tasks on the professional field and will operate interact professionals of field and customers alike [9]. At the Faculty of Art and Design practical training is not divided into working environment or occupation training. The idea of practical training is determined broadly: The education and working model is that the students will work on the area relating to the professional field [9]. In the figure one can be seen the credits achieved by training.

1 month practical training + report of practical training (3-5 pages) = 2 credits
2 months practical training + report of practical training (5-10 pages) = 4 credits
3 months practical training + report of practical training (10-15 pages) = 6 credits [9].

FIGURE 1: *The Required Completions for Practical Training.*

Following rules are for students at UL to get the study attainment from practical training. Students have to deal approval for the practical training before starting the practical training [9]. Students have to create the report of practical training with the following contents:

- description of the workplace and personal tasks,
- the use of knowledge learned from university during the work tasks,
- description of exercises or design assignments (with pictures or sketches during the different phases of ideation of the task) or analysis of specific problem or function,
- examination possibly do relate with the theory of major subject,
- what new viewpoints or things do relate with major subject were during the practical job offered,
- description of organization and operational environment of training job,
- possible assignment in suchlike working environment after graduation [9].

Between the years 2002-2005 only one MA-student has carried out international practical training period (Lipiäinen, L. personal notification 24.5.2005). The number of the students carrying out practical training varies between the years; 2002–2003 there were 5 students, 2003–2004 13 students and 2004–2005 4 students (Heikkilä, R. personal notification 26.5.2005).

### **3.5 Practical Training as Part of Education at Helsinki University of Technology – Machine Design**

Based on decree 215/1995 Chapter 1, Section 2 in science and technology the higher degree is Master of Science in Technology and post-graduate degrees are Licentiate in Technology and Doctor of Technology.

In the Degree Regulation of TKK (Teknillisen korkeakoulun tutkintosääntö) there are several clear definitions for practical training as a part of education of Master of Science in Technology. The Degree program is two-tier and depending on the curriculum of training program it may contain from 2 to 10 credits of practical training [3].

In the Machine Designs' study guide there is circa 16 pages appendix with clear guidelines for practical training. At department of Machine Design the experiences of practical training along with other studies have traditionally felt to be important and it raises the level of profession, maturity and understanding of business life [4]. Because of the versatility on education at Machine Design the goal and requirements for practical training vary greatly between special fields [4]. Clear goals and orders have been set for the specific education direction. Practical training can be working environment- or occupation practical training. If the training period is at least 2 months long the trainee can make a report of practical training in order to earn an extra credit (6+1=7 credits or 8+1=9 credits).

Practical training Guidelines at Machine Design are based on the Degree Regulation of HUT and decisions made inside training schedule. The minimum requirement for practical training is 6 credits, which can be accomplished by 18 weeks of full time work [4]. In this system 3 weeks all-day practical training corresponds to one credit which is the minimum length for practical training period [4].

The international training is highly recommended. The Students can attain full 8 credits if at least 6 weeks of the training has been international [4].

### **3.6 Summary for Legislations and Practices of Universities on Practical Training**

As a conclusion, acts and decrees do not define practical training as a part of education. However in degree regulations it can be done. On the department level instructions are very detailed in TKK and on the other hand very common and short in ID. The training guidelines at TKK include both ‘factory floor’ and ‘office’ training both of them are considered as equally important. All universities considered in this study have career services. The Bologna Process will not force art and design universities to make change in their current systems on training.

## **4. Findings**

### **4.1 Student Inquiry Findings**

A survey questionnaire was set up for ID students, in order to learn about their activities during spring term and summer 2004. A total of 26 respondents took part in the inquiry. From the respondents 57.7% were male and 42.3% female. 61.5% of the respondents were studying at UIAH and 38.5% at UL. 38.5% of respondents were studying in bachelor’s degree and 61.5% in Master’s of Arts degree.

Most of the ID students had been working while studying. 38.5% of students said that they had worked for less than one week, 38.5% had worked for 40–400 h, 19.2% had worked for more than 400 h, and 3.8% had worked continuously during spring term 2004. Even though students worked in addition to the studies, on the average they carried out 16 credit units during spring term 2004.

According to our study, majority of ID students wanted to work in the fields of design and product development, planning, and research. In the reality, students worked mostly in design and product development, planning work, or in other undefined field. The biggest difference occurred in the field of research, where none of the students had worked even though more than half of them would have been willing to.

**What Kind of Work Industrial Design Students Would Like to Do During the Summer And Main Tasks During The Summer 2004 (ID.)**

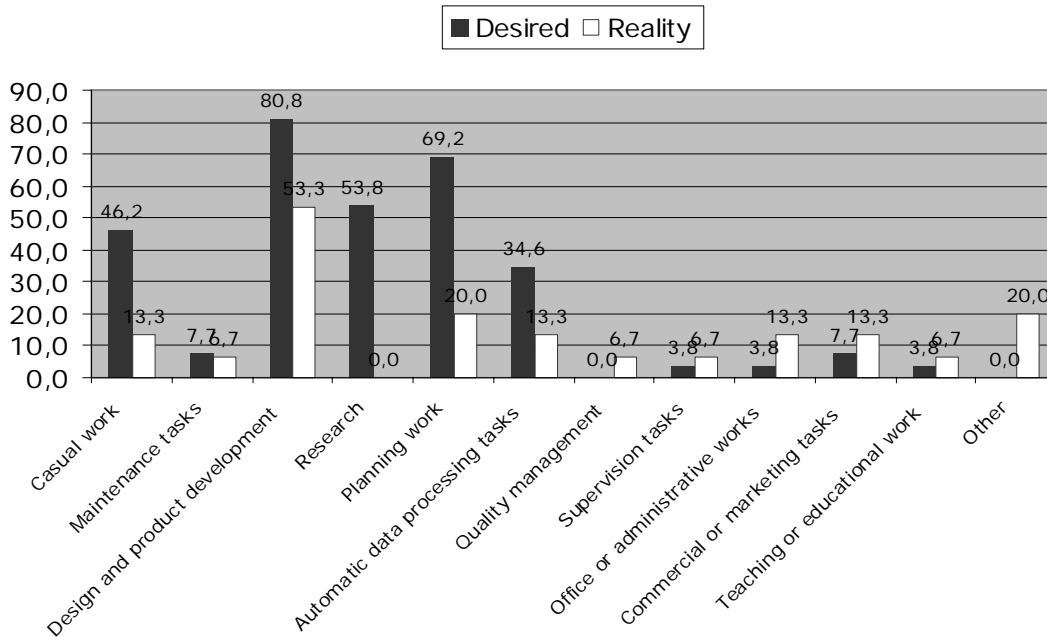


FIGURE 2: What kind of work industrial design students would like to do and what task they mainly did during summer 2004.

Based on the inquiry, most of the ID students sent less than five job applications and none more than 30. Most of the students worked in a field related to the studies, almost as many in a field not related to the studies, and some in a field slightly related to the studies. None of them had a diploma work placement or were in the army, on maternity leave, or on nursing leave.

Have instructions concerning practical training been produced for students at ID degree programs? Most of the students of UIAH felt that they are not informed of, nor supported or encouraged to participate in practical training. At UL most of the students felt that they are not well informed of the practices of practical training, but they are still able to get more information if they ask for it. Overall 80.8% of students did know that training is not compulsory part of their studies. 57.7% of students were still satisfied with the current training instructions. Altogether 52.2 % of students knew that their universities offer recruiting services and 50% knew how many credit points at most they could achieve by practical training.

According to our study, the students who did not get a job during summer 2004 used mostly the following methods for job-hunting: by answering internet job advertisement, by contacting the employer, and by using recruiting services. Unused ways to get work were: by answering advertisement (newspaper), the employer offered work, work in own company, and other undefined reasons.

Based on our study, the students who had a job were mainly employed by a design or consulting company, industrial enterprise, or other undefined employer. Students did not work for nation or

state owned companies, municipalities, federations of municipalities, or municipality-owned companies, or organizations and foundations.

As in figure three can be seen, students worked mostly in design or consulting companies (40%). 20% worked in industrial enterprises, and 13.3% in commercial or service sector.

According to the students' estimation, the main reasons why they got their job are the following: by contacting the employer 46.7%, the employer offered work 33.3%, and other undefined reason. The students did not find the following job-hunting methods significant: by answering advertisement, by using recruiting services, and working own company.

Comments on how the work was managed and instructed varied a lot. The fellow workers acted for the most part positively towards the trainees. The median working time for domestic training was 12 weeks and for international training 0.

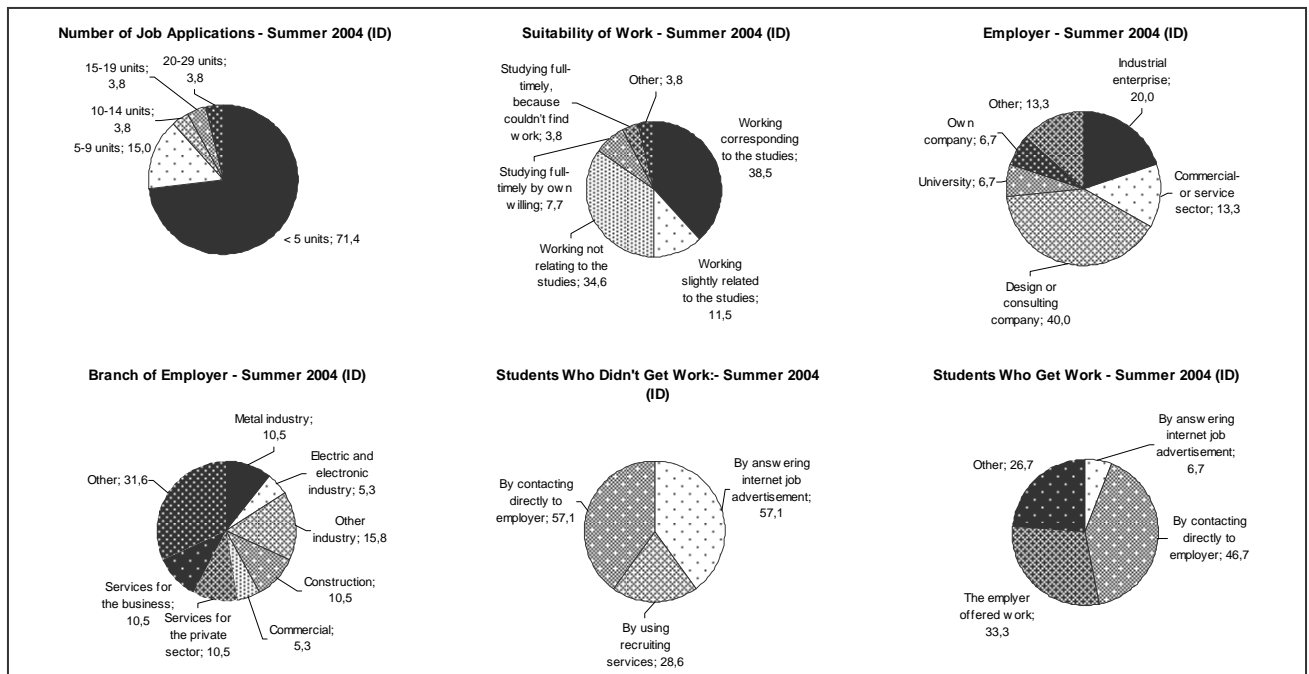


FIGURE 3: Results from ID student questionnaire.

#### 4.2 What Student Felt About Training?

The students' feelings on getting a job or a training job for summer 2004 compared to the previous year varied as follows: easier 26.9%, harder 11.5%, no change 38.5 %, and don't know 19.2%. Students felt it would be very helpful if there could be a better structure or forum for finding open job opportunities. They also wanted some ideas on what kind of work positions could be available for industrial designers, and perhaps a training guidebook including salary recommendations as well.

Students felt that practical training gives them hands-on experience, it helps build their own occupational image and contacts, and they are paid. In the question of what kind of skills the ID training should educate they answered: design process in reality, hands-on experience,

manufacturing methods, co-operational and communicational skills, understanding real working pace, scheduling, and skills for working with customers. Except for two students, all felt that the importance of practical training is not enough emphasized in their studies.

### **4.3 Interviews of Industrialists and University Administrators**

The interviewees agreed that there is a need for practical training for students of ID. The representatives of companies emphasized the fact that students learn customer driven working style. The goal for practical training on the industry side is to show students the realism and practices of working life. Through practical training students will learn and understand processes of the companies, manufacturing methods and other limitations. The representatives of administration said that it is good for students to see what the actual work is in practice. It was mentioned that through training students learn how multifunctional teams work.

When asked about the suitable role and task for an ID student in practical training, there were different opinions. Some of the company representatives said that the role should be to produce new ideas and views, like in planning and product design tasks. Another said that he would give trainee tasks, that take a long time or 'tasks that a project manager wants to get rid of'. The representatives of administration emphasized that the task must be 'professional' that students can train their abilities. However the roles of trainees are very case-specific. The working areas may include tasks on usability, designing appearance of products and producing marketing material. The main idea is that all activity should happen under direction of an experienced worker.

The benefits that students bring to companies were considered to be mainly new ideas, fresh insights and also a possibility to check out possible recruits. Administration representatives emphasized more the possibility to get to know the design industry and profession in whole.

Reasons to the fact that companies don't take so much industrial design trainees, company representatives answered that the possibilities to take any trainees have been weak, because of financial situation. Also concerns existed related to question how to find a good trainee, they answered that there isn't good practices and structures available to be able to easily recruit industrial design trainees. All the representatives of administration said that the reasons lie in the regulations. Training isn't obligatory and that drives to the fact that students aren't enough motivated to find training places and schools can't support them enough.

So how to improve the situation? Companies say that there should be more ways and structures to help recruit students. The representatives of administration rely on the force of communication. They say that there should be more communication towards companies to tell about the benefits of design and design students.

What should the training teach to trainees? Companies say that the most critical is the ability to work in multifunctional teams and also see how the real world works. Also administrative people emphasize the ability to work with different people and learn communication skills. Also learning how the actual design process proceeds cost efficiently. These factors help students to find their role and occupational profile in working life.

In whole both company and school administration representatives saw the training full of good possibilities. Companies saw the biggest threats related to how to find good trainees. Administrative people saw challenges in finding good training places for all students.

How to prepare students to the training? This question aroused a lot of ideas. Company representatives talked a lot that students should prepare themselves by gathering information about the firm they are going to go for training. Administrative staff emphasized the fact that students must be able to present their works and what they can to their possible employees in form of for example portfolios.

Companies said that students should self be active in finding training places but there would be need to open a forum for recruiting trainees. Schools' administrative faculty admit that they should be more active but say still that student should be active.

#### **4.4 Summary**

There are still many difficulties in the current training culture to support students' in occupational growth from novice to expert. To summarize, students must be more encouraged (to apply, to make many applications, to contact manufacturing companies). Students' motivation for training is low, because it is not demanded. For companies the recruiting process is difficult (companies don't master, how to hire a trainee of ID). It is unusual for ID students to perform their practical training as "factory floor" (share of casual work or manufacturing is close to zero). Communication will need improvements or new channels between universities and companies.

#### **5. Discussion**

The question of the role of practical training proved to be difficult. Universities in their current education system don't appreciate the significance and potential of the work practice for professional development in the process growing from the amateur to the professional industrial designer. Problems are the high competition of training jobs, lack of resources and industry currently don't use the full potential of industrial design students. The consequence of these problems industrial design students do not currently put enough effort in finding work places, because universities don't encourage them enough. The timing of practical training in educational structure during the bachelor degree in current model is not facing up fully the industry and R&D companies needs for trainees. Based on comments of industry training periods could be more easily organized if running these around the year.

One suggestion for getting training places for the students is use of government funded vouchers. However, this kind of system will not be equal and practical in the competitive society. Problems mentioned before can be partly fixed by concentrating to the development and adding resources for the career services. Building the competitive and around year continuous recruiting forum which take care the student's personal development goals will be useful for all parties.

The current study do not include question do student feel difference as learning experience between study projects and practical training. The art and design universities have project courses where they can perform the specific tasks set by the industry. Though, our assumption is that in such kind of projects students do not experience fully the real working environment, working pace and processes of industry.

## 5.1 Ideas for Future

By starting an advanced training program, we could generate a positive spin: first some forefront companies join the program – then the first summer trainees join as well - students learn from other students' experiences – both sides become more aware of the needs and offerings – more companies join the program – etc.

We suggest also a new 'integrated design' model for practical training, where the training period is carried out in a two-person team, consisting of both technology and industrial design students. These pioneering 'guerilla duos' were introduced to the Finnish industry during winter 2005.

The idea of 'working pairs' was considered good from the side of companies and administrative staff. Some said that the idea is already 'old', but necessary. Questions arose around how to guide the pairs and whether it would be double time compared to one trainee. Industrial design students felt the idea of 'working pairs' model is good and opportunity to narrow the gap between industrial design and technology students.

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