Reflective diaries

A tool for promoting and probing student learning

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The reflective diary as a method for the formative assessment of self-regulated learning

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ABSTRACT
An increasingly desired outcome of engineering education is the ability to engage in self-regulated learning (SRL). One promising method for the formative assessment of SRL is the reflective diary. There is, however, a paucity of research on the use of reflective diaries in engineering education. To mitigate this gap, we report on a case study where reflective diaries were implemented in a master's course on tissue engineering. The objective of this paper is to explore the potential of reflective diaries for the formative assessment of three central aspects of SRL: conceptions of knowledge, conceptions of learning, and strategies for monitoring and regulating learning. Based on a theoretical thematic analysis of the diary entries, we show that reflective diaries can be used to assess these three aspects of SRL. We discuss ways of providing feedback to students, with a focus on dialogic feedback.

Creating Responsive Learning Environments to Develop Students' Reflective Capacity

Patric Wallin,[1] Jonathan Reams,[2] Sven Veine,[3] and Martha Kalvig Anderson[4]

Abstract: In today's society, rapidly changing conditions and expectations mean that students need to learn how to make reflective judgments, and there is a clear need to better understand how to create learning environments that scaffold student learning to make these judgments. Here, we explore the design of a learning environment that integrates an computerized scoring system into a large scale course to provide students with formative assessment of their cognitive complexity level. We discuss important aspects to consider when framing and integrating this technology and how the deployment allows for formative assessment practices in large scale courses found in today's education.

Keywords: Cognitive ability, higher education, learning environment, metacognition, scaffolding.

Reflective diaries – A tool for promoting and probing student learning

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ABSTRACT

For engineering students to be able to effectively solve problems in their future professions, it is essential that they become self-regulated learners and learn to reflect on their own learning using metacognitive strategies. One way to promote this is to introduce reflective diaries as a writing tool for students, and give them weekly prompts to reflect upon. These prompts should stimulate reflections on learning content and learning behavior, in order to help students in becoming self-regulated learners. In addition, reflective diaries allow for in-depth probing of student learning and can be used as a research method to better understand students' learning processes. In this case study, we describe and evaluate the implementation of reflective diaries in a project-based undergraduate course at Chalmers University of Technology, based on diary entries and individual interviews with the students. We explore the potential of reflective diaries for promoting and probing student learning, as well as offer research-based guidelines for implementing reflective diaries in undergraduate courses.

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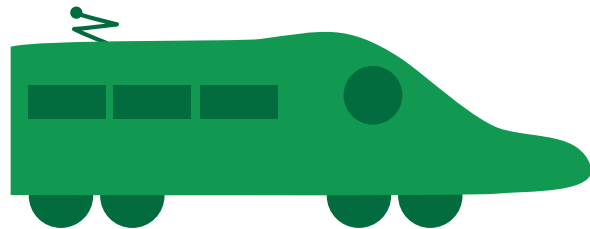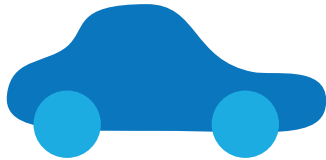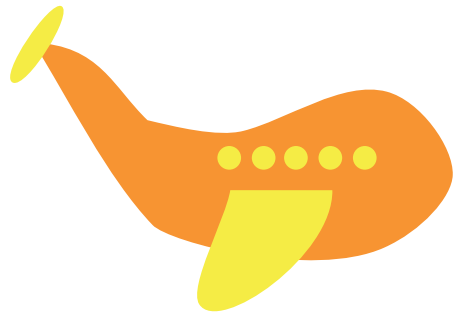International Journal for Academic Development

Reflection as a core student learning activity in higher education - Insights from nearly two decades of academic development

Sven Veine, Martha Kalvig Anderson, Nina Haugland Andersen, Thomas Christian Espenes, Tove Bredesen Søyland, Patric Wallin & Jonathan Reams
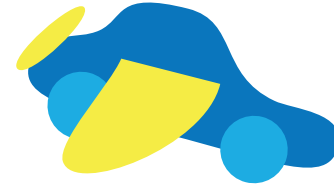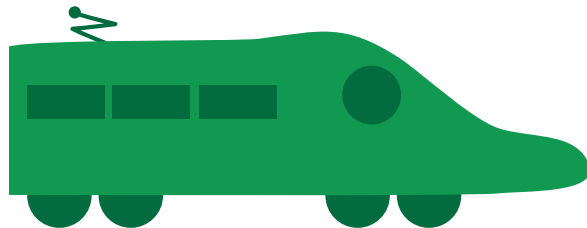
Teaching
Today

Teaching Today **to help students to** **solve problems of Tomorrow**
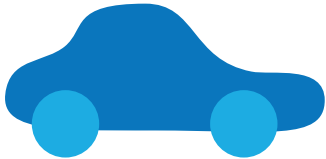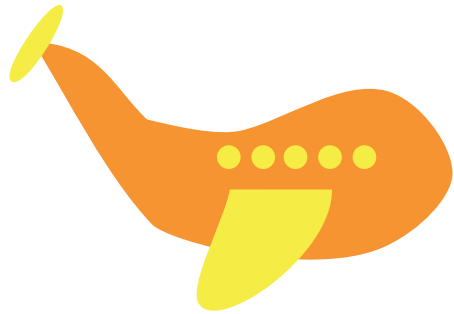
New Technologies

Different cutural norms values

Changed policies

Altered demands and desires

New restrictions
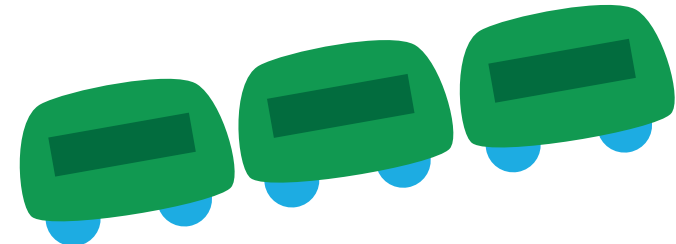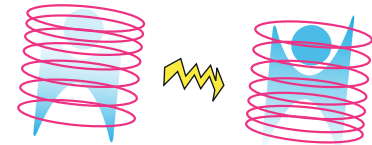
Engineering Education

Active learning

Contextual learning

Lifelong learning

Self-regulated learning

Cognitive strategies

Motivational strategies

Inductive teaching methods

Critical thinking

Problem solving

Inquiry-based learning

Metacognition
Reflection

Problem-based learning

Project-based learning

CDIO

Promoting and Probing:
The twin dimensions of reflective diaries
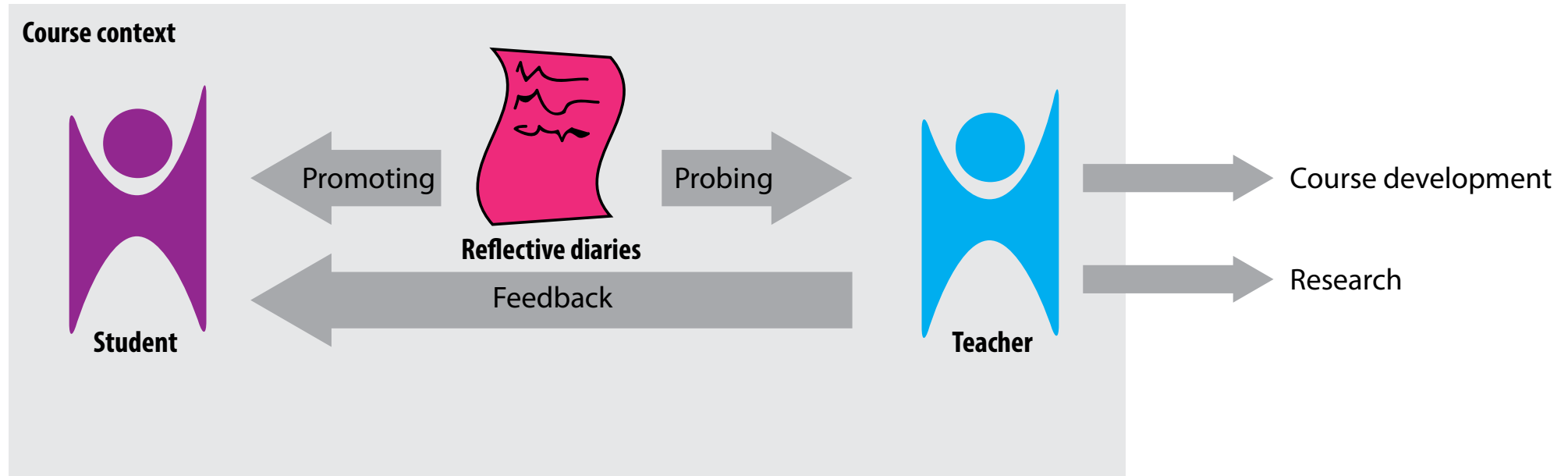
CASE #1 – Tissue engineering course

Reflective diary design

Tissue Engineering course 2014

Course start

Project planning
report & presentation

Final project
report & presentation

w1 w2 w3 w4 w5 w6 w7 w8 w9 w10 w11 w12 w13 w14 w15 w16 w17 w18

Reflective diaries

Reflective diaries

**Individual
Interview**

**Individual
Interview**
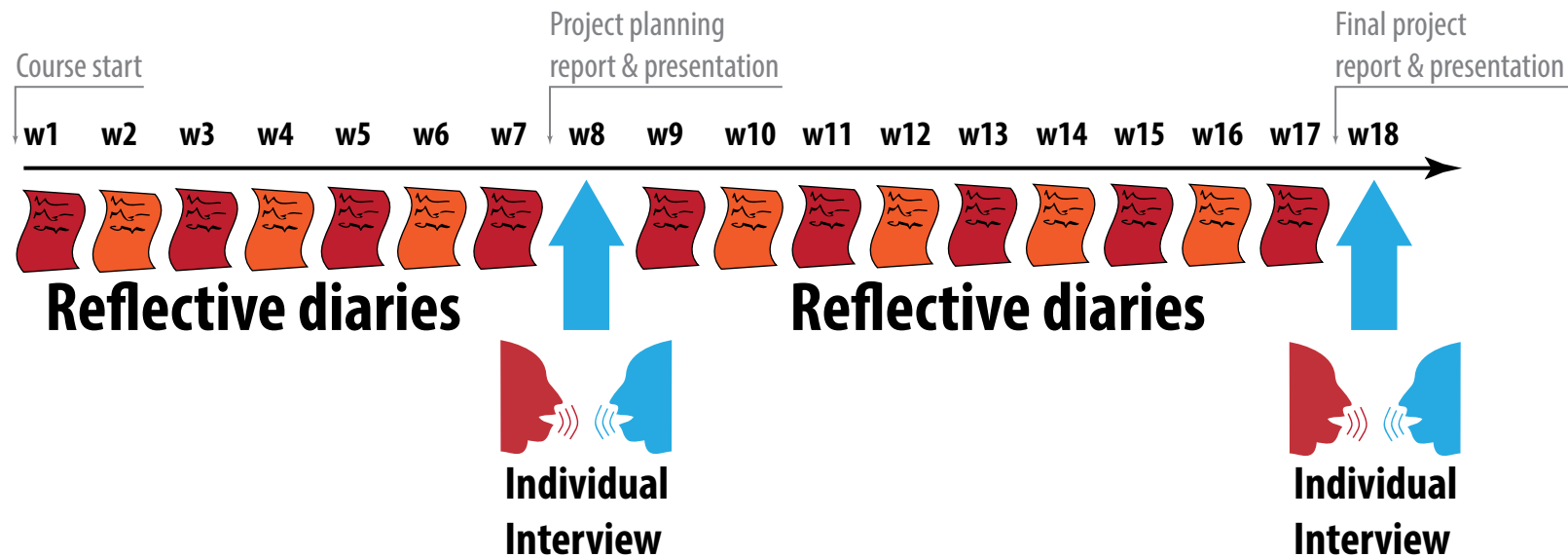
General prompts on learning experiences and challenges

Specific prompts related to project phases

CASE #2 – ELSYS
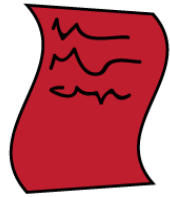
1. Semester　　**2. Semester**　　**3. Semester**　　**4. Semester**

Reflections

Themes:

Ingeniørfag som yrke
Du som blivende sivilingeniør

CASE #2 – ELSYS

Engineering as a profession

- How would you describe what an engineer does for a job?
- What are their most important skills and competences in your opinion?
- Why do you think these skills and competences are central for engineering?

You as a becoming engineer

- How do you think the first semester in the ELSYS program can help you to take a step towards becoming an engineer?
- What do you anticipate being important for you in the process?
- What do you think you will need to do to get the most out of the first semester?
- Why do you think these things will be important?

Reflective diary prompt design

Identify topic of interest coupled to:

Different phases within a project

Things you pick-up in students discussions

Generic aspects of learning

General concepts of importance for your course

Reflective diary prompt design

Identify topic of interest coupled to:

Different phases within a project

Things you pick-up in students discussions

Generic aspects of learning

General concepts of importance for your course

Four general categories of question to cover:

What has happened?

How did you approach the situation?

Why is it important?

How did you learn from it?

Reflective diary prompt design

Identify topic of interest coupled to:

Different phases within a project

Things you pick-up in students discussions

Generic aspects of learning

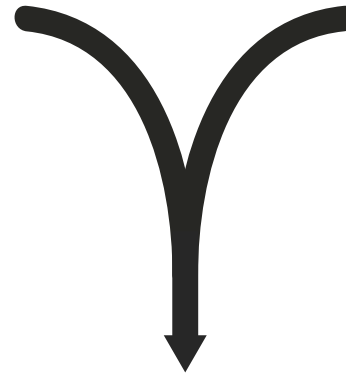General concepts of importance for your course

Four general categories of question to cover:

What has happened?

How did you approach the situation?

Why is it important?

How did you learn from it?

Design of specific prompts (examples):

General prompts on learning experiences and challenges

This week's learning experience
What was the most important thing you realized this week?
Why do you believe it is important?
What made/helped you to realize this?
What can you do to create more such learning experiences?

This week's challenge
What was the greatest challenge this week?
Why was it challenging?
How did you approach this challenge?
In what way was it important for your progress?
Would you approach it in the same way again or differently?

Specific prompts related to project phases (one example)

Learning from the scientific literature
What was the most difficult part of getting information from the scientific literature related to your project?
Why was it difficult and how did you approach the challenge?
How did you work with the literature?
What was your main learning outcome from reading the scientific articles?
Why do you think literature search and review is important?
How do you think this will help you throughout the project?

Promoting	Reflective Diaries	Probing
Planning	"What has happened?"	Awareness
Cognitive strategies	"How did I approach it?"	Support & Scaffolding
Evaluation	"Why is it important?"	Motivational factors
Future use	"How did you learn from it?"	Transfer

Promoting	Reflective Diaries	Probing
Planning	**"What has happened?"**	**Awareness**
Writing the reflective diaries helps the students to identify and become aware of the challenges they are facing, as they need to think through them and write about them. They need to analyze their current situation, in order to be able to plan their actions.	*One of the biggest challenges when starting a new project is to classify the information, due to the large amount of information that exists on the network, it is important to classify and select the ones that are relevant to our project.*	The reflective diaries can help teachers to become aware of the challenges that students experience during a project. This information can be helpful to design appropiate scaffolding of the students learning process and provide the right support to them.
Cognitive strategies	**"How did I approach it?"**	**Support & Scaffolding**
Evaluation	**"Why is it important?"**	**Motivational factors**
Future use	**"How did you learn from it?"**	**Transfer**

How do the students experience writing the reflective diaries

Purpose

"At the beginning, I thought about it like an assignment I did not know what to write. Later on when I had a real problem then it helped."

Personal preference

"For me it is difficult to write these kind of things. I prefer to write more specific things. For example "what did you feel" and these things, it feels a bit strange to write about them. I do not know what is the question. What you are looking for. I understand that you are not looking for any specific answer, but it is still strange."

Cultural background

"In my country people often do not care what you think, but here (Sweden) it is different. Here people want to know your opinion and point of view. I think this is good. This is the way to get a lot of ideas and change things if needed. To make it good for everybody."

Variation

"There were some weeks where the questions were very similar to the questions the week before, so I do not know what to write."

Feedback

"And I was looking forward you bringing up some quotes [during the feedback session]. I thought you were going to do that."

Conclusions

1. Students need to learn to reflect and practice it

2. Students appreciate and see the value of reflecting once they start doing it

3. Reflective diaries do promote the development of metacognitive abilities

Important to consider

- Explain the purpose of reflective diaries
- Create an environment that allows for free reflection
- Show that the students that you listen and care
- Be critical reflective yourself and show it to the students
- Have some variation in your prompts
- Design your prompts carefully -> What - Why - How - Future
- There will be a large variation between students
- Know your students and work together with them