COLIBRI MODULE O17:
Documentation of project results (Year 3)
Presentation of results

This material is developed as a part of the Erasmus+ Strategic Partnership Colibri: Collaboration and Innovation for Better, Personalized and IT-Supported Teaching.

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You can learn more about the Colibri project on www.erasmus-colibri.eu, and also find additional teaching materials, guidelines and reports.
COLIBRI

Collaboration and Innovation for Better, Personalized and IT-Supported Teaching.

Erasmus+ Strategic Partnership
Academic partners:
1. Aalborg University (AAU)
2. Bogazici University (BOG)
3. Riga Technical University (RTU)
4. UTP University of Science and Technology in Bydgoszcz
5. Universitat Politècnica de Catalunya · BarcelonaTech (UPC)
6. Hamburg University of Technology (TUHH)
7. University of Stavanger (UIS)

Industrial Partners:
8. National Documentation Centre (EKT/NHRF)
9. Talaia Networks S.L.
10. atene KOM GmbH
Colibri vision

We experience: Increase on the number of students

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The challenge: Student diversity

- Cultural Background
- Learning styles

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We need: Personalised teaching + new and innovative teaching methods

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We want:

Students ready for the labor market + collaborate across nationalities, cultures, and technical disciplines.

↓

By: Institutions working and experimenting on joint learning activities
Background experiences of the consortium

• The involved organizations all have different experiences with new teaching methods, and the staff involved are generally involved in this – and curious. We are sure we can learn from each other.

• Four of the universities in the past were running a successful Erasmus Intensive Programme (summer school), where the students also both followed courses and did projects together.
Colibri overall objectives

Enhancing the quality and relevance of the learning offer in education by developing new and innovative approaches, and by supporting the dissemination of best practices

Promote the take-up of innovative practices in education by supporting personalized learning approaches, collaborative learning, by making use of ICT and Open Educational Resources, and by exploring the use of blended and virtual mobility

Increase labour market relevance of learning provision and qualifications
Colibri overall idea

Important:
It is a goal of Colibri to not only impact the participating teachers and students, but to have a **systemic and lasting impact** – within the involved institutions, but also beyond.

- Implementation of new and innovative teaching as **joint learning activities**.
- Establishment of a “**Living Lab**” of students from different **universities**.
- Topic/Theme: Future Internet Opportunities, with participation of students from e.g. business, engineering, entrepreneurship, telecommunications, computer science.
Overview of project concept

3 yearly cycles

- July-August: Evaluations, Ambassador activities, Documentation
- July: Project seminar, Transnat meeting
- April - July: Virtual mobility (project)
- April: Midway seminar
- March-April: Virtual mobility (course)
- March: Virtual kick-off
- September: Transnat meeting
- October: Short Staff training

Evaluation + Dissemination

Preparation

Development

Teaching
The Colibri course structure (2017)

- Feb 17: Module work starts
- March 2: Intro modules finished
- March 3-4: Selection of basic modules
- March 20: Basic modules finished
- March 20: Project topics announced
- March 20-21: Selection of advanced modules
- April 13: Advanced modules finished
- At least 3 supervisor meetings
- July 10: Upload preliminary presentations
- July 21: Exam
- Virtual Kick-off February 16
- Per assessment submit by April 3 assess by April 13
- Midway Seminar April 18-22
- Project Seminar July 17-21
The course modules offered

- Depending on his background and interests, each student:
  - Follows all 10 introductory modules (1 hours of work)
  - Chooses 4 basic modules to follow (5 hours of work)
  - Chooses 2 advanced modules to follow (9 hours of work)

- 10 different topics are offered (each at intro, basic, advanced levels):
  - Advances in information systems,
  - Nanonetworking and molecular communications
  - Future Internet Architecture
  - Applications and services
  - Advances in wireless communication technologies
  - Machine-to-Machine communication
  - Advances in broadband technologies
  - Network Security
  - Enterprise architecture
  - Entrepreneurship and Corporate entrepreneurship
The course modules offered

10 introductory

- Intro module 1 (1 hour)
- Intro module 2 (1 hour)
- Intro module 9 (1 hour)
- Intro module 10 (1 hour)

Joint quiz for all intro modules (2 hours)

Select 4 basic

- Basic (5 hours)
- Basic (5 hours)
- Basic (5 hours)
- Basic (5 hours)

Select 2 advanced

- Advanced (9 hours)
- Advanced (9 hours)

Presentation midway seminar (2h)
The teaching methods

- **Personalization** by pre-module tests and providing (or linking to) preliminary teaching material.
- **Experiment** with new ways of conducting the courses and projects
- **Short video lectures**
- **Small assignments**
- **Mini projects**
- **Peer assignments**
- **Company proposed projects** to work in groups

**Teacher training seminars**

Forum for inspiration lectures, presentations, peer discussions, and time for creating and revising teaching material with the possibility to discuss with colleagues, and give feedback on each others approaches.
Expected outputs

- Focus is on **systemic impact** and **long-term results**. They key is to (1) make the material easy for others to use, and (2) to spread the word about the project to university teachers.

- Teaching material that can be **re-used and exploited by others**. Made publicly available as Open Educational Resources. Packed together with descriptions, instructions, evaluations for easy take-up by others.

- Reports, but also more practical and hands-on inspiration material for **different target groups**.

- Spread the word: **Colibri Ambassadors**.
The teaching methods (courses)

• We will experiment with new ways of conducting the courses and projects throughout the project. So, the teaching methods chosen for the third year will be chosen based on our experiences from the first year.

• The third year, the modules were mainly based on
  • A more coherent organisation of the introductory part
  • Self-assessment and preliminary material (basic modules)
  • Short videos, interchanged with quizzes to keep students active.
  • Literature and assignments, with well defined scopes.
  • Q&A Forums
  • Peer-learning (only in advanced modules) – important that tasks, interactions, deadlines etc. are clearly defined.

• The groups were formed from the beginning of the course, and the students in each group coordinated their choice of modules to ensure broad coverage.
Examples of introductory module (1 hour workload)

- Study learning objectives
- Literature: For example an introduction or case study
- Video
- Quiz
- Video
- Quiz
- Video
- Quiz
- Final quiz
Example of basic module (5 hour workload)

- Study learning objectives
- Pre-module test
- Premodule materials (based on test results)
- Scientific articles for reading
- Video Quiz Video Quiz Video Quiz
- Practical exercise
- Final quiz

Q&A Forum for discussions and questions available throughout the duration of the module
Example of advanced module (9 hour workload)

- Study learning objectives
- Scientific articles for reading
- Video
- Quiz
- Group exercise
- Assignment
- Review assignments from other students
- Read articles, and prepare presentation
- Final quiz

Q&A Forum for discussions and questions available throughout the duration of the module
The teaching methods (projects)

• We will experiment with new ways of conducting the courses and projects throughout the project. So, the teaching methods chosen for the second year will be chosen based on our experiences from the first year.

• **Real-world problems** proposed by companies
• 8 groups – each with 3-4 students from different universities.  
• **One academic supervisor and one company contact** per group.  
• Clear learning objectives.  
• Starts in midway seminar, ends in project seminar – virtual collaboration in between.  
• Supported by **introduction to problem based project work and collaboration** in the midway seminar and introduction to collaboration tools.  
• The project work is **self-organized**, but we support it through requirements for minutes and structured reporting to supervisors. The students are required to setup milestones and report accordingly.
Changes from year 2

Compared to year 2, the main changes were:

- A more coherent presentation of introductory modules
- Experimental implementation of interactive videos
- Experimental implementation of conditions for activities to ensure progression (e.g. you need to take the quizzes in a certain order).
- Better use of peer learning in advanced modules (and only in advanced modules)
- Use of Humhub for more interaction between students, and between students and teachers, than previously with Moodle forums.
- Different organization of presentations in the midway seminar, conference style with multiple tracks (to give more active audience).
- More integrated design of project proposals and modules, including explicitly mentioning the match between projects and modules.
- Better support for the project work through help with e.g. minute templates, templates for task distribution, more planning at the midway seminar etc.
The teaching methods (projects)
The flow of the project work

Virtual collaboration phase (April-July)

Students work independently
At least 3 supervisor meetings
Support from university supervisor
Support from company contact
Access to all modules
Access to relevant collaboration tools

Midway Seminar (April)

Tuesday: Finish modules

Wednesday: Team work and presentation skills

Thursday: Workshop on Future Internet Business and Innovation

Friday: Announcement of projects and work on Problem Analysis

Saturday: Continue project work. Plan the virtual phase

Project seminar (July)

Monday: Presentations and feedback from peers/companies

Tuesday: Group work + presentation skills

Wednesday: Guest lecture + excursion + group work

Thursday: Finalising presentation + video training of presentation

Friday: Presentations and exams
Module content is available as just-in-time resources

Problem Analysis

Learn about the problem domain

Continue with the project work, identify new problems to be solved ...

Identify problem when working on the project

Identify relevant tools/methods

Learn through just-in-time resources

Apply new knowledge to solve problem
**Blended mobility (I)**

- **February 16**: Virtual Kick-off
- **March 2**: Intro modules finished
- **March 3-4**: Selection of basic modules
- **March 20**: Basic modules finished, Project topics announced
- **March 20-21**: Selection of advanced modules
- **April 13**: Advanced modules finished
- **At least 3 supervisor meetings**
- **July 10**: Upload preliminary presentations
- **July 17-21**: Project Seminar
- **July 21**: Exam

*Module work*

*Project work - virtual collaboration*

Per assessment submit by April 3 assess by April 13
Blended mobility (II)

- The yearly learning activity is introduced to the students in a **virtual kick-off seminar** during February. The students are introduced to the overall learning objectives, topics, teaching methods, and quality control measurements.

- This is followed by a **phase of virtual learning** (the course modules).

- **The midway seminar** is the first physical mobility, and takes place in April. Here, students and teachers meet for five days in order:
  - Let students (and teachers) get to know each other, and work on methods for problem solving and group work.
  - Finalize the courses, with student presentations
  - Introduce the projects and supervisors. Having the groups working together towards a project plan, and initial problem analysis.
  - Focus on connection between course modules and projects, as well as on supporting the team work.
Virtual kick-off: Getting to know each other
Module work (virtual)

Quiz with immediate feedback

Podcast

Video lecture
Midway seminar: Start working on problems
Blended mobility (III)

• The midway seminar is followed by a **phase of virtual collaboration** in the groups. The groups and supervisors will have a large degree on freedom on how to work together, and what tools to use – but objectives/milestones should be clear. More structured than in year 1, without losing the self-organization.

• **The project seminar** is the second (and last) physical mobility. Here students are working together in order to finalize the projects, and for presentation/examination. Also, the project seminar will be used to receive feedback from students regarding all aspects of the learning activity (evaluation).
Project work: Virtual collaboration
Project seminar: Finishing projects
Project seminar: Presentations and exams
Content of the learning activities (projects)

• The student projects are based on **real-world problems/cases**, and defined by the industrial partners in the program, with the possibility that other companies may also participate with proposals. EKT/NHRF will also propose projects, where the starting point will be a start-up company with a specific market idea.

• The projects will **require the students to work together, and make use of both technical and business-oriented competences**. The project analyses a specific problem, and selects appropriate tools/methods to design and verify one or more possible solutions.

• **The project must ensure that the learning objectives of the learning activity is supported** (key words: Skills in exploring the opportunities in Future Internet, by relating technical, social and business aspects, demonstrating these skills in one or more real-case scenarios. Competences in working together in teams across scientific areas, countries and cultures, and being able to bring into play the students own knowledge in the teamwork).
New services through networking: Opportunities of industry 4.0

- As a provider of electrical engineering, Limtronik is currently working in the classical manner: A customer orders a product, e.g. a circuit board, and delivers the data for the production (CAD data: design sketches for the construction of technical solutions, parts lists etc.). Limtronik then manufactures the product according to this data, delivers the product and after that, the business relationship ends.

- The opportunities of industry 4.0 in relation to new internet based services after the manufacturing process are hardly being used so far, as these services are largely unknown. However, in the near future, it is important to develop sound concepts and ideas on how to make use of these possibilities for staying marketable.
The Colibri Ambassadors

- All staff who at some point has been involved in Colibri becomes **Colibri Ambassadors**.

- These are the people who “spread the word” both inside and outside our organizations. We use this to get in touch with a **large number of university teachers** (and we keep track of how many).

- We make sure that the Colibri Ambassadors are ready to take on the role: They get to know the project well, and we keep them informed about progress and results (both through our Facebook group and by yearly meetings in each organization).
Results from the first three years

• Based on surveys to all students, teachers and company representatives

• Feedback during midway seminars and final seminar
**Students:** To what extent do the teaching methods used in Colibri increase the quality of the learning offer?
**Students:** To what extent do the teaching methods used in Colibri increase the relevance of the learning offer?

![Bar Chart](image)

- **Year 1**: Blue bars
- **Year 2**: Red bars
- **Year 3**: Green bars

Options:
- None
- Minor
- Somewhat
- Moderate
- Major
**Students:** To what extent do the teaching methods used in Colibri increase the labor market relevance of learning provisions and qualifications?
Students: Personal outcome: To what extent do you think the teaching methods used in Colibri will help you in your further studies?
**Students:** Personal outcome: To what extent do you think the teaching methods used in Colibri will make you better prepared for the national labor market?

![Bar chart showing responses to the question. The categories are None, Minor, Somewhat, Moderate, Major, and the years are Year 1, Year 2, and Year 3. The chart shows a distribution of responses across the years and categories.](chart-image)
**Students:** Personal outcome: To what extent do you think the teaching methods used in Colibri will make you better prepared for the international labor market?
How well did the following elements support the project work? - The modules (before and during the project work)

None: 4% 1
Minor: 18% 5
Somewhat: 57% 16
Moderate: 11% 3
Major: 11% 3
How well did the following elements support the project work? - The introduction to project work given during the midway seminar

- None: 0%
- Minor: 7%
- Somewhat: 7%
- Moderate: 39%
- Major: 46%

Number of responses:
- None: 0
- Minor: 2
- Somewhat: 2
- Moderate: 11
- Major: 13
How well did the following elements support the project work? - The instructions about the expected outcome of the project

- None: 0%
- Minor: 0%
- Somewhat: 29%
- Moderate: 32%
- Major: 39%

Numbers:
- None: 0
- Minor: 0
- Somewhat: 8
- Moderate: 9
- Major: 11
How well did the following elements support the project work? - The templates provided for minutes and time/activity planning

- None: 11% (3)
- Minor: 18% (5)
- Somewhat: 32% (9)
- Moderate: 14% (4)
- Major: 25% (7)
How well did the following elements support the project work? - The guidance received during the virtual collaboration phase from supervisor(s)

- None: 4% (1)
- Minor: 4% (1)
- Somewhat: 11% (3)
- Moderate: 18% (5)
- Major: 64% (18)
How well did the following elements support the project work? - The group work and supervision during the final project seminar

None 0%
Minor 0%
Somewhat 4%
Moderate 0%
Major 96%
**Teachers:** To what extent do the teaching methods used in Colibri increase the quality of the learning offer?
**Teachers:** To what extent do the teaching methods used in Colibri increase the relevance of the learning offer?
Teachers: To what extent do the teaching methods used in Colibri increase the labor market relevance of learning provisions and qualifications?
Companies: To what extent do the teaching methods used in Colibri increase the quality of the learning offer?
Companies: To what extent do the teaching methods used in Colibri increase the relevance of the learning offer?
**Companies**: To what extent do the teaching methods used in Colibri increase the labor market relevance of learning provisions and qualifications?
Dissemination and impact from first two years of Colibri

• Numbers are from all three years written as Year 3 // Years 2 // Year 1.

• Tangible and intangible results of Colibri has been used in 38//35//28 courses/learning activities. A total of 1142// 860//583 students have benefited from this.

• 70//129//74 colleagues in the local teaching environments have been inspired by the use of Colibri, from which 1585//1288//325 students have benefited.
Take away messages

• Based on both comments and qualitative evaluations, it is clear that the international, cross-disciplinary and problem based approach is highly valued. This is by many of the participants seen as the most valuable aspect of Colibri. Thus, it is especially the improved horizontal competences that are seen as benefiting from the project.

• This is also confirmed in the rating of personal outcome, where the students are particularly happy about the improvement of their preparedness for the international labor market.
Take away messages

• The course was generally well received by the students – especially when they got to work in international groups on real-world problems.

• The modules generally worked well, and was improved during the years. In particular, the expectations and activities were much more clearly formulated, and the amount of communication between students reduced to two advanced (but larger) modules.

• Especially the last year gave in general a better fit between modules and projects.

• Progression tracking, more individualized setups (students could only see the modules they chose), clear formulations of tasks, and clear conditions for finalizing each module helped improve the students experience.
Take away messages

• Peer learning is a good idea, but need **clear instructions and guidelines** (e.g. it is hard to self-organize). Also there has to be **clear and explicitly formulated learning goals** with the activities instead of just “being there”.

• **The combination of short videos and quizzes worked well** – both in a setting with quizzes at the end, and in the last year where the quizzes were integrated in the videos. Again it depends on the content what makes sense to have in different places. And multiple choice questions are not suitable for all courses! It is important that the form does not dictate the content.
Take away messages

• The virtual collaboration between the seminars worked better for each year—early formation of groups and more focus on team work processes in the first seminar helped for this, and the more structured approach to group work, supervision, templates for minutes, tasks and time plans introduced in the last year improved it even further.

• **Video/presentation training** during midway seminar was well received through all the years. The students improved a lot on their presentation skills, and became much more confident with making presentations in front of other people.
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