EPICES

European Platform for Innovation and Collaboration between Engineer Students

Workshop «Development of a platform for helping teachers / tutors / coaches involved in problem- and project-based learning"

Prepared by Wouter Van der Hoeven, Ilmars Viksne, Antoine Lanthony, Alexis François

SEFI 2016– Tampere– September 12-16, 2016

Erasmus+

FACTS AND FIGURES

- 2 ½ year European project co-financed by Erasmus+ (from September 1, 2014 to January 31, 2017)

- 2 background: PLACIS
  - The French PLACIS project and issues raised during PLACIS : A new format to train engineers through at-a-distance international and/or industrial multidisciplinary projects carried out collaboratively by students,
  - The progressive change of the curricula, with new methods, new tools, new complexity, MOOCs issue…

- Partners:
  - Supméca, France (coordinator)
  - KU Leuven, Belgium
  - SEFI, Belgium
  - Riga Technical University, Latvia
  - Aalto University, Finland
  - Universita di Napoli Federico II, Italy
  - Politecnico di Torino, Italy
  - Universitat Politecnica de Valencia, Spain

MAIN GOAL OF EPICES

- Improve the project-based learning in engineering and work on the teachers roles, through 6 intellectual outputs:

  - O1 : Model of facilitator roles and skills in Project-based Learning in European Engineering Education
  - O2 : Initiation of training packages for developing effective facilitation skills for teachers involved in project based learning in European Engineering Education
  - O3 : Creation/adaptation of a platform for teacher networks for sharing best practices of facilitation in different media
  - O4 : Feedback and results on larger scale use of training packages & possible use of guidelines
  - O5 : Assessment Methodology for Project Based Learning in Engineering studies
  - O6 : Development of toolboxes/toolkits (for measurable competencies) for assessment of skills and knowledge with reference to the environment you are working in

PROGRAM OF THE WORKSHOP

5 min	Presentation of the workshop and introduction
5 min	Summary of the work already done in EPICES and publications related to it (coaching profiles, assessment issues for PBL)
10 min	Presentation of the platform + Coaching Tool
10 min	Assessment tool
5 min	Creation of groups
25 min	Exploration of the platform by the groups, tasks to do, and report-feedback to the team
10 min	Questionnaire on platform, tools and proposal for extra tools
20 min	Feedback by each group and final discussion

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Results already achieved / Publications & dissemination

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BACKGROUND AND CASE STUDIES

- Our background consists in feedbacks from PLACIS and EPICES

- Our general experience is based on around:
  - 30 projects,
  - With different kind of industrial partner: SME, transnational company or research center,
  - Involving Bachelor and/or Master 1 and/or Master 2 students, from different countries and backgrounds,
  - Both with or without at-a-distance collaborative format,
  - Both with or without international context.

- Then, specific case studies and experience we used to :
  - Work on assessment challenges (7 case studies in 2015-2016),
  - Design the platform (KU Leuven experience)

RESULTS ALREADY ACHIEVED

- Continuation and launching of many sub-projects used as case studies,
- Modeling of facilitators roles and realization of a coaching tool related to the roles,
- Definition and implementation of an assessment method based on a specific skills grid,
- Realization of an online platform gathering all the tools developed by EPICES and adding a forum.

MAIN PUBLICATIONS & EVENTS

- Plenary presentation / ECED 2015 / Valencia / Spain
- Workshop on the roles of teachers in problem- and project-based learning / SEFI 2015 / Orleans / France
- Paper & workshop on the “Challenges of project-based learning in engineering education” / WEEF 2015 / Florence / Italy
- Poster, paper & workshop on the “Development of a platform for helping teachers / tutors / coaches involved in problem- and project-based learning” / SEFI 2016 / Tampere / Finland
- Local dissemination events and use of tools at EPICES members

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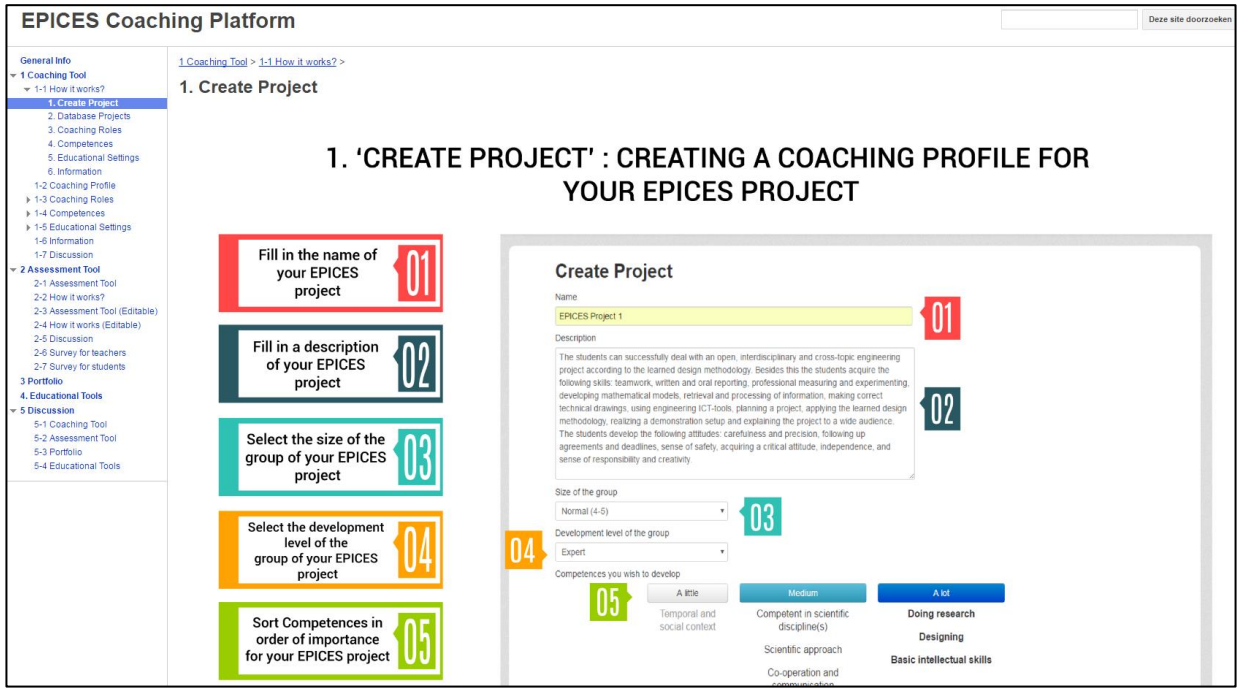
EPICES COACHING PLATFORM



Digital platform for collaboration between/support of coaches in PBL Engineering courses in Europe

https://sites.google.com/site/epicescoach/

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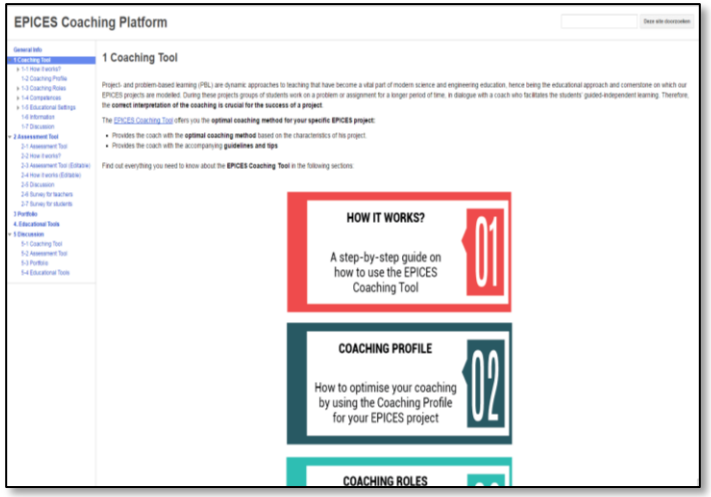
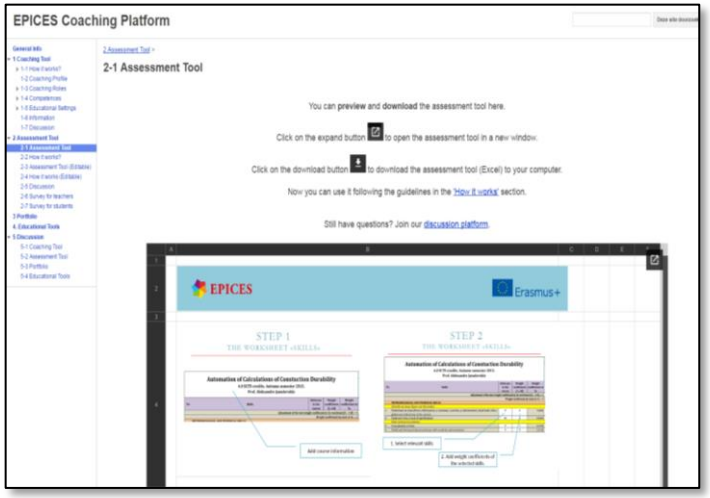


1. COACHING TOOL

- Define the optimal coaching method for a specific project
- Guidelines to successfully take on this coaching method

2. ASSESSMENT TOOL

- Assess acquirement of skills and the application of knowledge
- Predefined (29 skills) + modifiable excel template



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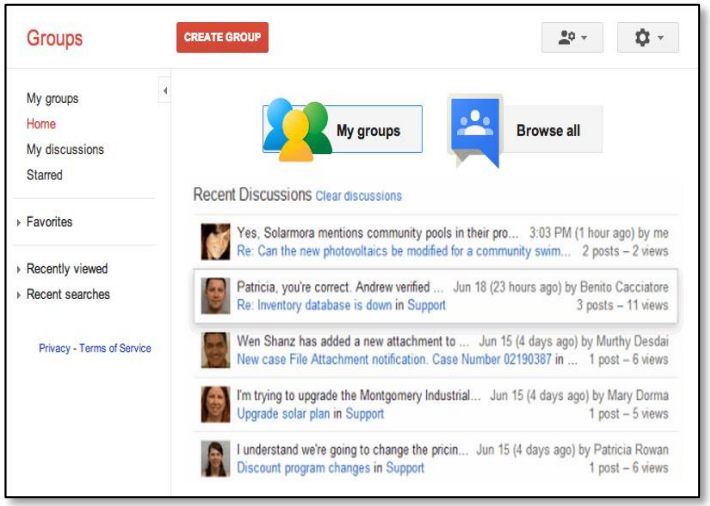
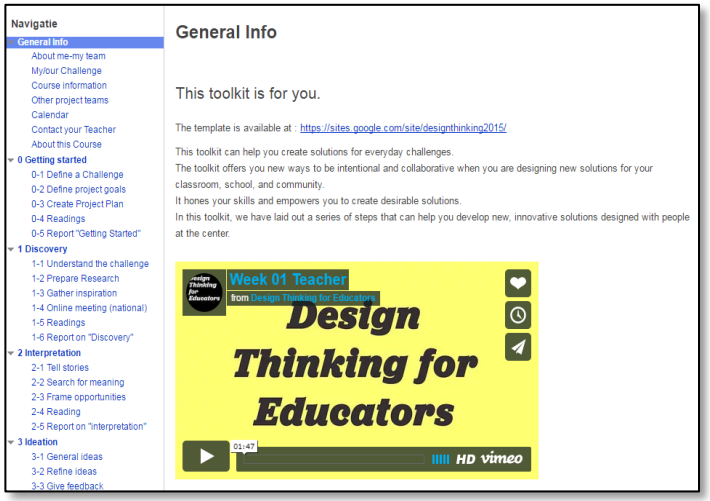


3. COMMUNICATION PLATFORM

- Direct contact with peers and EPICES instructors
- To share experiences, tools, guidelines, tips & tricks,… or look for help

4. PROJECT PORTFOLIO

- Development of online project portfolio
- Tailored to international PBL engineering projects
- Reusable + modifiable template



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1. COACHING MODEL

Development 'coaching model'

1. Define the optimal coaching method for a specific project
2. Provide guidelines to successfully take on this coaching method
3. Provide tools to facilitate this coaching method

Framework Coaching Roles

1. Advisor	Provides the students with indirect answers and advice.
2. Authority	Provides the students with ready-to-use answers and instructions.
3. Problem solver	Can be reached when problems emerge and helps to solve them.
4. Inspector	Checks if the students are working and making progress.
5. Model	Acts as an example for the students: the students gain insight in the reasoning and thinking of the coach.
6. Motivator	Motivates the students during the course of the project.
7. Feedback provider	Provides feedback, individual and group, on a regular basis.
8. Educator	Steers the learning process by urging the students to reflect on their personal development and their learning methods.
9. Group specialist	Makes sure the group and all its members are functioning properly.

COACHING MODEL

Research

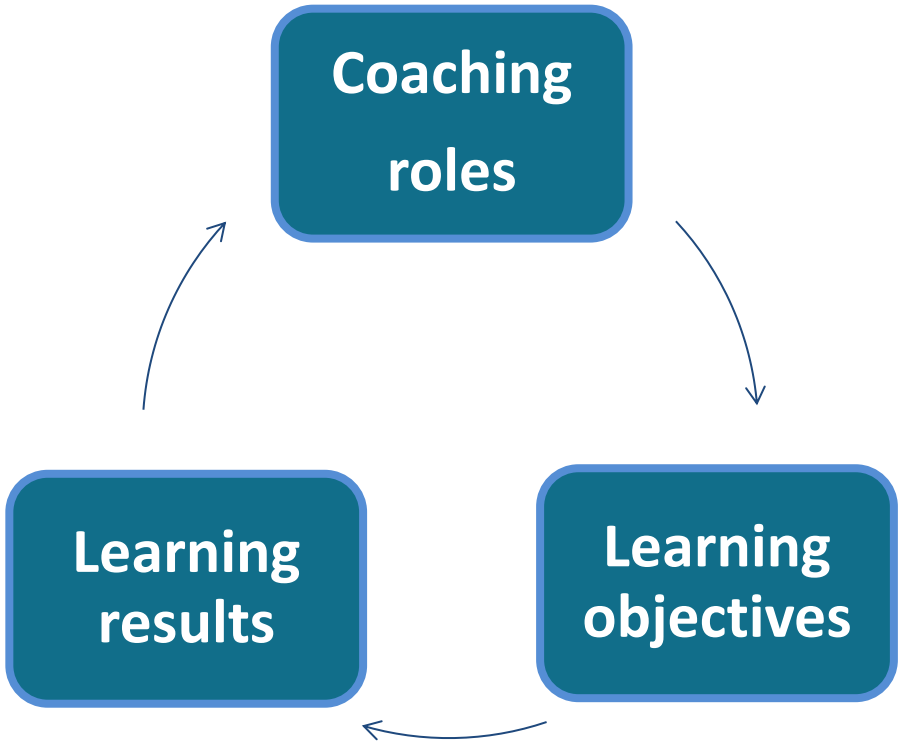
Relationship 'coaching roles– learning objectives – learning results'

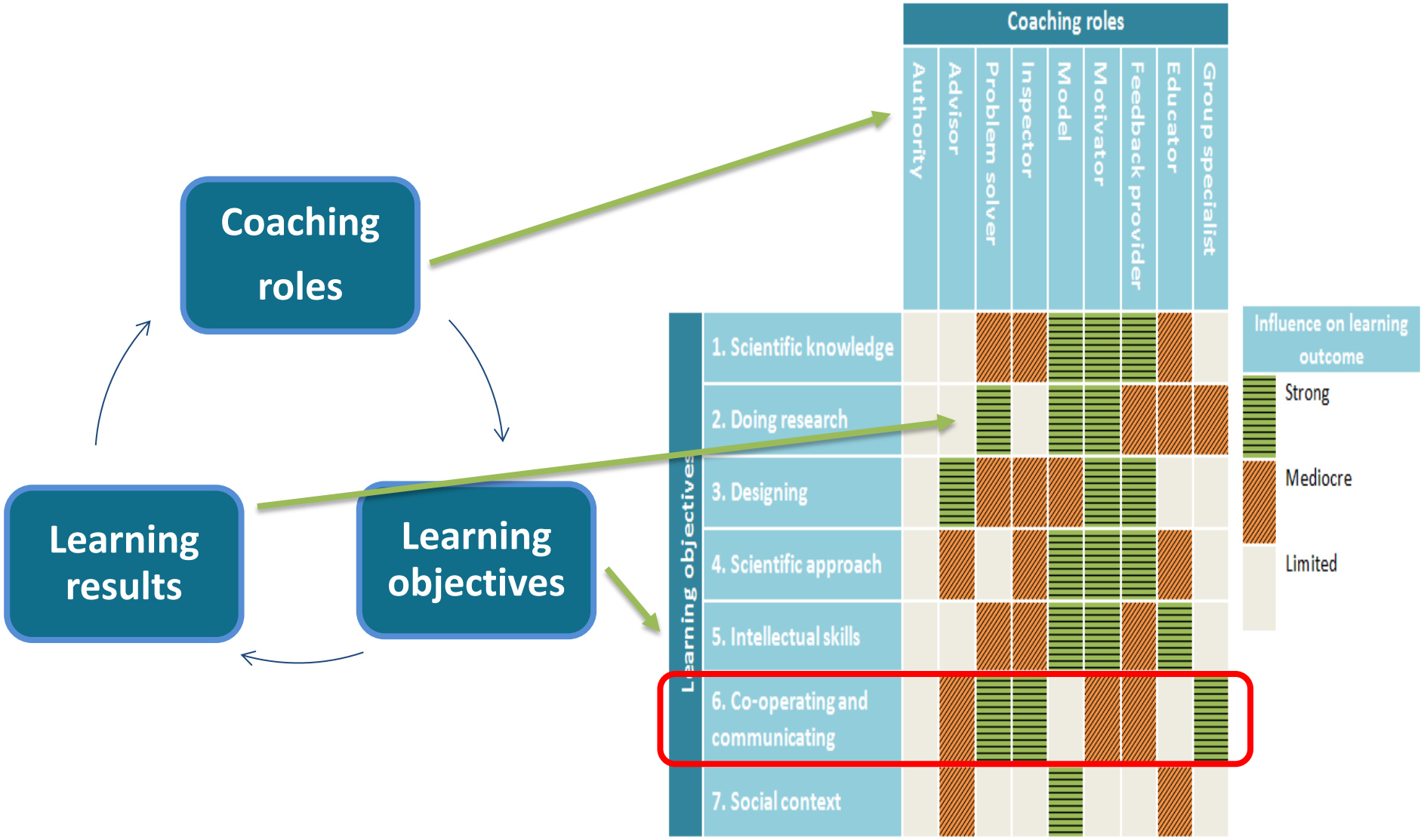
Survey + Journal → 900 students & 50 coaches

Model

- Which coaching role is needed
- To work on a specific learning objective
- To warrant the best learning result

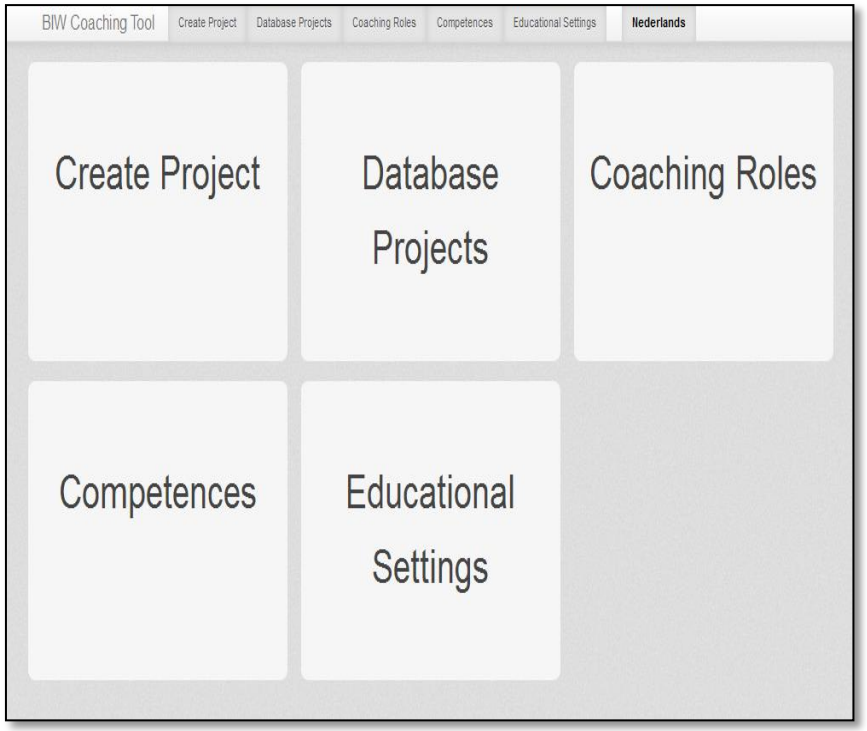
Relationship = Coaching model

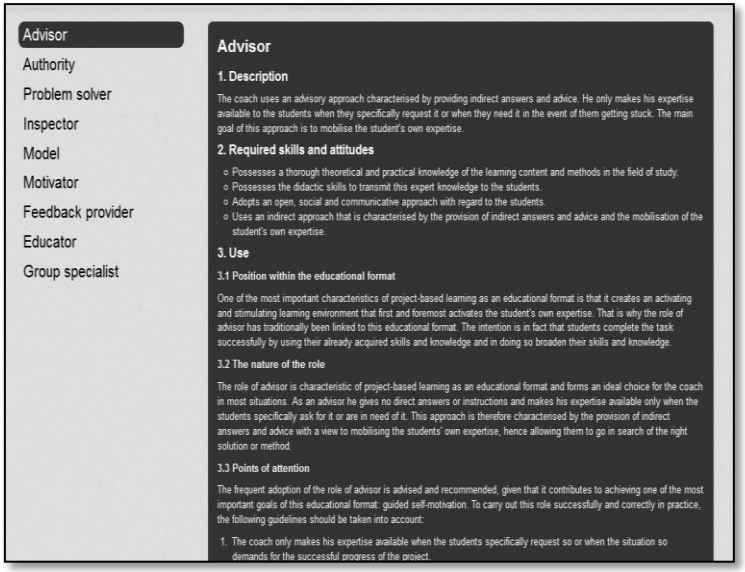



Coaching roles
Learning results
Learning objectives
Coaching roles
Authority
Advisor
Problem solver
Inspector
Model
Motivator
Feedback provider
Educator
Group specialist
Learning objectives
1. Scientific knowledge
2. Doing research
3. Designing
4. Scientific approach
5. Intellectual skills
6. Co-operating and communicating
7. Social context
Influence on learning outcome
Strong
Mediocre
Limited

Coaching Profile

Web Application EPICES platform





Guidelines & Tools

ASSESSMENT TOOL

STARTING POINT

- **Competencies are already defined by stakeholders an accepted by universities in the PLACIS project.**
- **There are approved curriculums.**
- **There are students form undergraduate and graduate courses.**

MAIN CRITERIA FOR PBL

- **Project-based learning and problem-based learning projects (PBL)**
  - are central, not peripheral to the Curriculum;
  - are focused on questions/problems that “drive” students to encounter the central concepts and principles of a discipline;
  - involve students in a constructive investigation;
  - are student-driven to some significant degree;
  - are realistic, not school-like.

Source: Thomas, J. W. (2000). A review of research on project-based learning.

DIFFERENCES OF PROJECT-BASED LEARNING

- **Project-based learning**
  - is multi-disciplinary;
  - is closer to professional reality and involves real-world, fully authentic tasks and settings;
  - includes the creation of a product or performance;
  - often takes a longer period of time;
  - follows a thematic stepwise process.

STEP 1

Automation of Calculations of Constuction Durability

6.0 ECTS credits. Autumn semester 2015.

Prof. Aleksandrs Januševskis

No	Skills	Relevant to the cou	Weight coefficients (1..10	Weight coefficients in %
			Adjustment of by test impact (-9...+9) --->	
			Weight coefficients by tests in % --->	
	METHODOLOGICAL AND TECHNICAL SKILLS			
	Identify an issue, figure out the stakes			
1	Understand an issue (from a third person, a customer, a service...), reformulate it, stand back, with a global and critical view of the context	Y	6	3.59%
2	Build and write a book of specifications	Y	4	2.40%
	Solve technical problems			

Add course information

STEP 2

No	Skills	Relevant to the course	Weight coefficients (1..10)	Weight coefficients in %
			Adjustment of by test impact (-9...+9) --->	
			Weight coefficients by tests in % --->	
	METHODOLOGICAL AND TECHNICAL SKILLS			
	Identify an issue, figure out the stakes			
1	Understand an issue (from a third person, a customer, a service...), reformulate it, stand back, with a global and critical view of the context	Y	6	3.59%
2	Build and write a book of specifications	Y	4	2.40%
	Solve technical problems			
3	Conceptualize an idea	Y	7	4.19%
4	Model and develop technical solutions with creativity and innovation	Y	9	5.39%
5	Check the work and pay attention to the details	Y	7	4.19%
6	Learn by yourself and use computer tools	Y	10	5.99%
7	Choose a solution	Y	9	5.39%
	Manage a project			

1. Select relevant skills.

2. Add weight coefficients of the selected skills.

STEP 3

Automation of Calculations of Constuctions Durability 6.0 ECTS credits. Autumn semester 2015. Prof. Aleksandrs Januševskis

10	is the highest mark

Nc	Title	Type	Date	Description
1	The mid-semester test	Problem solution test	12.10.2015	
2	The coursework	Classroom presentation	03.09.2015	
3	The final exam	Problem solution test	14.10.2015	
4				
5				

1. Add information on the planned assessment.

2. Add the highest possible mark.

STEP 4

1. Adjust overall impact of the assessment to the skills.

2. Select the evaluated skills by this the assessment.

The test revelance to the skills		
The mid-semester test	The coursework	The final exam
1	2	3
-4	3	1
5.0%	**61.0%**	**34.0%**
Y	Y	Y
N	Y	N
N	Y	Y
N	Y	Y
N	Y	N
N	Y	Y
Y	Y	Y

STEP 5

			The mid-semester test	The coursework	The final exam			Final
No	Student name	Group	1	2	3	4	5	6
1	Student 1	EPICES	7	4	6			**4.83**
2	Student 2	EPICES	7	10	10			**9.85**
3	Student 3	EPICES	8	7	8			**7.39**
4	Student 4	EPICES	5	6	5			**5.61**
5	Student 5	EPICES	6	7	7			**6.95**
6	Student 6	EPICES	8	0	0			**0.40**
7	Student 7	EPICES	6	5	4			**4.71**
8	Student 8	EPICES	9	10	6			**8.59**
9	Student 9	EPICES	7	7	7			**7.00**
10	Student 10	EPICES	6	7	7			**6.95**

2. Add assessment results.

1. Create students' list.

STEP 6

Student name	The mid-sem	The coursew	The final exa
Student 3	8	7	8

1. Select the student.

7.39

	Skills	Maximal points	Achieved points	Achieved %
	METHODOLOGICAL AND TECHNICAL SKILLS			
	Identify an issue, figure out the stakes	**0.5988**	**0.4380**	73%
1	Understand an issue (from a third person, a customer, a service...), reformulate it, stand back, with a glob	0.3593	0.2703	75%
2	Build and write a book of specifications	0.2395	0.1677	70%
	Solve technical problems	**2.5150**	**1.8579**	**74%**
3	Conceptualize an idea	0.4192	0.3120	74%
4	Model and develop technical solutions with creativity and innovation	0.5389	0.4012	74%
5	Check the work and pay attention to the details	0.4192	0.2934	70%
6	Learn by yourself and use computer tools	0.5988	0.4458	74%
7	Choose a solution	0.5389	0.4055	75%
	Manage a project	**1.1377**	**0.8184**	**72%**
8	Define objectively the deadlines and milestones of the various tasks of an activity	0.2395	0.1677	70%
9	Grasp quality, costs, risks, and react to differences relating to the life of a project	0.2395	0.1677	70%
10	Plan and manage the project during its lifetime	0.2395	0.1677	70%
11	Adapt his / her attitude and accuracy of deliverables taking into account the requirements	0.4192	0.3154	75%
	MANAGEMENT AND COMMUNICATION SKILLS			
	Report in both written and oral form	**1.7365**	**1.2956**	**75%**
12	Synthesize, structure and present information in a clear and precise manner	0.4192	0.3120	74%
13	Communicate in both written and oral form in a foreign language	0.3593	0.2703	75%

2. Analyze acquired skills.

WORKSHOP

https://sites.google.com/site/epicescoach/

→ Firefox or Chrome

1. COACHING TOOL

- Generate a coaching profile

→ Use guidelines '1-1 How it works'

- Go through (guidelines on) coaching roles, competences and eductional settings

2. ASSESSMENT TOOL

- Set up an assessment

→ Use guidelines '2-2 How it works'

→ 10 skills – 2 tests – 5 students

- Set up an assessment (own skills)

→ Use guidelines '2-4 How it works'

DISCUSSION

1. **Do you have any experience with PBL?**

→ Role: teacher, student, pedagogue, …
→ Characteristics of your PBL-based projects
→ + or – of the format
→ PBL in your institution

2. **What's your first impression of the Coaching Tool?**

→ Hands-on experience
→ Use of coaching roles, competences, …
→ Information on the EPICES platform
→ Improvements

3. **What's your first impression of the Assessment Tool?**

→ Hands-on experience
→ Skill-set used
→ Information on the EPICES platform
→ Improvements