

FOSTERING EMPLOYABILITY THROUGH PRACTICAL PROJECTS

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While Anglo-Saxon HEIs focus on a strong educational background and personal development of students, the German system, in particular Universities of Applied Sciences, emphasize employability through the transfer of job-related professional and soft skills. In this context, learning by practical application of skills has become an important instrument. Concepts for linking theory and application include research-based learning, practical internships or service learning – methods, which also maintain high standards of academic education.

The Engineering Department at Bonn-Rhein-Sieg University of Applied Sciences (H-BRS) has gone so far as to drastically change the structure of the curriculum to what is now called the *4-1-4-1-4-1-system*. A four-week block of lectures is followed by one week of self-learning and practical projects in small groups. This module is repeated three times over the course of a semester.

However, such interference with existing curricular structures requires strategic commitment from department and university management, the allocation of additional resources, and a substantial lead time. A less disruptive approach is the use of practical projects, which is standard with most H-BRS programmes. In addition to its educational value, practical projects have proven to be a valuable tool for the interaction with

companies, particularly for marketing-related questions. In this contribution, examples from several departments will be highlighted and success factors evaluated. This chapter's contribution aims at showcasing the width and the diversity of this approach through numerous examples. These examples should not be understood as general blueprints to be copied. They should rather serve as an inspiration to develop and implement ideas and concepts, reflecting the particular educational and socio-economic framework. Therefore, the presented examples vary in terms of duration, resources and number of people involved. While many of those examples come from the field of business administration, contributions from other scientific disciplines demonstrate that application in other departments is principally possible as well.

The presented projects are all from the university-wide competition "Best practical project", are open for application from all departments and from lecturers and students alike. The submitted contributions were assessed by a jury consisting of internal (university) and outside experts. The winning team was given an award and prize money, handed over during a festive ceremony at the opening of the new academic year. The event included a poster exhibition of the other submissions. This competition created significant visibility and motivation for the teams involved and might therefore be considered a best-practice activity in its own rights.



CASE 1

Optimization of the storage management of a SME in the whole sale trade sector

Team:

14 undergraduate students, Business Administration

Duration:

2 ½ months from kick-off to final presentation, including a mid-term presentation after 6 weeks

Project subject and goals:

The partner is a medium-sized company in wholesale trade for the construction machine industry, specialized in wear and replacement parts. The company maintains an electronic merchandise management system. The placement of goods in the storage facility and the tracking of the inventory, however, are mostly performed manually. Furthermore, a consolidation of the current two storages into just one is planned. Students are expected to analyse the current status, to recommend actions to be taken to optimize the current management system, and to make suggestions for the concept of a unified storage facility.

Supervised by the overall project leader, the student team decided to create four subgroups on "Incoming Goods," "Storage," "Outgoing Goods" and "Automation." Each group was headed by a subgroup leader and developed its own work and time plans, in line with the overall milestones of the project.

Educational goals:

- To provide deeper and practice-based specialist knowledge and methodical competence to a private sector partner.

- To strengthen interpersonal skills through team work (including the division of labour between small groups) as well as communication and negotiation skills.

Outcome:

Analytical and conceptual work included twelve personal meetings of the student groups. The students made extensive use of flow charts, visualization software and the university's online learning platform for the exchange of documents and worked highly independently. The role of the lecturers was restricted to creating the organizational framework, to challenge project findings, and to – potentially – mitigate conflicts.

In the final meeting, students presented a 12-point list of short and mid-term measures to be taken, as well as a basic concept for the new facility. The company rated the results as highly innovative in terms of organization and technical development. During the subsequent implementation, the recommendations have proven successful in terms of faster processes and less manual work.

The strict adherence of the lecturer's role solely to accompany the processes and dialogues was very productive and innovative. It is reflected in the student's evaluation, which is extremely positive.

A follow-up is ensured through a student team member, who will spend a practical semester (20 weeks full-time) in the company, with a subsequent Bachelor thesis.

CASE 2

The fear-free operating room of a hospital – An economic perspective

Team:

4 Business Administration students

Duration:

11 weeks

Project subject and goals:

The university partnered with a large hospital to address a novel patient-centred approach. Under the current economic constraints, many hospitals focus on new medical technologies and improved internal processes. The partner hospital, however, introduced a pilot project to take into account the patient's perspective with their anxieties, fears and stresses. Several relaxation techniques are being used individually and have proven to be effective in medical terms. The university project will now feature a cost-benefit analysis over a five-year period.

For the study, relevant quantitative categories and performance figures had to be developed. Extensive research was required, including medical literature and current studies as well as a number of interviews, which involved medical staff.

Educational goals:

- To provide a deeper and practice-based specialist hospital and medical knowledge (processes and products) to be able to develop relevant performance indicators.
- To develop methodological competences necessary for a quantitative (spread sheet) model, which can easily be transferred to other hospitals.

- To appreciate the ability to make a contribution towards the well-being of people which, in turn, created very positive feedback from patients and hospital staff.

Outcome:

Following the data acquisition, the quantitative model was established. This required a substantial effort on the benefit side because indicators needed to be newly developed. A documentation of the overall approach and the necessary assumptions was then provided to ensure a smooth transfer to other cases.

A final presentation of the results was given to the hospital management. Other hospitals have declared their interest in the results of the study. According to hospital management, this proves the innovative approach of the project and the need for a sound methodological cost-benefit approach at hospitals.

CASE 3

Does it have to be that way? A newspaper series

Team:

20 students from Journalism and Engineering

Duration:

3 weeks over the course of a semester

Project subject and goals:

Electrical devices that fail shortly after the warranty period has expired; fruits in the supermarket that were transported over distances of thousands of kilometres, those are examples of everyday issues many people may have considered at some point. Are there alternatives? These are questions addressed by a group of university students in a series of articles in the business section of the regional newspaper: "Does it have to be that way?"

Educational goals:

- To provide deeper and practice-based specialist knowledge and see academic expertise applied in real life
- To strengthen interpersonal skills through teamwork as well as creativity, communication and self-organization skills.

Outcome:

For the print and the online edition of the newspaper, students prepared articles, slide shows and videos. The first project week was used for the selection of topics and research. The second week was devoted to the presentation of a draft, while the third week was used for editorial tasks and the preparation for publication. The best contributions were published in print and/or online. Topics chosen included:

- Food from far-away countries – does it have to be that way?
- Staying for vacation in an expensive hotel – does it have to be that way?
- Old cell phones in the trash – does it have to be that way?
- Bisphenol A in food – does it have to be that way?
- Repairs too expensive – does it have to be that way?
- Devices out of order just after the warranty expired – does it have to be that way?
- Fighting the ticket machine – does it have to be that way?
- Food ending up in the trash can – does it have to be that way?

This project is part of an ongoing cooperation between the two partners, university and newspaper, and has yielded a substantial number of internships as well as bachelor and master thesis projects. In addition to providing a platform for articles on interesting topics, the newspaper sees such activities as a useful contact for recruiting promising candidates for its staff.

CASE 4

Regional energy site development

Team:

14 Engineering and 10 Journalism students

Duration:

3 project weeks over the course of a semester

Project subject and goals:

In cooperating with a regional waste management company, students were given the task to develop a concept for the future use of a waste disposal site. The site contains sealed municipal wastes as well as a processing plant for biodegradable waste and a nature preserve. It is envisaged to open the site to the public eventually. The project encompasses the following elements, which the students worked on in interdisciplinary groups:

- Development of creative ideas for future use
- Selection of promising ideas according to the acceptance with the citizens involved and external effects
- Combination of various future use aspects into a comprehensive overall concept.
- Elaboration of technology-based usage aspects
- Using sustainable technologies and the environment aspects as a narrative for branding the “new” site
- Development of a communication concept, a documentation, print material for the press and a corporate video

Educational goals:

- To provide the opportunity for the practical application of academic knowledge
- To strengthen soft skills through interdisciplinary team work
- To strengthen motivation through contributions for a project which immediately benefits the neighborhood of the university

Outcome:

The first week was devoted to the idea and concept phase, focusing on initial research, technology selection and acceptance studies. The following design phase in the second week focused on energy generation (photovoltaic and solar thermal) and the conceptualization of a technology park for start-ups on site. Furthermore, a visitor centre was planned. In the third week, the results were summarized and the communication concept devised.

As a result, a unique concept, including nature, technology and citizen involvement, was developed. It was presented to the management board and will be incorporated in the on-going site development process.

CASE 5

Subscription management – a market analysis

Team:

10 Business Administration students specializing in B2B marketing

Duration:

3 months

Project subject and goals:

The partner is an international manufacturer of identity authentication and data protection technologies. The market for subscription management is not yet established. It is expected to become a highly attractive M2M market, with a huge number of active working SIM cards. However, customers require more flexibility for the management of SIM cards and require stable partners as well. Various competitors are entering the market for subscription management, but still with low market shares due to market's lack of maturity.

The focus of the study was on the automotive industry and the utility sector. Fifteen personal interviews (of up to one hour) were conducted. Subsequently, four use cases were investigated. The two main project goals were:

- comprehensive documentation of the market acceptance
- recommendations for market entry

Educational goals:

- To improve methodological competences, especially with respect to the preparation and implementation of the primary data collection and the statistical analysis of the results

- To strengthen interpersonal skills and presentation techniques.

Outcome:

Out of the four use cases, two were identified as the most interesting usage cases for the interviewed experts, with cost reduction and flexibility being cited as main benefits. Key strategic partners were identified. The results were presented to the management board.

The results and recommendations constitute the basis for strategic decisions on the market entry for machine-to-machine applications. The university team is involved in ongoing discussions with the company management.

LESSONS LEARNT

- Lecturers need to establish and maintain good personal networks to industry and other partners outside academia in order to be able to initiate attractive projects on a regular basis.
- Lecturers need to find partners willing to make an effort (more in terms of time invested, than in terms of money) to create a good learning experience and a good outcome for all sides involved
- Lecturers need to make clear before the project is initiated: these students are still enrolled in an education programme, they are not a cheap consulting company. Create realistic expectations - the results will often be surprisingly good.
- University and lecturers need to properly address confidentiality issues requested by industry partners.
- Lecturers should stipulate incentives for good results if the project partner benefits.
- Lecturers need to properly define their role in the project – they should see themselves as tutors, not as protagonists.
- Lecturers should optimize their project design by proper evaluation of student's and project partner's response.

If practical projects go well, lecturers and university management should use them to create visibility (e.g. through the media, chambers of commerce and other stakeholders, awards ...) and to improve the university's reputation as a competent partner for industry. Graduates will greatly benefit from this reputation.