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Help Them Grow – The ENG-IST Tool - Supporting Students’ Personal Development Process To Stimulate Lifelong Learning

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and Johanna NAUKKARINEN

**HELP THEM GROW – THE ENG-IST TOOL –
SUPPORTING STUDENTS’ PERSONAL DEVELOPMENT PROCESS
TO STIMULATE LIFELONG LEARNING (WORKSHOP)**

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Keywords: Lifelong Learning, Personal Development Process, Supporting Students, ENG-IST Tool, Supporting Lecturers

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1 MOTIVATION AND LEARNING OUTCOMES

Teaching staff often acknowledge the importance of Lifelong Learning (LLL) competencies but they do not necessarily feel adequately prepared to support students' personal development towards obtaining these important skills. TRAINeng-PDP is an Erasmus+ project which aims to prepare students for a life full of learning through a personal development process (PDP).

One outcome of the project is an Engineering Programme - Intervention Selection Tool (ENG-IST) to assist lecturers in choosing appropriate interventions for the engineering classroom which support the students' personal development process. Our motivation in this workshop is to showcase, test and enhance the ENG-IST tool so that once complete it is a highly relevant, broadly applicable and context specific resource for the engineering education community.

Specifically, participants of the workshop will be able to;

1. Recognize the variety of interventions that are available to support the PDP of students
2. Reflect on their own teaching to identify a module which would be suitable for an intervention
3. Co-create an intervention design appropriate to a specific context
4. Discuss the constraints associated with the implementation of a particular intervention

2 BACKGROUND AND RATIONALE AND RELEVANCE

The project team undertook a scoping review to identify which types of interventions have already been successfully implemented in higher education more generally (van den Broeck et al., 2022). We used these findings and the contextual aspects of how they were implemented to create the ENG-IST tool to be appropriate to the engineering classroom. The ENG-IST tool is a flowchart which identifies the most appropriate intervention for a particular context, and the educator's aims, based on different criteria and preconditions (Fig. 1). Some considerations include:

- Focus of the intervention (type of skill to be developed)
- Investment required from students,
- Class-time devoted to PDP,
- Type of feedback,
- Other developed skills,
- Preparation time for lecturers,
- Follow-up time for lecturers.

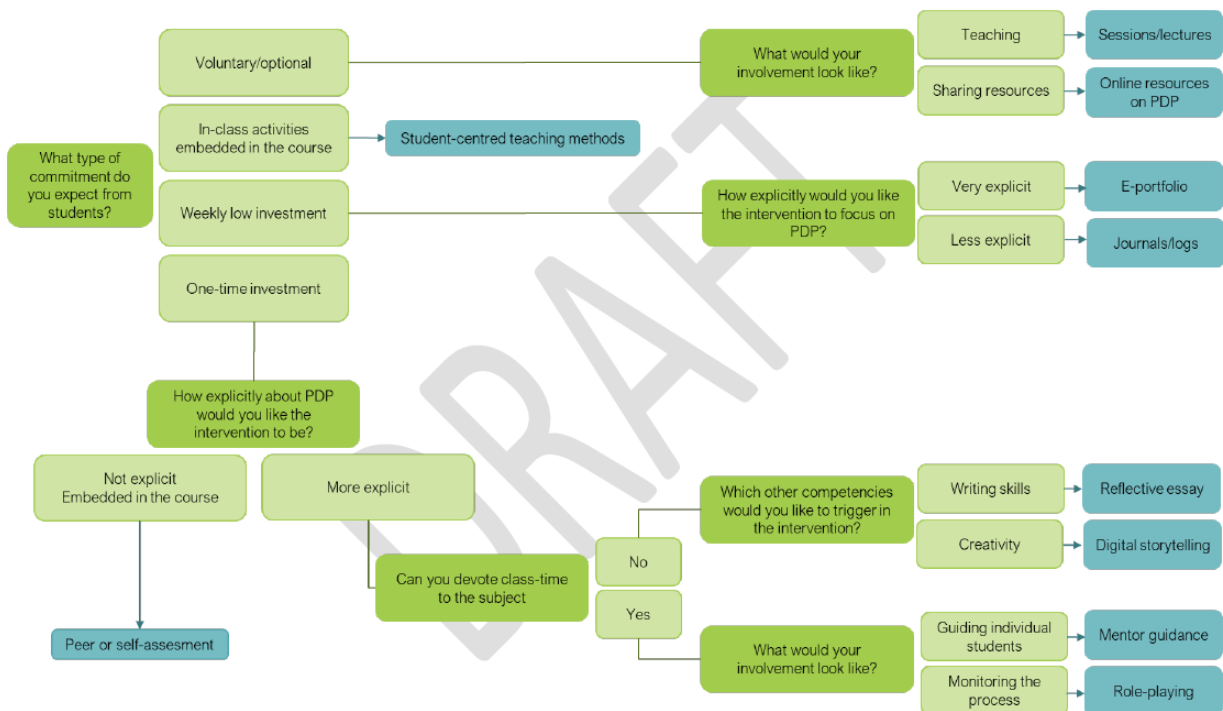


Figure 1: Draft ENG-IST Tool

Educators can use the flowchart to select an appropriate intervention for a particular context. As a further resource for educators, we have also drafted instructional “How To” guides for each type of intervention. We wish to improve the quality of the ENG-IST tool and the intervention guides in this workshop by testing, co-creating and enhancing the tool and instructional guides for specific interventions.

3 WORKSHOP DESIGN

0-10 mins - Short introduction to the workshop, explanation of interventions identified in the literature as part of the scoping review (van den Broeck et al., 2022). (LO 1). Full presentation is included in Appendix A.

10-15 mins- Individually, participants reflect on their own teaching and choose a module that would be suitable to introduce an intervention. Using a Context Template, they record the constraints and contextual considerations associated with this module. (LO2 and 4)

15-20mins- The ENG-IST flowchart is circulated, and participants use it to choose an appropriate intervention based on their context.

20-45 mins- Participants now move to a table specific to that intervention.

Facilitators and participants co-create an Intervention How to Guide (with some sections pre-filled) gathering best practice and views from participants including any constraints. (LO 2,3 and 4)

45- 55mins- Each Group reports back (2 mins each) (LO 4)

55-60 mins - Wrap Up. Participants leave with the ENG-IST flowchart and list of interventions.

4 WORKSHOP AFTER WORK

This final workshop paper has been supplemented with the key findings of the workshop as part of the proceedings. The feedback and notes which were taken in each group on each intervention are now included in Appendix B.

The next step of the project is to trial interventions with student groups which will use the Intervention Guides created in this workshop. We hope that the participants will also be motivated to trial interventions in their own context.

5 SIGNIFICANCE FOR ENGINEERING EDUCATION AND ATTRACTIVENESS OF THE WORKSHOP TOPIC

Engineering employees need to continuously update and up-skill their competencies, to keep pace with changing technology and shifting requirements of the labour market (European Commission, 2019; OECD, 2019) hence Lifelong Learning skills (LLL) are a key component to maintain and improve employability (Employers Statement, 2019). Thus it is essential that students are facilitated in their personal development and this ENG-IST tool and accompanying guides provide a useful resource for educators.

This workshop is attractive as it is an engaging interactive session which will allow educators to become aware of the key LLL competencies students require and the appropriate interventions needed. Furthermore, educators will have some space to reflect on a module in which they could implement an intervention and to assist in co-creating an intervention guide. We hope this workshop will both motivate and support educators in implementing an intervention which we would love to hear about at SEFI 2024.

6 TARGET AUDIENCE, PARTICIPANT KNOWLEDGE REQUIRED, TARGET NUMBERS OF PARTICIPANTS AND RESTRICTIONS ON SIZE IF APPROPRIATE.

Our target audience includes engineering educators who are interested in helping students with their personal development and who are open to undertaking an intervention. No participant knowledge is required, but it would be helpful if the participants are active educators so they can consider a specific module in which to undertake the intervention. Target number is 25, max 40.

7 ENHANCEMENT OF KNOWLEDGE AND DIALOGUE ON THE WORKSHOP TOPIC.

Participants will leave not only with a useful tool for selecting appropriate interventions but also with an awareness of the different types of interventions available. The following interventions were chosen as result of our scoping review (van den Broeck et al., 2022) which investigated appropriate interventions in many different disciplines. These include;

- E-portfolios,
- Reflective essays,
- Digital storytelling,
- Mentor guidance,
- Role-playing,

- Online resources,
- Sessions/lectures,
- Journals/logs,
- Student-centred teaching methods,
- Peer or self-assessment.

The workshop will also enable us to meet like-minded educators who are interested in LLL so that we can further develop projects such as this and increase the impact of our work and further research funding applications on a wider scale.

8 SUMMARY AND ACKNOWLEDGMENTS

We would like to acknowledge the EU Erasmus+ funding body and all partners and associated partners in the TRAINeng-PDP project (grant number: 2021-1-BE02-KA220-HED-000023151) for their help in this activity and report. Many thanks also to the academic staff who provided the module descriptors for analysis and external experts of the project, who reviewed the report.

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TRAINengPDP



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Grant number :
2021-1-BE02-KA220-HED-000023151

TRAINengPDP - Objectives

OB1 | Engage and motivate engineering students in their personal development process;

OB2 | Motivate and train lecturers to engage in the students' personal development process;

OB3 | Increase awareness about the competencies for LLL that are needed in engineering education & practice.

TRAINengPDP



www.fet.kuleuven.be/traineng

Lifelong learning (LLL)

= Progressively acquire, finetune, and transfer knowledge over long time spans while retaining previously learned experiences

(Parisi et al., 2019)



MOTIVATION AND
CURIOSITY TO
LEARN

(Cruz et al., 2020)



CREATING A
LEARNING PLAN



LOCATING AND
SCRUTINIZING
INFORMATION



SELF-MONITORING

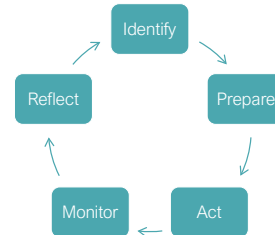
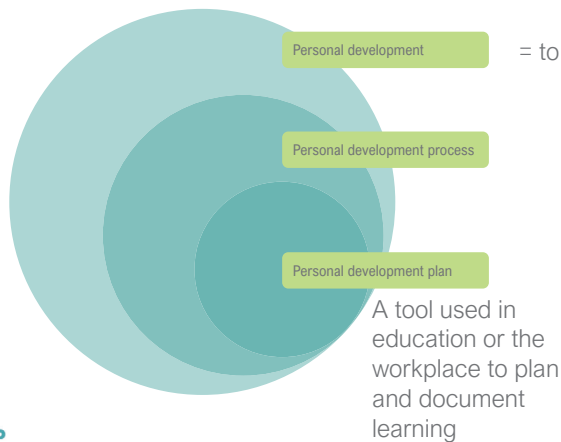


SELF-REFLECTION

TRAINengPDP

www.fet.kuleuven.be/trainengpdp

The personal development process (PDP)



www.fet.kuleuven.be/trainengpdp

TRAINeng PDP

But how can we support students?

- › Scoping review presented @ SEFI 2022: Lifelong learning as an explicit part of engineering programmes: What can we do as educators? – a scoping review
- › Workshop SEFI 2022: The role of lecturers in engineering students' personal development process and promoting lifelong learning.

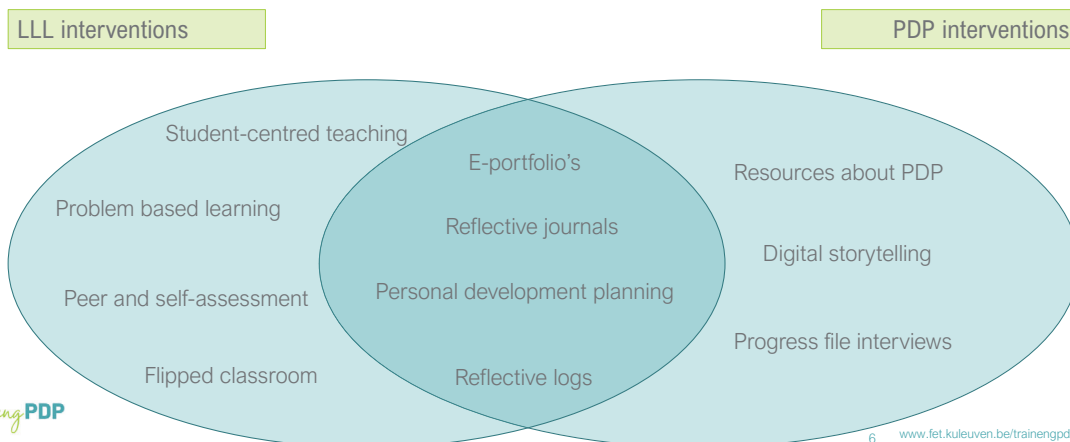


- › Survey February 2023:
 - › Gather good practices and general experiences
 - › Capture lecturers' perceptions of their role in the students PDP

TRAINeng PDP

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PDP and LLL interventions



TRAINeng PDP

Let's start!

- › Step 1: 5 mins – Complete Context Template
Think individually about a module you could use to implement an intervention.
- › Step 2: 5 mins –
› Use the ENG-IST tool to select an intervention
- › Step 3: Move to a table with that intervention
 - › Complete the template using the prompts:
 - › Identify, Prepare, Act, Monitor, Reflect
- › Step 4: Feedback

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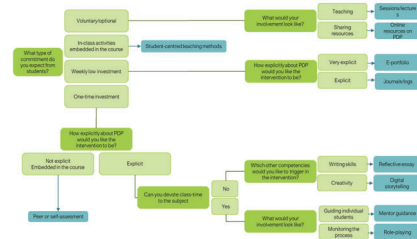
TRAINengPDP

How can a Personal Development Process (PDP) be implemented in the curriculum?

1. Which module do you have in mind for this exercise?
2. How many students are in this module?
3. On which LLL competency or competencies would you like to focus?
 - Locating and scrutinizing information
 - Self-monitoring
 - Creating a learning plan
 - Willingness, motivation and curiosity to learn
 - Self-reflection
 - Not sure
4. What type of commitment do you expect from students?
 - One-time investment
 - Weekly low investment
 - In-class activities embedded in the course
 - Optional or voluntary commitment
 - Not sure
5. What would your involvement look like?
 - Limited: providing resources or giving instructions
 - In-class teaching or monitoring
 - Guiding individual students
 - Not sure
6. How much class time can you devote to this?
 - Little to no time
 - A considerable amount of time
 - Not sure
7. How explicitly about PDP would you like the intervention to be?
 - Not explicit
 - Explicit
 - Very explicit with each step of the PDP clearly included
 - Not sure

TRAINengPDP

The ENG-IST Tool – A first version



Online resources

Description
Digital slides, theory, worksheets, exercises available to students
Advantages:
- Efficient way to reach a large number of students
- No class time
- Hard to be prepared only once and can be revised and shared actively
Disadvantages:
- Voluntary or optional
- The online resources need to be developed

The personal development process

Try to think of how you can implement the PDP steps in your intervention.



The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Peer or self-assessment

Description
In peer or self-assessment students evaluate their peers and/or their own competencies
Advantages:
- Embedded in a course
- Can include all types of competencies
- Can be used cross-course
Disadvantages:
- Implicit personal development process
- Can be influenced by team dynamics or social desirability

The personal development process

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The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan
- Monitor the learning process
- Reflect on the process and what is next

The lifelong learning competencies

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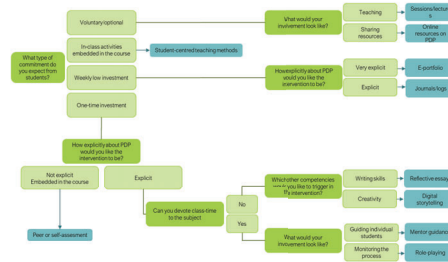
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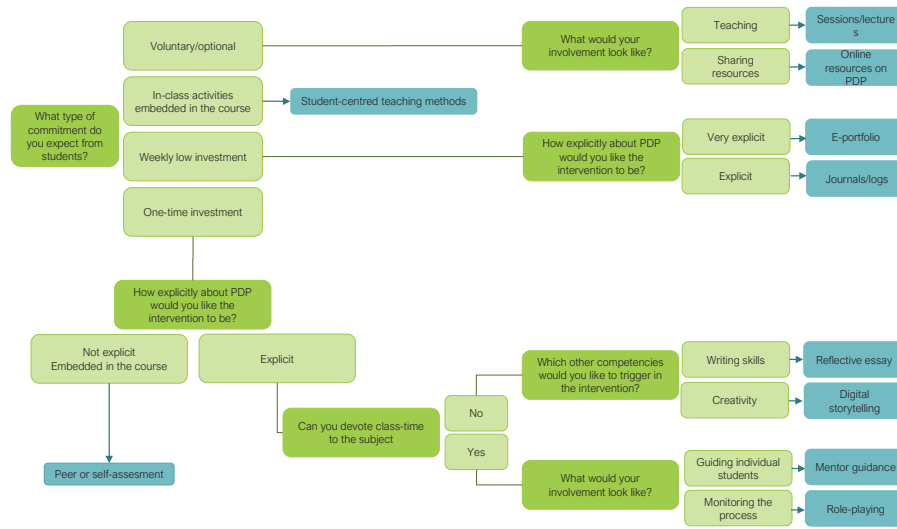
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The ENG-IST Tool – A first version



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Description

Digital slides, theory, worksheets, exercises available to students

Advantages:

- Efficient way to reach a large number of students
- No class time
- Hard to be presented only once and can be reused and shared internally

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- The online resources need to be developed

The personal development process

Try to think of how you can implement the PDP steps in your intervention.



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- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Peer or self-assessment

Description

In peer or self-assessment students evaluate their peers and/or their own competencies

Advantages:

- Embedded in a course
- Can include all types of competencies
- Can be used cross-course

Disadvantages:

- Implicit personal development process
- Can be influenced by team dynamics or social desirability

The personal development process

Try to think of how you can implement the PDP steps in your intervention.



The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

The e-portfolio

Description

An e-portfolio is an online tool to monitor progress throughout a longer period.

Advantages:

- Applicable to many different courses
- No class time needed for a short introduction
- Short time investments from the student

Disadvantages:

- Need for an online platform
- Can be difficult to evaluate

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan
- Monitor the learning process
- Reflect on the process and what to learn

The lifelong learning competencies

- Locating and searching information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Role-playing exercise

Description

In role-playing students mentor each other on their personal development process.

Advantages:

- High intensity guidance is more likely to be effective
- Smaller time investment than discussion but with individual mentor guidance
- Can be easier to see up to a peer than to a lecturer

Disadvantages:

- Requires an effort from the students
- Difficult to assess

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan

Digital storytelling

Description

In digital storytelling images, audio and/or videos are used to present a process.

Advantages:

- Applicable to many different courses
- Includes time needed for a short introduction
- Triggers other competences than a regular essay or other writing exercise

Disadvantages:

- Can be difficult to assess
- Evaluation can be time consuming

The personal development process

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The lifelong learning competencies

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- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Reflective journals or logs

Description

Reflective journals or logs contain short reflective exercises throughout a longer period.

Advantages:

- Applicable to many different courses
- No class time except for a short introduction
- Short time investments from the student

Disadvantages:

- Requires individual investment from the student
- Can be difficult to evaluate

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan

Sessions or lectures

Description

In sessions or lectures theory is presented to a group of students.

Advantages:

- Efficient way to reach a large number of students
- Share large amounts of content
- Usually not mandatory

Disadvantages:

- The lecturer needs knowledge on the subject
- Passive way of learning

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

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- Prepare a plan for learning
- Act by executing the learning plan
- Monitor the learning process
- Reflect on the process and what to learn

The lifelong learning competencies

- Locating and searching information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Reflective essays

Description

Reflective essays are a writing assignment on one or a couple guiding reflection questions.

Advantages:

- Applicable to many different courses
- No class time except for a short introduction
- Practical writing competences

Disadvantages:

- Longer time investment
- Can be difficult to evaluate

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan

Online resources

Description

Digital slides, theory, worksheets, exercises available to students

Advantages:

- Efficient way to reach a large number of students
- No class time
- Have to be prepared only once and can be reviewed and shared instantly

Disadvantages:

- Insufficient or optional
- The online resources need to be developed

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

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Description

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- Embedded into a course
- Can include all types of competences
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Disadvantages:

- Individual personal development process
- Can be influenced by team dynamics or social desirability

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Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan
- Monitor the learning process
- Reflect on the process and what to learn

The lifelong learning competencies

- Locating and searching information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Student-centred teaching

Description

Student-centred teaching focuses the focus of learning shifts to the student, for example PE

Advantages:

- Embedded into a course
- Training of many different competences
- Away present in most programmes

Disadvantages:

- Individual personal development process
- Usually working with already a set of different elements, competences and assignments

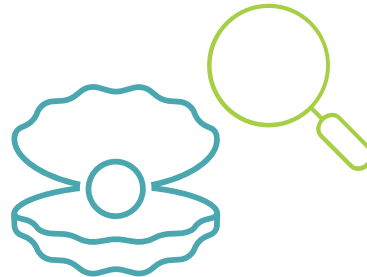
The personal development process

Try to think of how you can implement the PDP steps in your intervention.

- Identify strengths and weaknesses
- Prepare a plan for learning
- Act by executing the learning plan



Interesting findings?!



TRAINeng PDP

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TRAINeng PDP

Training engineers for lifelong learning
through a personal development process

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APPENDIX B – Notes and Feedback from Workshop Participants in specific interventions

Student-centred teaching

Description

In student centred teaching the focus of learning shifts to the student, for example PBL.

Advantages:

- › Embedded into a course
- › Training of many different competencies
- › Already present in many programmes

ADVANTAGES

- Meets the students where they are
- Aligns with employability skills
- Educator is made more aware of struggling students

Disadvantages:

- › Implicit personal development process
- › Usually a setting with already a lot of different elements, competencies and assignments

DISADVANTAGES

- Different engagement based on student's prior experience could lead to loss of impact
- Attendance is required but could be weak

The personal development process

Identify strengths and weaknesses

- Use self and peer assessment and repeat after phases e.g. every 2 weeks. This allows for recognition of prior learning and allows the identification of knowledge gaps
- Self-assessment regarding key competencies and group dynamics
- Personality/teamwork test – what can everyone bring? Which perspectives?
- Learning outcomes – SWOT focused on these
- Content test (for maths)
- Identify gaps in knowledge based on the learning outcomes of the module

Prepare a plan for learning

- Create a learning plan, Plan “how to learn”
- SMART goals – how do you go about problem framing (who/what do you need?)?
- Students use results from “identify” to set own goals
- Topic analysis/surveys to identify needs gaps
- Brainstorming
- Co-create learning materials list (books, podcasts etc)
- List how you currently learn and link this back to the personality test

Act by executing the learning plan

- Act on plan in class and collect material on how to approach the problem
- Attend lectures
- Video knowledge synthesis
- Milestone reflections on goal achievement – logbook/journal online with weekly/ bi-weekly submission
- Map of skills

Monitor the learning process

- Self-assessment on the Process itself. I.e. get them to reflect on how they performed in the self-reflection task via peer review
- Test yourself, and compare to others / the teachers (teammates reflections, staff notes on submissions)

Reflect on the process and what is next

- Compare the problem frame and attitude towards complexity to start
- Look to the future – what's next, and reflect on the learning process – what have they learned about complexity and positionality, can they set SMART objectives for the next academic year to then reflect on in may of next year
- Have these students create the learning material for the new students as a starting point to help reflection and learning
- Comparison / reflection on outcomes from “monitor” step

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan

Willingness, motivation and curiosity to learn

- Self-reflection

The e-portfolio (Group 1)

Description

An e-portfolio is an online tool to monitor progress throughout a longer period.

Advantages:

- › Applicable to many different courses
- › No class time except for a short introduction
- › Short time investments from the student

Disadvantages:

- › Need for an online platform
- › Can be difficult to evaluate

Why did you choose the e-portfolio?

- The portfolio chose me (using the flowchart)
- We already use a basic portfolio (professional portfolio)
- It can be used to compile all experiences at the end of a programme and use them for job applications or to create a cv (= advantage)

A disadvantage: difficult to motivate students for a longer period of time. An essay f.e. is easier because you only have to motivate them once.

The personal development

Try to think of how you can implement the PDI steps in your intervention

Identify

- Job applications: rate yourself on competencies that are used in a job application that is interesting for you OR think about what skills you think an engineer would need and then compare to job applications.
- Use a map of competencies to let students choose a competency. This gives them more guidance ([example from feelings](#)).

Prepare

Prepare the learning activity

- Let them look for a course. Following the idea of using job applications, you can also work specifically with linkedIn courses
- Study plan, one action you are going to take

Act

Act on the plan

Importance of motivation

Monitor

Monitor the learning process

Reflect

Reflect on the learning process and what is next

- Go back to the job applications
- What have you learned from this course? Would you recommend it to the other students?

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

The e-portfolio (Group 2)

Description

An e-portfolio is an online tool to monitor progress throughout a longer period.

Advantages:

- › Applicable to many different courses
- › No class time except for a short introduction
- › Short time investments from the student

Advantage:

- You have a more explicit reflection of what students want and do, not only reflections of specific parts/competencies
- Creates option for individual learning

Disadvantages:

- › Need for an online platform
- › Can be difficult to evaluate

Disadvantage:

If you have an online platform, this is not a disadvantage. Tip :

check <https://mahara.org/>

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

Identify

strengths and weaknesses

- Identify crisis points, interview themselves
- Read job advertisements; identify skills a present it on posters. The posters can be on the walls so that the students can see these skills the whole time.

Prepare

a plan for learning

- Link with self-assessment
- Link with the programme
- Look for actual events where something happened --> what could your role as an engineer be?

Act

by executing the learning plan

- SWOT analysis: what are you doing now? What later?

Monitor

the learning process

- Prepare collect the plannings more on an individual basis

Reflect

on the process and what is next

- Act/Monitor current gap. Need for advisors in the groups to monitor the process is often missing

- Reflection after the projects.
- Credits help to encourage the reflection process
- Works better if you can build further on previous projects

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Prepare portfolios for (after) graduation

→ Depends on the student. Is quiet subjective in most of the times due not well supported prepare/act/monitor phase

Reflective journals or logs

Description

Reflective journals or logs contain short reflective exercises throughout a longer period.
Advantages:

- › Applicable to many different courses
- › No class time except for a short introduction
- › Short time investments from the student-teacher

General instructions:

- Give language for identification / reflection
- Create safe space & build trust
- Give detailed instructions / examples (especially when logs are a new thing)

Disadvantages:

- › Require sustained investment from the student
- › Can be difficult to evaluate ← challenging indeed

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

Identify
strengths and weaknesses

Use prompts (e.g. digital polling tools) to invite ideas and illustrate that there are no right and wrong answers
Have students interview each other → reduce the white paper syndrome

Prepare
a plan for learning

Connect to practical/concrete goals: pick one thing you want to develop

Act
by executing the learning plan

Connect a reflective journal and a practical project → identify & prepare parts in a log & execution during a project, monitoring and reflection in a log

Monitor
the learning process

Johanna's afterthoughts:
Reflective journals seem to work well for the thinking part (identify, prepare, monitor, reflect) but might need some other framework (individual or group project, specific learning task etc.) to concretize and invite the action

Reflect
on the process and what is next

Engineering students are not very used to expressing their thoughts on writing → good instructions and activity-based prompts useful to facilitate thinking

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Mentor guidance

Description

Mentor guidance is the individual coaching of students' personal development process. Advantages:

- › High intensity guidance is more likely to be effective
- › Creates a closer relationship between lecturer and student
- › Can be easier to address problems than in written form

Disadvantages:

- › Large time investment from lecturer
- › Requires specific competencies from the lecturer

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

Identify
strengths and weaknesses

Questionnaires, peer assessments, +/- ambitions, norms, values, identity

Prepare
a plan for learning

Create socially safe environment

Act
by executing the learning plan

Students can share personal experiences, mentors step back and let students interact

Monitor
the learning process

Reflect
on the process and what is next

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection

Role-playing exercise

Description

In role-playing students mentor each other on their personal development process.
Advantages:

- › High intensity guidance is more likely to be effective
- › Smaller time investment from the lecturer than with individual mentor guidance
- › Can be easier to open up to a peer than to a lecturer

Disadvantages:

- › Requires an effort from the students
- › Difficult to assess

The personal development process

Try to think of how you can implement the PDP steps in your intervention.

Identify
strengths and weaknesses

Prepare
a plan for learning

Act
by executing the learning plan

Monitor
the learning process

Reflect
on the process and what is next

1. Self-assessment (written format)
2. Group presentation about past experiences, strength and weaknesses presenting which role they would prefer to play
3. Discussion and role assignment
4. Role assignment and periodical evaluation
5. Self-evaluation – written format

The lifelong learning competencies

- Locating and scrutinizing information
- Self-monitoring
- Creating a learning plan
- Willingness, motivation and curiosity to learn
- Self-reflection