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 – A guideline for teachers wanting to try out new learning styles
Version 2 (preliminary version after second year of Colibri)

Purpose:
This document aims to share our experiences so far, promote the use of new teaching methods, and to make it easy for other organisations and teachers to get started. It is created as a part of the Erasmus+ Strategic Partnership Colibri: Collaboration and Innovation for Better, Personalized, and IT-Supported Teaching.

The document demonstrates the teaching methods we have been using during the first year, with links to our material which is openly available for others to use and modify.

All the material referred to can be found on our website www.erasmus-colibri.eu, and is free for others to use and modify.

Teaching methods covered:

The whole blended learning concept, mixing virtual and physical mobilities.
This has made it possible to work together across different European institutions, which is quite unique for Colibri. But it can also be applied locally, to make the time spent with teachers and students together more active and interactive.

This has in our project been achieved by having course modules run mainly online, but each module was finished during the physical meetings in the midway seminar.

An individualized and learner-centered approach:
The idea behind the personalized approach using in Colibri is that each student follows his own track of modules, depending on his goals as well as preliminary knowledge. The more difficult part is to take into account preliminary knowledge. We implemented it in the following way:

• Before taking a basic module, the student did an online test/questionnaire
• Based on his replies, he was recommended additional pre-module material as needed to follow the module.
• During the first year we did not experiment with letting the student skip parts of the basic module, but this can be considered in the future. However, in this case each module has to be broken down to well-defined stand-alone modules, where some but not all can be skipped, without destroying the progression of the module.

We believe that personalization could also be in terms of learning styles, so students would be offered different media (e.g. video or text) depending on preferences. However, this requires that both elements are implemented so there are parallel elements in each course.

Our learning platform (Moodle) did not really support personalization at a course level. So when each student (in principle) has to do different activities, there is no automatic way of presenting this to him/her. While it might be possible for a student to keep track of this for one course, it quickly becomes difficult to maintain an overview when he/she follows multiple courses/modules. We believe some platform support/setup is needed if it is to be used at a larger scale.

Use of videos and quizzes
For the online part, our experience is that especially a combination of (short) video lectures and interactive quiz’es worked well. The idea is that the student after each video takes a corresponding quiz covering the
learning objectives of the lecture, and is given immediate feedback. In our case this was implemented using the quiz feature in Moodle. Depending on the results, the student can go back to study videos/literature, and then attempt the quiz again. For the teachers it also provides a useful channel of feedback, i.e. knowing what was particularly difficult for the students, so the physical mobility activities could support the learning of this part.

In this second year of Colibri we implemented additional functionality, which solved some of the challenges met during the first year of the project

- It must be very clear for the students what they are supposed to do, so they should be able to see those activities that they are actually going to undertake – in most learning management system this is poorly supported because they are not designed for individual learning purposes. We achieved this by letting each level of each model be a “course” in Moodle, which somewhat solved this challenge.
- Completion tracking was implemented, which made it possible for students (and teachers) to always track how far he/she is, and which activities are still to be done. However, also here it requires a similar approach among the different teachers involved in order not to confuse students. It also requires some considerations to decide what makes an activity completed (and the possibilities are limited by the platforms) – for example, it might be better to ask students to manually “check” an article being read than automatically register this just based on the students having downloaded it.
- Considering the above points is especially true when students follow different modules who are designed in different ways (and it easily becomes a bit confusing).
- Likewise, it should be clearly defined when a module is done. There should also be a clear and communicated line between learning objectives, learning activities, and criteria for finalizing/passing.

Due to different pedagogical and scientific backgrounds of the teachers, the videos and quizzes have been implemented in different ways. This reflects in our view that a university teacher is not just a “content provider”, but also a mediator of methods and traditions within his/her topic. Thus, form and content cannot be decoupled, a factor that must be respected when creating online and blended teaching materials. On the other hand, there is a danger in confusing the students unless it is very clear which activities should be carried out.

Midway seminar – finishing the modules
The midway seminar roughly consisted of three elements, teambuilding/group work introduction, finishing of course modules, and introduction to the projects.

The modules were more or less self-contained, so only one day during the midway seminar was used for finishing these. It was organized in a conference-like fashion, where each student presented work from an advanced module of his/her choice.

With around 30 students this can be a long session, so we ran it in two parallel sessions (divided by modules). This way most attendees also has knowledge and interest in the topics presented, which encourages an active session with discussions.

It is our experience from the midway seminar that the physical activities would ideally:

- Activate the students, and ensure interaction both among students and between students and teachers.
- Train the students problem-solving skills, in a way where they need to apply their knowledge gained (in our case this was done through the project work).

In the future, we would probably organize it with even a higher degree of freedom: Instead of creating two parallel one-day sessions, we would organize it with sessions (one session=one module), of which some of course would run in parallel. This would make it possible for even more students to follow their favorite discussions.

The size of the groups/sessions should be decided so that it allows active discussion rather than many one-way presentations.
Project work
In Colibri the students were working on real-life problems posed by the involved companies. They were working in groups of 3-4 students, composed so that all the students in each group were from different institutions (and each group would be as broad as possible in terms of technical/scientific background). Each group was appointed both a company contact, and an academic supervisor whose role was to facilitate the group work.
Last year the project work was organized with projects and groups being presented during the midway seminar. This year an additional approach was taken, where groups were announced already during the virtual kick-off to allow for earlier collaboration and coordinated choice of modules – so that all groups would cover all modules (basic and to the largest possible extend advanced modules).

The project work was organized as follows:
• During the midway seminar, the students were introduced to tools and methods for project planning, project management, intercultural communication, and conflict handling.
• At the end of the midway seminar, each group was supposed to have a common understanding of the problem and tasks to be carried out, as well as a time plan for the virtual collaboration period.
• The students would then work together remotely until the project seminar. Prior to the project seminar the students had to submit a preliminary presentation of their project, including which main challenges they had to work on during the project seminar.
• During the project seminar, the students would finalize the project and present their works during a 1-day seminar which also serve as the exam.
• Presentation training was carried out in both midway and project seminars – this was very well received by students, and also helped the students a lot in preparing and rehearsing their presentations. This was done using video recording equipment, which was also available for them for the rehearsals later.

As stated, the problems were real life problems posed by the companies. While it is a real problem, it is also chosen and described so it fits the overall learning objectives of the course. The problem based approach also implies that the students need to analyse the problem, and choose relevant tools and methods depending on what is required to solve the problem. This makes it more open, and sometimes more challenging to supervise, as the steps to be taken are not known on beforehand but decided based on the problem. The approach is known from Aalborg University’s PBL-model.

The students were supposed to report their work in terms of (1) a 25-minute presentation to be given in the project seminar.

One thing that we have been missing is a good tool/platform that supports group work across distances. Students were generally using a set of different tools for chat (e.g. Messenger, Google Hangout), virtual meetings (e.g. Adobe Connect, Skype, Google Hangout), and document sharing (e.g. Dropbox, Google Drive, Google Docs), but there is a lack of professional and integrated tools. We would like to support better the students in working together “professionally” with projects, rather than just working with the tools-at-hand.

Our learning points from the project work can be summarized a follows.
• It is very important to facilitate collaboration and team work, to provide them with relevant tools and methods, and to also train these in practice as much a possible during the physical mobility. We still need to find a tool/platform that supports the project work.
• Facilitating the process is important, but also to make clear and explicit what is expected. Students with different backgrounds can have very different interpretations of what a “project” is, and what is expected as an outcome. It might be useful to use the learning objectives as an offset for this discussion.
• As also the teachers/supervisors come with different backgrounds and expectations, it is important to align expectations while on the other hand respecting personal differences and preferences. It is important to discuss this among supervisors to create a common view, but a document (supervisor guidelines) can also be useful.
• While we tried to make sure that all students would leave the midway seminar with a clear problem understanding and project plan, for some groups it turned out to be quite challenging to get started.
on the virtual part. We probably need to facilitate this better. In addition to what is already written, we could set up some clear tasks and templates for the project work – this should be done with care, however, in order to maintain the projects as being student managed and driven.

- The video training of students was very well received by the students, and we saw big improvements in student’s performance. This is highly recommended to do, especially when the exam involves a public presentation (done in English). For some students this is quite a new experience.
- In the current setup the evaluation is done as pass/fail (i.e. without grading). We are unsure how it would work with grading, especially how this would affect group dynamics and team work – both virtually and during the seminars.
- Overall, the students rated the international and interdisciplinary experience very high, and we believe it was generally quite successful.

**Just-in-time materials for Problem Based Learning**

One concept developed during the course is that if Just-in-time materials for Problem Based Learning. The idea is to provide the students with relevant courses/materials just when they need it in their project work, since:

- The students are aware they need the knowledge to solve a specific problem, leading to a very high motivation.
- The students will apply the knowledge right after learning it, leading to a better learning process.

When providing the knowledge in courses, it is very hard to time it correctly, especially when different groups need different knowledge at different times. This model plays well together with the current modules, since an overview of the field is needed in order to know what knowledge to look for afterwards.

The model is depicted below, and will be described in more detail in an upcoming scientific paper.