

TEACHING INNOVATION REQUIRES INNOVATIVE METHODS OF TEACHING

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ABSTRACT

Throughout Engineering programmes within Higher Education there has always been a demand to reflect the “real world” within activities of Design & Development [1]. To some extent this has been successful through the use of role play within project teams [2].

However, to fully realise this demand requires a full extension across all specialisms necessary for the creation of innovative products.

This paper seeks to present a model which encompasses the missing element of Economic Engineering within traditional engineering projects by incorporating specialisms from Northumbria University (Engineering), Rheinhold Wurth University (Economics) and Industry.

A secondary, but nevertheless important benefit results from English and German students working together with a common aim for a commercial enterprise.

In addition students experience a dynamic, interdependent project which must reflect all stakeholders necessary to achieve the innovation.

This should result in students with increased employability through work related learning and further development of transferable skills of team building, language skills, communication and planning and control within project management.

It is envisaged that the model be implemented within the 2007/08 academic year.

Keywords: Project Teams, Innovation, Total Design, Employability.

1 AIM OF THE PROJECT

The main aim of the project is to work towards producing graduates who are able to seamlessly transfer from academia to industry, and this is seen as being best served by incorporating industry and students from the widest set of specialisms as possible to as close as possible reflect true working conditions.

The project is an interdisciplinary and international project incorporating students from the Rheinhold Würth University of Künzelsau in Germany and Northumbria University of Newcastle. The project is Market Innovation orientated with respect to Process Optimisation. It is important to realise that the project is a “real world” requirement for industry. It is very important that students complement each other from a functional point of view with Product Development students from Northumbria and Economic students from Kunzelsau, numbering eight in total.

The project runs over one semester commencing autumn 2007.

Key to the success of the project lies in the methods of supervision which will follow the rules of the Project Management Institute (PMI) and be carried out by all three stakeholders.

2 STAKEHOLDERS

2.1 Rheinhold-Wurth University

Rheinhold-Wurth University is the second campus of the University of Heilbronn in the state of Baden-Wurttemberg in Germany. It specialises in Electrical and Industrial Engineering, Product & Customer Management, Culture among others with 1600 students.



2.2 Northumbria University

With over 20,000 students and 9 major Schools Northumbria University, based in North-East England has been voted the best new University in the Best University Guide.

Students taking onboard this project reside within the School of Computing, Engineering & Information Sciences and are currently taking the Electronic Product Development module of the BEng(Hons) Electrical & Electronic Engineering degree.

2.3 Cooperating Company

The Würth Electronic Company, with a 90 million Euro turnover specialises in Polymer based sub-assemblies on small to medium-sized orders. The complete infrastructure is geared to produce a large number of orders with small to medium quantities. Around 200 different designs pass through the production every day and the company have the capability to generate new process flows to satisfy >65 new orders arriving daily. More than 20% of the employees are permanently in direct contact with customers – whether in field service, in customer support centres or in the Service Department.

Solution competence finds the motto: "We do not sell products, but solutions." A highly qualified team combined with groundbreaking production know-how ensures that every circuit board delivers what you expect from it – whether it is a prototype or series production.

The illustration shows a simple circuit board as a partially assembled, pre-tested component assembly. This component assembly then allows the direct connection to the next hierarchical level circuit boards.



Irrespective of the application, polymer pastes on circuit boards excel by virtue of:

- high consistency in the conductance value achieved
- good adhesion on copper, laminate and solder-stop varnishes
- high abrasion resistance
- good sliding properties
- high resistance to chemical reactions, moisture and heat
- elastic construction, dependent on the type of paste
- good storage properties
- ease of processing

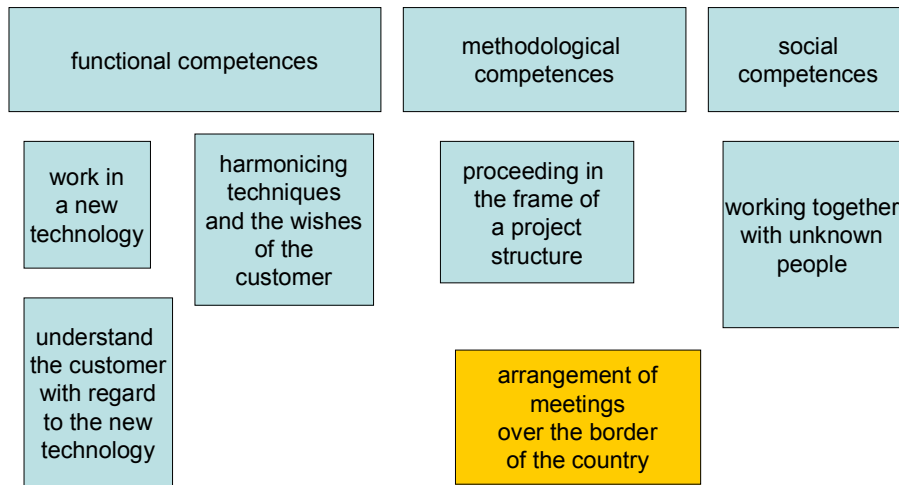
3 ORGANISATION OF THE PROJECT

The project is supervised by Käestel and Willis in conjunction with the Würth Electronic Company. The active phase commences during the winter semester as this is a conjunction of the academic timetable of both Universities. Due to the relatively limited duration of the active project, some initial preparation must be carried out during the summer vacation period. This will essentially cover identification of the market, customers and the product requirements. The project itself is steered by German and English student project leaders.

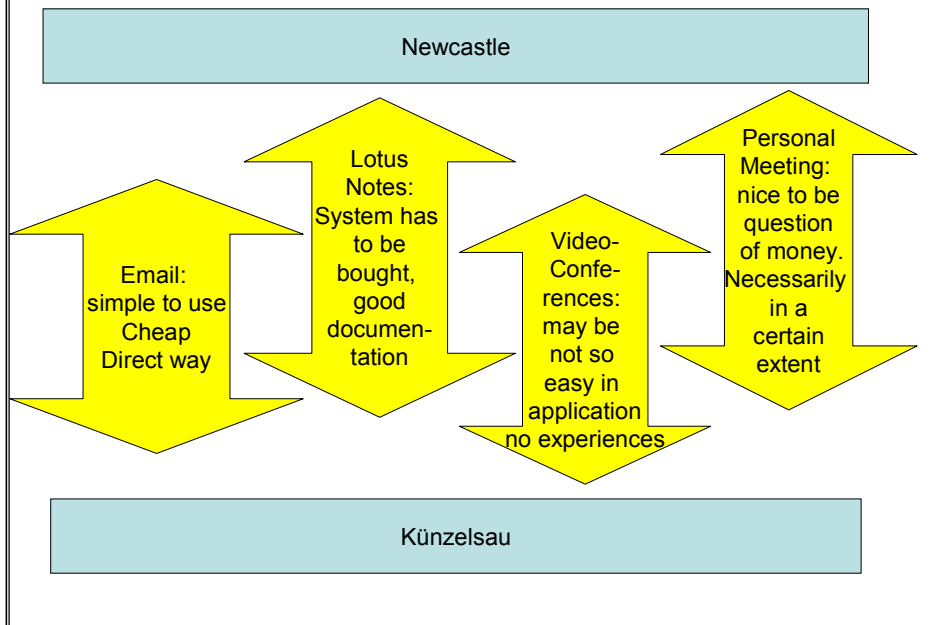
4 COMMUNICATION

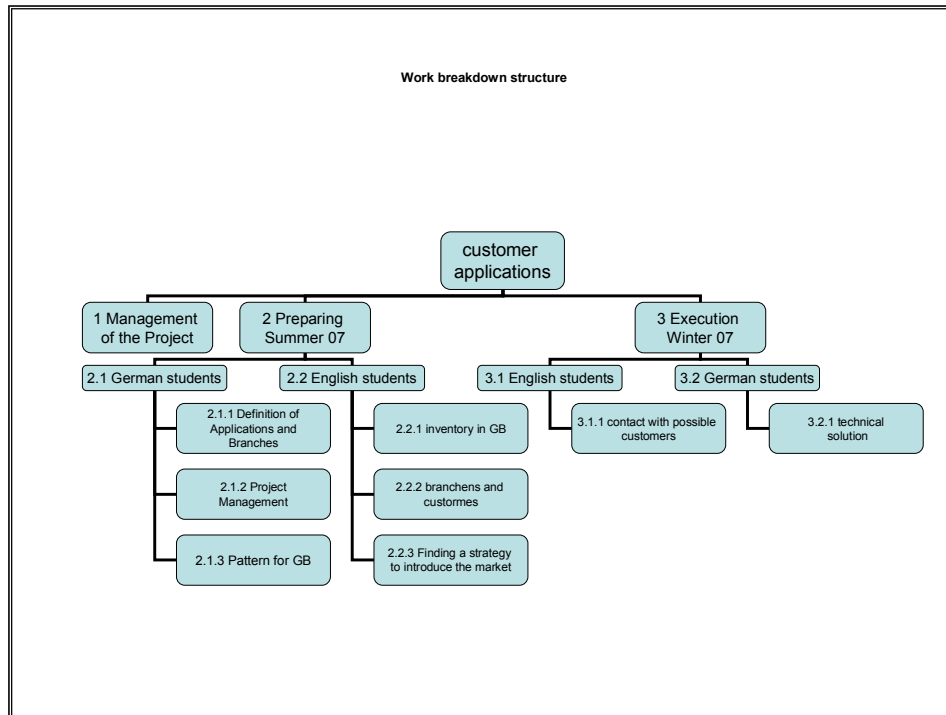
Identification of communication channels is fundamental to the successful operation of this project. Ideally a video conference line would provide the best form of communication to further integrate the disparate groups. Further communication and documentation would be established by Lotus notes. Business language is English. This limits the number of potential students in Germany. The students must meet requirements such as technical, methodological and social competences.

Requirements for the students



Communications





Planned schedule:

Prior to Summer vacation 2007:

Preparation to the growing of the project.

During the Summer vacation 2007:

Developing the aim of the objectives

Analysis of the German market

Analysis of the market potentials

Defining business fields and applications. This is also what the English group will do.

Preparations of the English Students to the contact with the customer: writing letters, direct contact, fares for train and other expenditures.

During the Winter semester 2007:

The English students use the addresses and ask in the companies. They communicate with the German group and discuss the way of getting a solution for the customer. The German group is holding contact with Würth.

Definition of the milestones

1 The first milestone is a letter of Intend with the company Würth, which is interested in performing this project. The chief executive participates as well as two specialist from market and technology.

2 Acceptance of the project concept

3 Starting shot for the students, kick off meeting

4 Controlling - Reviews

- 5 At the end of the summer course, presentation with Würth company
- 6 Establishment of the new group
- 7 End of project, delivery of documents and experiences

Level of Support of the Industrial Company

1. Visiting the factory in Pforzheim by supervisors
2. Introduction to the project by a Würth representative in Newcastle
3. Arrangement of a Meeting with English and German Students
4. Nomination of a company Engineer to oversee the project on a day by day basis
5. Final Student presentation in Pforzheim

During the initial Pforzheim meeting questions of funding of resources and student final presentation will take place.

5 CONCLUSIONS

The project provides for many benefits:-

- Students experience working in multidisciplinary teams on “real” industrial based projects.
- The planning and communication transferable skills are enhanced.
- In the long term the project will enhance student employability.
- Students further develop an interdependent attitude to working within teams.

REFERENCES

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