Chalmers University of Technology, Göteborg, Sweden, CDIO conference 2009

Lessons learned from developing and operating a large-scale project course

Background

- In 2004 Chalmers decided to develop a project-based course för third-year students enrolled in Chalmers five-year engineering programmes.

- A motive to start the course was to develop the students´skills in project planning, teamwork an communication.

- Another motive was to meet the Bologna framework style which requires a bachelor thesis project.

Facts about Chalmers project course

- Course size is 15 ECTS credits
- Compulsory course for third-year students
- 14 programmes MSc in Engineering and Architecture programme
- 900 students are enrolled each year
- 200 projects in many different areas
- Large number of faculty and staff involved
- Complexity: many moments to coordinate

Topics

- Development process of the course
- Account for the course design
- Learning outcomes
- Teaching approach
- Assessment
- Evaluation of process running the course

Aims of Chalmers project course

- Students should be able to integrate, deepen and develop knowledge and competency aquired the first three years.
- Students should be able to use a critical and reflecting way of addressing and solving a project task.
- Students should have the competencies needed to work as engineers in a scientific way of working and finding solutions.
- Students generic competencies should be developed during the project course

Design issues – some examples

- Selected generic competencies: problem formulation, information search, planning, teamwork, written and oral communication.

- Assessment: challenging to identify connections between learning outcomes and components of assessment-pass/fail or "graded" grades-relevant assessment methods for each learning outcome-how should individual contribution be assessed.

- Dual goals: team-based and independent work.

- Project selection and team composition.

- Nature, extent generic competencies training.

- Language: project report in Swedish and/or English.
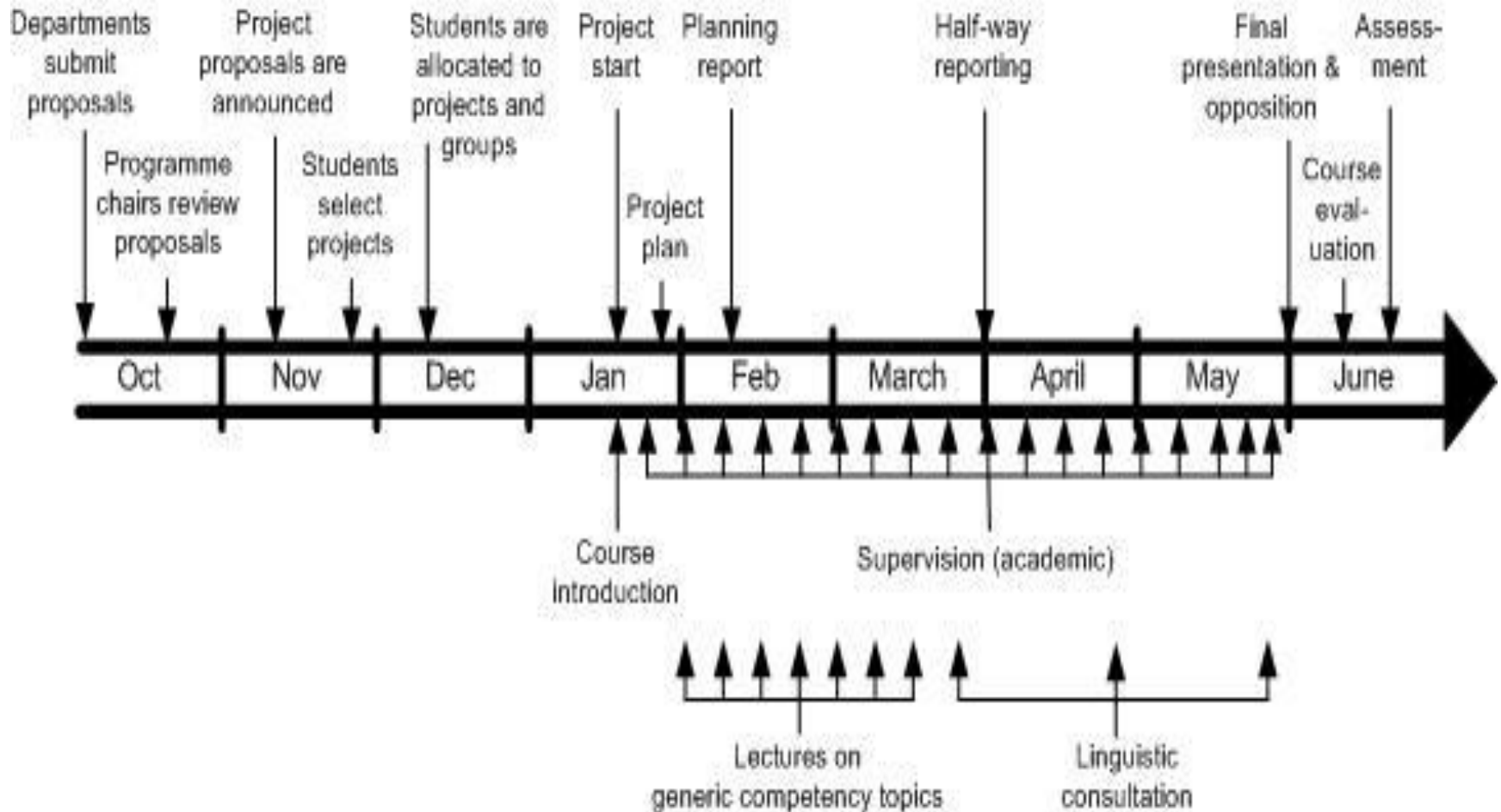
Roles of faculty and staff involved

- Programme chairs:responsible for learning outcomes, contents, coordination, projects
- Supervisors:a very central role to guide project groups and judge project quality.
- Examiners:responsible, together with supervisors, for course assessment
- Teachers/supervisors/librarians:offer and supervise generic competencies elements
- Educational aministrators:examiners of generic competencies; responsible course evaluations
- Administrative staff:admission, information, projects, documentation of compulsory course elements

Learning outcomes

- Identify, formulate and delimit a problem
- Plan, solve, report within given time frame
- Seek, gather, interpret relevant literature
- Integrate, develop, use knowledge
- Contribute to project team solving problem
- Engage in teamwork and cooperation
- Diary documentation of project process
- Orally present and defend task solution
- Hand-in a written report of good quality
- Evaluate the project outcomes <–> project goals
- Critically read and evaluate another project work with respect to problem formulation, execution and results

Course Timeline

Departments submit proposals

Programme chairs review proposals

Project proposals are announced

Students select projects

Students are allocated to projects and groups

Project start

Project plan

Planning report

Half-way reporting

Final presentation & opposition

Course evaluation

Assessment

Oct | Nov | Dec | Jan | Feb | March | April | May | June

Course Introduction

Supervision (academic)

Lectures on generic competency topics

Linguistic consultation

Written reporting – Project plan

- Description of the aim, goals and scope of the project

- Resource needs in the project

- Project time schedule

- Distribution of roles and responsibilities in the project

Written reporting – Planning report

- Title
- Background
- Aim(s)
- Problem, issue, subject
- Limitations
- Method(s), performance

Written reporting – Final report

- Title page
- Abstract, summary
- Table of contents
- Introduction, background
- Project description – main part
- Discussion
- Conclusions
- References
- Attachments

Written reporting – Continuous reporting Summary report of individual contribution

- Planning

- Information/literature search and analysis

- Selection research/development methods

- Problem solving, analysis and synthesis including contributions on creativity, reflection, discussion and conclusions

- Main author of certain parts, project report

Oral project presentation – parameters evaluated

- Content
- Structure
- Presentation techniques/skills
- Visualization
- Time management
- Handling of questions

Oral and written project opposition

- 10 minutes oral opposition and written:
- Structure +other formal aspects on report
- Problem formulation
- Theory background, literature assessment
- Method/realization of the project
- Results,reflections,discussions,conclusion

Assessment – several steps

Component – Assessment basis – Grade scale – Weight

- Planning report   Instruction   0-10   1
- Final report   HISS*criteria   0-10   5
- Result   Subject dependent   0-10   2
- Working process Project Diary,
-                                       Time log
-                             Supervisors contact   0-10   2

- *HISS criteria consider the holistic appearance of the report, contents and understanding, structure and language
- Assessor in the three first steps are the examiner.
- Assessor for the working process is the supervisor

Evaluation of project course the first two years – parameters focused

- Information to all actors involved before and during the project course
- Course memo with student course information
- Planning and administration
- Roles and responsibilities for actors
- Allocation of tasks to involved actors
- Dual goals: team-based and independent work.
- Generic competencies
- Quality of projects compared to learning outcomes
- Connection learning outcomes and course elements
- Assessment instructions and criteria
- Grading

Evaluation process

- Following of the whole project process
- Contact and interviews with all actors involved in the Chalmers project course
- Programmes student course evaluations
- Reference group meetings and discussions resulting in …
- Certain (acute) steps to improve the course

Conclusions

- It **is** possible to run a large project course **!**
- However, design of such a course poses certain course design challenges
- Development team composed of the programme chairs is needed
- Big communication challenges first year(s)
- Start of a university-wide coordination function
- Very appreciated course among students
- Good quality of the students project work
- Need for continued evaluation and refinement

Discussion and Questions!

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