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LifeLongLearning project KA3MP

KNORK

Promoting Knowledge Work Practices in Education

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D4.1 Summary of surveys, version 1, the “M6 report”

Internal summary of previous practices, goals, expectations, plans etc

Input of collected data to month 6 (until June 2014)

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Background

The aim of this summary is to create an account of the pilot teachers' previous pedagogical practices as well as *goals, expectations and plans for developing the practices* concerning students' digital and knowledge work competencies. Information of the pre-survey will be used in planning the knowledge work in WP3. Six cases are presented. All cases were followed up and investigated further and data collected during and after these cases are presented in the M12 report.

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1. Karolinska Institutet, health informatics course

Previous practices and goals, expectations, and, plans

The course where Trialogical learning was applied is called Case Studies in Health Informatics, targeted at first year health informatics master students in Karolinska Institutet, Sweden.

a. In the beginning of the research, an interview was conducted to the teacher of the course to find out more about the course and her expectations towards knowledge work practices in health informatics education. Then, the students who participated in the chosen course (N=21), were approached through a web questionnaire in order to recruit them and find out more about their expectations towards the course goals, knowledge work practices and study skills

(<http://freeonlinesurveys.com/app/rendersurvey.asp?sid=3gu540g13dq242m465570&refer=freeonlinesurveys%2Ecom>).

b. A workshop followed up where the teacher was introduced to the Trialogical learning and was provided a more detailed description of the design principles. Throughout the workshop a series of flexible digital tools were demonstrated and according to the functionalities they offered some of them were chosen for the implementation of the course under Trialogical learning.

c. Using the KNORK template for planning and describing pedagogical scenarios, together with the teacher, a guide on how to implement the two last case studies under the design principles was written and where more emphasis was put on the implementation of Design Principle 1 (Organizing activities around shared objects) and Design Principle 6 (Provide flexible digital tools).

d. As soon as the modified cases were about to begin, a pre interview with the teacher of the course was conducted to find out about her expectations towards implementing the course under the trialogical learning design principles. The proposal for pre and post questions on five issues (1. Design principles/theory, 2. collaboration, 3. technology, 4. challenges in the background that motivate change, and, 5. issues of concern) was used: <http://knork.metropolia.fi/intra/wp-content/uploads/2014/01/Proposal-for-pre-and-post-questions-to-teacher-first-version.doc>

Main findings

The Case Studies course offers an introduction to the case study pedagogy, continuing with the studying of four case studies related to health informatics. Only two hours of instruction are provided in the beginning of the course and where the teacher shows to the students the different

ways of tackling case studies and then students are expected to use the learning material and work individually on their own in order to provide their solutions to the cases.

The cases describe health informatics scenarios and are explained in written text. Each case lasts for four weeks and during that time students are expected to analyse them individually in a case essay. Each case is treated in a seminar that is held in the end of a four week period and where students discuss the case and all of them are expected to be able to explain their analysis orally.

The modification of the course plan under Trialogical learning was done on the last two case studies of the course. The following table illustrates a summary of the differences between the first two case studies (that were organized without the Trialogical approach) and the last two cases studies (that were organized according to the Trialogical approach) as far as the Design Principles were concerned.

Trialogical Learning Design Principles	Two case studies without Trialogical approach	Two case studies with Trialogical approach
DP1: Organizing activities around shared objects	The case studies course involved individual case essays and there were no shared objects to organize activities around.	The case studies involved individual case essays but now students had to build a digital prototype solution (which was the shared object) in groups for each of the two case studies.
DP2: Supporting integration of personal and collective agency and work	There were no groups to support the collective work. The cases were solved individually and therefore they only supported the integration of personal work during the case seminars.	The cases were dealt in groups to provide a prototype solution where students with different backgrounds were mixed. Through this way, students were given the possibility to integrate personal and collective work in their group work too.
DP3: Emphasizing development and creativity through knowledge transformations and reflection	Students followed predefined templates to write their individual reports. There was little opportunity for knowledge transformation and reflection throughout the seminars.	The digital tools that students were asked to use throughout their group work, offered the possibility to transform knowledge in a creative way and also students were expected to reflect on their team work through the individual essays and the seminars.
DP4: Fostering long term processes of knowledge advancement	Students had the opportunity to revise their case essays after each case seminar and use the knowledge of case pedagogy and prototyping in other courses in their second year.	Students had the opportunity to revise their case essays and digital solution after each case seminar and use the knowledge of case pedagogy and prototyping in other courses in their second year.

DP5: Promoting cross-fertilization of knowledge practices and artifacts across communities	Students worked in real health informatics cases but there was little opportunity to collaborate with professionals or other external communities related to the case study subject.	Students worked in real health informatics cases but there was little opportunity to collaborate with professionals or other external communities related to the case study subject.
DP6: Providing flexible tools for developing artifacts and practices	The only tool students were provided, was a learning management system called Ping Pong, through which students could download the course material and communicate in a forum with the class but no further collaboration or interaction could take place due to the nature of the cases that needed to be solved individually.	Except for Ping Pong, students were provided with three digital tools whose purpose was to promote collaboration, interaction, communication, project management and creativity in the group work. The tools were chosen according to a set of criteria that enhanced dialogical learning (see the criteria below)

Digital tools

Due to time and economic constraints, it was not easy to find only one tool that could provide the desired described elements altogether. To overcome this obstacle, it was decided to use a combination of free digital tools which if combined, for different purposes throughout the development of the digital prototype, they could offer the desired elements even though separately.

The tools that were chosen were Padlet, Popplet and Trello, and the following table provides a small description of their main functionalities.

Digital tool	Short Description	Link
Padlet (Digital Wall)	Padlet is a free tool, which can be used collaboratively by many people in the same time. It is actually a digital wall where anyone can put a post on it and then organize these posts according to the categories they belong. Also, someone can post on this wall images, links, documents etc. It is an interesting tool that can promote collaboration and innovation through an innovative way.	http://padlet.com
Popplet (Mind Mapping)	Popplet is a free tool that can be used collaboratively by many people in the same time. It is a tool that helps to mind map and organize ideas, through popplets, and which can be edited according to the users' needs. Users can add in the popplets images,	http://popplet.com

	links or even draw in them	
Trello (Project Management)	Trello is a free collaborative project management tool that can help users manage their projects by organizing them into boards. In these boards the users can add other users and assign activities or resources and see what needs to be done and who is working on what and until when	http://trello.com

For all the tools the digital accounts were created for the students who participated in the study. More specifically, for Padlet, the digital walls for each group were created, for Popplet the corresponding Popplet area was created and for Trello the corresponding boards were built for the groups to manage their group work.

The chosen tools followed the characteristics that flexible tools should have, according to the way that knowledge creation metaphor and Design Principle 6 recommend (a synopsis of these characteristics can be seen in the following table). The rationale for assigning the following characteristics to each tool was based on research and trial on the functionalities they offered.

Characteristics	Popplet	Trello	Padlet
Collaboration	✓	✓	✓
Coordination		✓	
Community Formation (Integration of people)	✓	✓	✓
Interaction		✓	✓
Co-construction of shared artefacts (integration of objects)	✓		✓
Co-construction of shared practices (integration of practices)		✓	
Analysis	✓		✓
Reflection	✓	✓	✓
Knowledge building environment	✓	✓	✓

- Due to its flexibility and simplicity, Popplet was chosen as a mandatory tool through which the groups could visualize the problem description and justify their digital solution through the utilization of a mind map.
- Trello was suggested as a non-mandatory project management tool through which students could make a project plan on how to deal with the case and assign roles to the group members.
- Padlet was suggested as a non-mandatory digital place where the team members could share resources and build their ideas on digital walls.

In total 10 students (out of 21 from the case studies course) agreed to participate in this study. Their

demographic data can be seen below

Participant	Gender	Age	Background
S1	Male	27	Technical
S2	Male	29	Technical
S3	Male	26	Technical
S4	Female	35	Technical
S5	Female	27	Technical
S6	Female	29	Medical
S7	Female	45	Medical
S8	Female	38	Medical
S9	Male	28	Medical
S10	Male	26	Medical

The students expressed the following expectations towards knowledge work practices they would like to obtain throughout the case studies course:

- Skills and abilities related with better analytical and evaluation skills,
- Better collaboration abilities,
- Improved writing skills,
- Better ability to solve successfully real health related challenges,
- Learn how to handle situations or plan projects according to the user needs,
- Be prepared to face real job environments in Health Informatics,
- Learn how to solve real problems with support of different Health informatics solutions and tools.

The teacher expressed that throughout the case studies; students should obtain knowledge work practices related to the course goals. The following knowledge work practices are the ones that were extracted from the course syllabus:

- Knowledge and understanding
 - Ability to synthesize theoretical knowledge within health informatics
- Skills
 - Identify actors in health informatics scenarios
 - Explain and reflect on the actors' roles and professional relations
 - Identify problems within healthcare
 - Analyse and categorize problems
 - Suggest potential health informatics solutions
 - Evaluate, suggest and recommend solutions in favour of others based on their effects
- Attitudes

- Develop a problem, patient and clinically oriented attitude in their role as health informaticians”

From the pre interview that was conducted to the teacher regarding her expectations towards implementing the design principles in the course the following two themes were created:

a) Appropriateness of the triological learning in the course

All in all, the teacher found Triological learning quite appropriate for her course taking into consideration the nature of the case studies. She found it quite hard for one person to provide an appropriate solution and design by being based on his/her own background alone and therefore by designing the course through this way could help students to provide better solutions by combining their backgrounds and previous experiences.

She mentioned that all the design principles could be covered through the course with the exception of DP5 for which she thought that it was not easy to reach that level right now but which could be applied in the future with some further organization. For the appropriateness of Triological learning, she especially expressed that DP1 and DP6 were very applicable to the course. In general the new course plan was received positively.

b) Differences on the implementation of the course plan under triological learning and issues of concern

In the previous implementation, the cases were totally individual and there were no groups at all. Now students had to create groups through which they should conduct a group analysis and provide together a prototyping solution and there was only a report, which had to be written individually. The only concern expressed by the teacher was that some students might prefer to work individually and might not work harmoniously in the groups.

2. University of Helsinki & Metropolia (Sensor Technology course)

Previous practices and goals, expectations, and, plans

The case was a Sensor Technology course in Metropolia University of applied sciences for the students in information technology. The teacher had not run the course beforehand.

Before the course, the teacher wrote his ideas about implementing the dialogical design principles in the course plan template as a Google document (the teacher participated in the KNORK Kick-off workshop but made the plan only afterwards). In addition, he shortly answered to the following pre-questions by writing (open questions answered in Google document):

https://docs.google.com/document/d/1kPAaDgz_Wv92oPLFYpJnPkzexYdB_3PI4JfN6loO3nU/edit?usp=sharing

The students (N=11) answered (in paper) to the following seven statements and one open question before the course: http://knork.metropolia.fi/intra/wp-content/uploads/2014/01/KNORK-Informed-Concent-and-pre-questions-for-students_UH-2014.docx

Main findings

The teacher's reflections before the course

Below is a review of the teachers' pedagogical plan in implementing the Design Principles:

- DP1: To create a collaborative portfolio on the sensor technology that can be published and presented to outsiders (shared presentation materials, Wiki-pages, a common blog, or videos or multimedia presentations);
- DP2: Combining participants' own interests and shared tasks by dividing the class into working pairs that choose a theme to study in detail. Coordinating individual and collective activities by having common weekly themes and by gathering all work results into common pool. Fostering the learning of collective responsibility and action by agreeing on common and collective work rules at the beginning of the course, and by revising the agreement in middle of the course.
- DP3: Choosing the topic at start, deadline for the first version, commenting on the work of others along the way.
- DP4-DP6: No concrete ideas about these in the plan.

Before the course, the main concerns of the teacher were about whether the course will be practical enough to interest the students, and whether it is possible to concretely build and design something during eight weeks or will the course practices mainly consist of thinking, discussions and writing. In addition, the teacher was wondering what the main differences are between the dialogical approach and, e.g., problem-based learning, collaborative enquiry, project-based learning, or seminar/workshop.

The students' reflections and expectations before the course

The students' answers to the seven statements before the course are reported in the M12 report together with their answers to the same statements after the course.

An open question "What do you want to achieve by taking part in the course?" was asked from the students at the beginning of the course using a paper questionnaire (including also the seven statements about their study and knowledge competencies). In all, ten students answered to the question. Below is a list of issues mentioned by the students in their answers (students answered in English because the whole course was run in English):

- *Learning the course content* (10); e.g. "Gain knowledge in the sensors & it's working principle behind it", or "I want to gain knowledge about the topics discussed during the courses at least basic knowledge".
- *The benefits of learning new content* (1); "This would help me to use sensors more efficiently as an embedded student".
- *Good grades* (1): "Also points and good grade of course."
- *Collaboration with other students* (1): "Work in team to achieve a set goal".

As can be seen from the list of students' expectations, mostly the students mention the learning of the content or topic of the course, and only one student mentioned an issue related to the collaborative working practices of the course. This might reflect the fact that also in the course description of the course, provided by the teacher to the students beforehand, there also were only topic-related issues mentioned in the description of learning outcomes, course content and assessment criteria. The term "project work" was mentioned in the section describing the teaching methods. **One suggestion for future courses is that also the learning goals and assessment criteria concerning the generic skills and competencies related to working practices (e.g. collaboration skills, teamwork, creation of new solutions etc.) are explicitly defined and described in the course descriptions informed to students before the course.**

3. Helsinki University & Helsinki Upper Secondary School of Media Arts (‘Energy in ecosystem’ assignment)

Previous practices and goals, expectations, and, plans

The case combined three courses (biology, chemistry and physics) for the first year upper secondary school students. Otherwise the course were conducted as usual, but there was one common assignment for the students of all courses concerning the topic of energy.

Before the course, the three teachers wrote their ideas about implementing the dialogical design principles in the course plan template as a Google document (as part of KNORK Kick off workshop). In addition, they answered together to the following pre-questions by writing (open questions answered in Google document):

https://docs.google.com/document/d/1kPAaDgz_Wv92oPLFYpJnPkzexYdB_3PI4JfN6loO3nU/edit?usp=sharing

The students (N=66) answered (in paper) to the following seven statements and one open question before the course (but in Finnish): http://knork.metropolia.fi/intra/wp-content/uploads/2014/01/KNORK-Informed-Concent-and-pre-questions-for-students_UH-2014.docx

Main findings

In all, 67 first year upper secondary school students from three obligatory courses (biology, chemistry and physics) participated in the process. First the students had a joint brainstorming session about phenomena that interest them in the topic ‘Energy in the ecosystem’. Students formed groups that have a task to create material about the phenomenon they have chosen to examine. All materials of the groups were supposed to be combined as a larger entity to be used as study material in future courses of the school. An expert from a solar system company participated in the process by giving an expert lecture to the students. Google documents were used for sharing and co-authoring material, and the final product was planned to be constructed with Prezi (see also http://www.iced2014.se/proceedings/1579_Karlgren.pdf)

According to the teachers, a major challenge for them was to implement the joint phenomenon-based assignment integrated in the compulsory content of the three courses. The courses were first courses of each subject in the upper secondary curriculum, and the assignment was only one part of the course content. The curriculum in Finnish upper secondary schools is very tight in terms of the amount of content to be studied. At the start of the course, the teachers worried about the importance to ensure that students learn basics of all course content for future studies.

The students’ answers to the seven statements before the course are reported together with their answers to the statements after the course in the M12 report.

An open question “What do you want to achieve by taking part in the course?” was asked from the students at the beginning of the course using a paper questionnaire (including also the seven statements about their study and knowledge competencies). In all, 59 students answered to the

question. Below is a list of issues mentioned by the students in their answers (the excerpts are translated from Finnish):

- *Learning the course content* (23); e.g. “I want to learn more about Physics”, or “Learn and understand the central topics and issues of the course”.
- *Good grades* (19): “I want to receive a good grade.”
- *To complete a compulsory course* (12); “I want to complete the compulsory courses in order to graduate from high school”.
- *Pass the course* (10); e.g. “Pass the course. Physics is not for me.”
- *No specific goals* (3); e.g. “Nothing”.
- *Learn new issues for the future* (1); “Learn new useful things that are beneficial in future.”
- *Collaboration with other students* (1): “A lot of collaboration with other students”.

As can be concluded from the students’ expectations, the focus is either in the learning of course content, or the completion of the courses and receiving good grades. Presumably the students did not know beforehand that the courses would include atypical working practices, or at least they did not expect anything special. All three courses were compulsory courses for all students.

4. University of Rome and Salvemini

Previous practices and goals, expectations, and plans

Data collection type (interview/questionnaire/other)? Respondents (teachers, students, other stakeholders)? How many?

Before the trial, a semi-structured questionnaire (http://knork.metropolia.fi/intra2/?page_id=672) was sent to 7 teachers (whom initially declared to be willing to take part in the trial) to verify in advance their technological expertise and at the same time to understand how and if they used technology to foster knowledge building or any practices of collaborative learning. Data collected would have allowed us to plan teachers' workshop in a targeted manner, by introducing informations and activities built upon their specific needs and constraints.

Since the beginning of the trial we have activated a mailing list (ML) to facilitate the spontaneous exchange of information and opinions. Periodically we have launched stimuli to promote discussion around any problems encountered, benefits of technology, climate of the class, their expectations and so on.

At this stage, moreover, teacher workshops had been carried out (3 on the trialogical approach and 2 in order to give information and specific training on technological environments and tools) and the first versions of pedagogical plans were written (http://knork.metropolia.fi/intra2/?page_id=672)

Main findings

From the short questionnaire on teachers' technological skills emerged a general low-level skill, mainly based on the use of email, ppt or digital blackboard in the classroom. Teachers do not use technology to promote collaborative learning.

From teachers' exchanges in ML and during workshops we could gather their main expectations (introducing an innovative learning method able to engage students and improve the classroom climate; enhancing students' and teachers' technological skills), but also their concerns about time management (since the trial coincides with the last few weeks of the school year), students' and teachers' poor technological literacy, teachers' collaboration.

Also, teachers used the ML for asking feedback from researchers about plans, technology to be used and how to use it, and class management.

Unfortunately, only few teachers used the email communication system (and at a low level), preferring instead f2f communication during dedicated meetings and, above all, the Google Drive comment system which they later described as the most powerful tool they discovered during the trial.

5. Technology School Electronic Systems associated with Technical University of Sofia (CAD course)

Previous practices and goals, expectations, and, plans

The course at the Technology School “Electronic Systems” associated with Technical University of Sofia (TUES) is a specialized course in the field of Computer Aided Circuit Design in Electronics (CAD).

The teacher hadn't experience in running project-based course. One of the teachers participated in the KNORK Kick-off workshop and made the first version of revised plan taking in consideration suggestion given during the workshop. A plan of CAD course applying the principles of dialogical approach is developed. Plan with comments and recommendations can be found in Google Drive on the following link:

<https://drive.google.com/folderview?id=0B70xRVoq4zvJYIIWRFFTU19hZ1U&usp=sharing>

Before starting the course at the end of January was organized a workshop with teachers of TUES who were acquainted with the principles of dialogical approach for the designing of educational training. A number of proposals and comments on the application of the principles of dialogical approach to the start-up of the curriculum of both general education and the discipline of vocational training were carried out and discussed.

<https://drive.google.com/folderview?id=0B70xRVoq4zvJWVQzRWhjRk5qbG8&usp=sharing>

The teacher of CAD course answered to the proposal for pre and post questions to teachers on five issues

(<http://knork.metropolia.fi/intra/wp-content/uploads/2014/01/Proposal-for-pre-and-post-questions-to-teacher-first-version.doc>): 1. Design principles/theory; 2. Collaboration; 3. Technology; 4. Challenges in the background that motivate change; 5. Issues of concern.

<https://drive.google.com/folderview?id=0B70xRVoq4zvJTIRzMjdhSUo2dTQ&usp=sharing>

The project involved 52 students. In the beginning of the course students answered the questionnaires on paper and uploaded to the shared space files with questionnaires. The questionnaires include the following seven questions and a one open question.

- 1.1 I know how to organize my studies purposefully.
- 1.2 I know how to analyze theoretically the topics to be studied.
- 1.3 I know how to discuss with others about the topics to be studied.
- 1.4 I know how to take advantage of common discussions for deepening my understanding.
- 1.5 I know how to work in a goal-oriented way in a group.
- 1.6 I know how to develop productions (e.g., plans, reports, models) collaboratively with others.
- 1.7 I know how to use technology in multiple ways during collaborative work

The answers of the open question: What do you want to achieve by taking part in the course? are summarized for 36 students of two classes in the files.

Files with student's pre questionnaires can be accessed at the following links:

<https://drive.google.com/file/d/0B70xRVoq4zvJb1NsV1Q1c0UtUmM/edit?usp=sharing>

<https://drive.google.com/file/d/0B70xRVoq4zvJV3dvRIVFN116NzA/edit?usp=sharing>

Main findings

Review of the teachers' plan in implementing the DPs:

- DP1: Collaborative development of common project, and preparation of shared report in collaborative environment. Task distribution between the members of a team. Activities: regular meetings for discussion of project tasks and preliminary review of the used tools and the progress of the project development
- DP2: Combining participants – team members will choose the partners they want to work with. Coordinating individual and collective activities by having weekly assignments and long time project work. Motivating students to distribute tasks between team members take the responsibility for the project deadline Collective responsibility - in the group each member takes the responsibility for their project tasks.
- DP3: Discussion and analysis of problems the teams faced during their collective work on the common project. Thoughtfully and creatively establish, conduct and operate the project development. Practice already gained knowledge and skills in using dedicated CAD software to solve the tasks of the project.
- DP4: Prolonged working process with iterative circuits simulations – performing number of analysis of the designed circuit to refine the circuit parameters and characteristics. Planning and writing the documentation, sharing the drafts, asking the teacher and other students for feedback, improving the project and project documentation, submitting respective report and presenting the obtained design and simulation results.
- DP5: Teachers, students and industry professionals discuss and analyze collaborative experience. Students use modern professional tools in order to plan, organize, and execute the project tasks and write project documentation.

DP6: Using forums, blogs and social media for discussing problems and talk about their points of view and opinions. Google Calendar - for project scheduling and related events by sending RSVP invitations; Skype – for Face to face and virtual meetings; Google Apps – for sharing materials/comment easily and project management; Google Docs for collaborative editing and commenting. Google Drive for file sharing. Google+ for discussions; Google Sites – for web site of the project.

6. Technical University of Sofia (ASIC Design & VLSI Design courses)

Previous practices and goals, expectations, and, plans

The cases were ASIC Design and VLSI courses in Technical University of Sofia for the bachelor and master degree students in Electronic Engineering. The teachers had previous experience in running project-based course

Before the course, the teachers wrote their ideas about implementing the dialogical design principles in the course plan template as a Google document (one of the teachers participated in the KNORK Kick-off workshop and made the revised plan taking in consideration suggestion given during the workshop). In addition, teachers shortly answered to the following pre-questions by writing (open questions answered in Google document):

https://docs.google.com/document/d/1wfrEkVhDc_H7ZE622SUYUdRWwkjj03XyjWjmWoZ7xv8/edit?usp=sharing

The students answered (on paper) to the following seven statements and one open question before the course:

https://docs.google.com/document/d/1BhCs8TdN5Mp99n8dEWuxO1W8J_W8-XqHFvlevqFkxoU/edit?usp=sharing

Main findings

Review of the teachers' plan in implementing the DPs:

- DP1: To organize collaboratively development of common team project in collaborative workspace for project work and preparation of shared report from students teams
- DP2: Combining participants' own interests and shared tasks by dividing the class into working pairs that choose a theme of the project. Coordinating individual and collective activities by having five individual homework assignments in addition to the project work. Each team had to choose a project subject from a list provided by the teacher. Fostering the learning of collective responsibility and action by agreeing on common and collective work rules at the beginning of the course – two project milestones were set – intermediate report and final report. Also students have to write short weekly note or message in a shared system both for individual and group progress.
- DP3: Choosing the project theme at start, two milestones, peer commenting on the work of others along the process of project development.
- DP4: Continuous working process on 3 month project, iterative circuits design – performing several synthesis and analysis of designed circuit to improve parameters in order to fulfill required technical specifications. Planning and writing the documents, sharing the drafts, getting feedback from the teacher and other students, improving the project and project report (versioning), submitting relevant documents and presenting the prototype
- DP5: Students use professional tools in order to plan, organize and perform the project as well as for writing project report.
- DP6: Face to face and virtual meetings (Skype), Google Docs for collaborative editing of the project reports, reviewing and commenting. GitHub for sharing project artifacts.

The students' answers to the seven statements before the course are reported in the M12 report together with their answers to the statements after the course.