

Nordic countries' approach to learning analytics

COURSE DIARIES

One's reflection is others' feedback



WHAT WE COVER TODAY

- Project background
- The product presentation
 - Links to theory and practice
 - Teacher perspective
 - Student perspective



FACULTY OF EDUCATIONAL SCIENCES

How did I end up here?



BACKGROUND: ONLINE LEARNING PROJECT INITIATIVE

From an idea to a product (2016-2020)

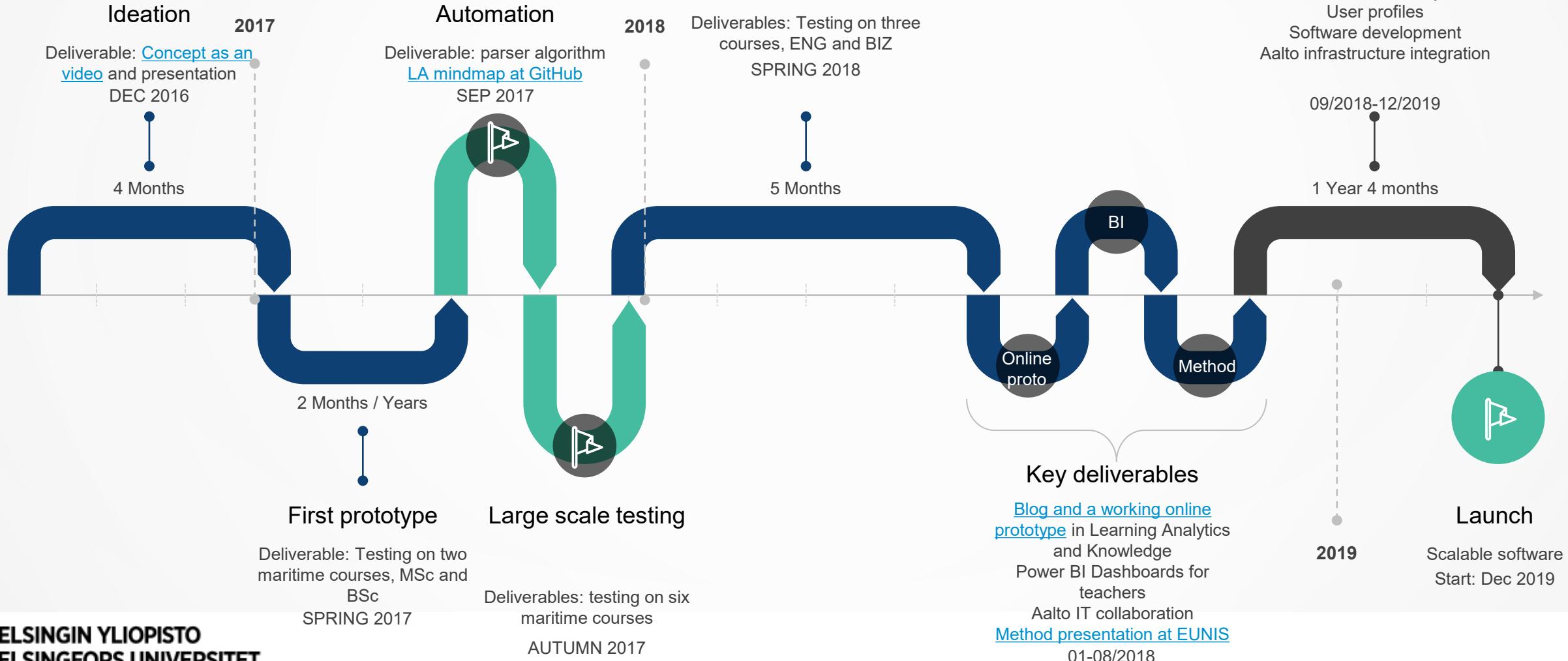
Personalized learning brings solid results





PRODUCT DEVELOPMENT ROADMAP

BIZ Collaboration





Word from Project Owner

Jani Romanoff

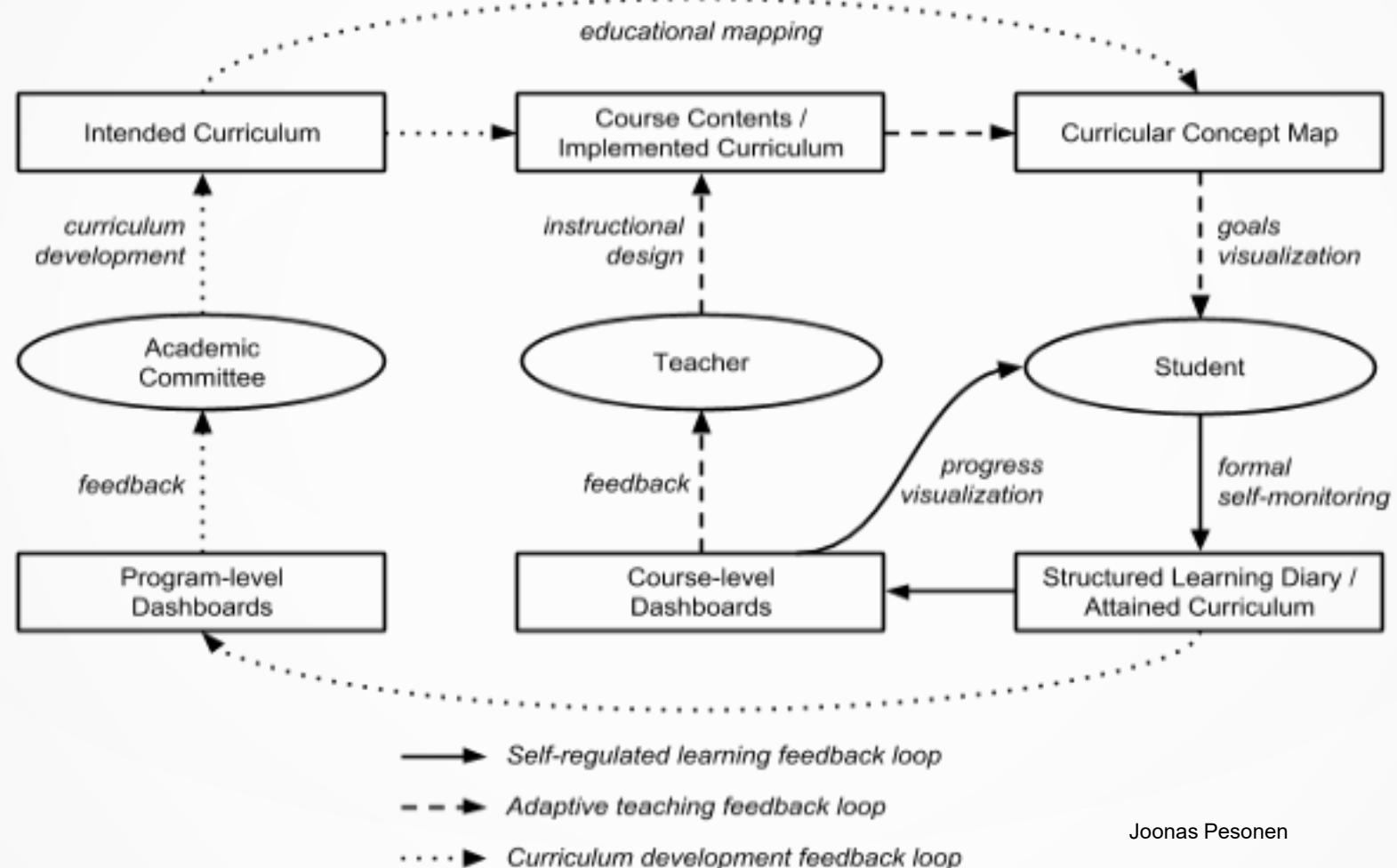
The idea of the project was to enable each teacher to identify the possible well-being issues in their course by utilizing the Aalto Course Diaries and dynamic course feedback. This allows teachers to interfere with the problems at early stages, before they escalate to major issues. This is believed to help on student wellbeing by reducing the stresses from individual courses which may accumulate over several course and negatively affect the wellbeing due to studies.



DYNAMIC FEEDBACK SYSTEM

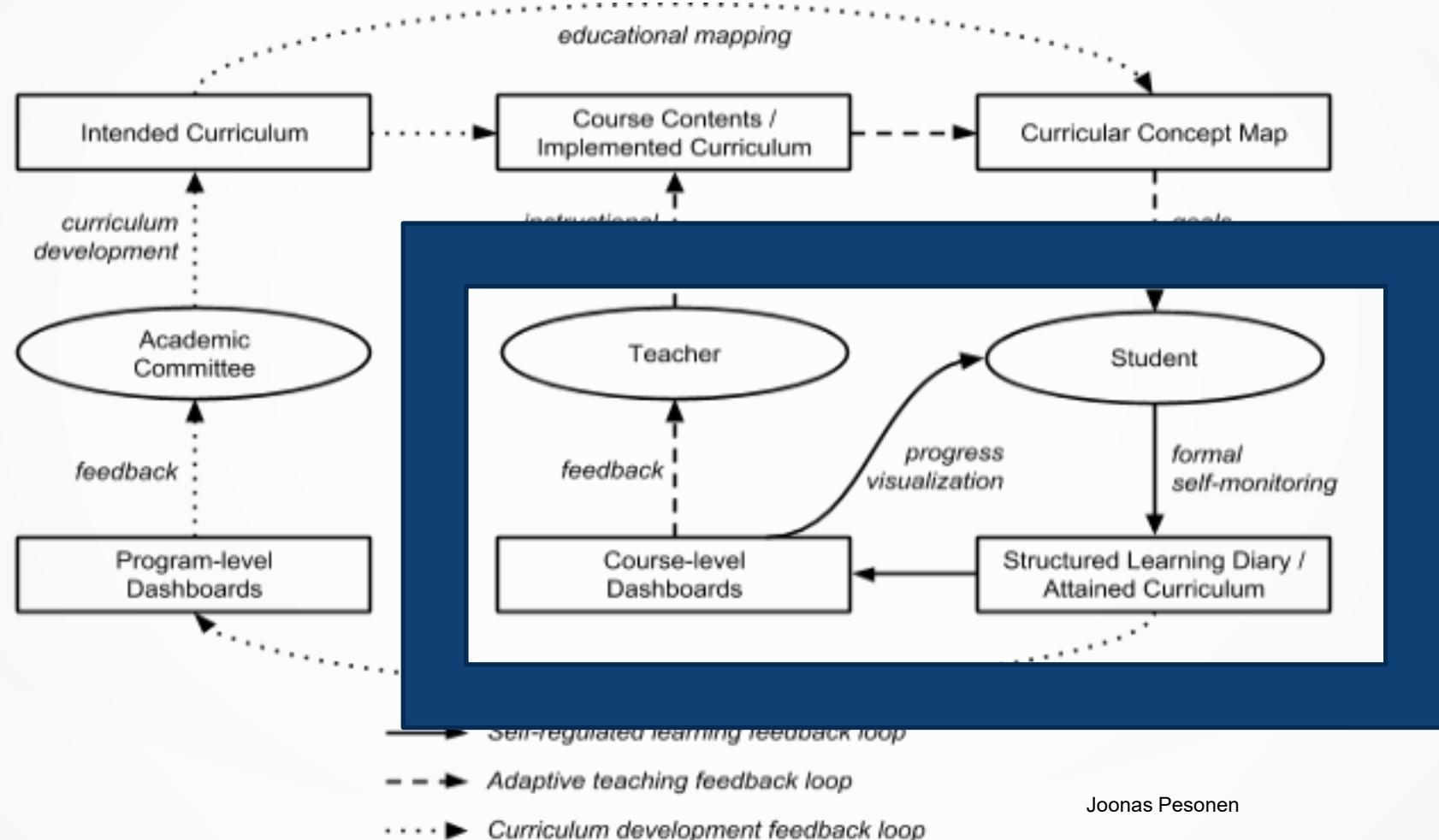


DYNAMIC FEEDBACK SYSTEM (DFS)





DYNAMIC FEEDBACK SYSTEM (DFS)





**LEARNING RESULTS FROM WHAT THE STUDENT DOES AND THINKS
AND ONLY FROM WHAT THE STUDENT DOES AND THINKS. THE
TEACHER CAN ADVANCE LEARNING ONLY BY INFLUENCING WHAT
THE STUDENT DOES TO LEARN.**

HERBERT A. SIMON



THEORETICAL PERSPECTIVES

- Alignment in course setting
 - Memory
 - Sensemaking
 - Valuing metacognition
- Adaptive learning and adaptive teaching
 - (openness in) Feedback
 - Integrative learning experience
 - Wellbeing



TECHNICAL PERSPECTIVES

- Mindmapping
- Structured learning diary
- Curriculum mapping
 - Dashboards
- Curriculum visualization
 - Experience data
 - MyData



AaltoCourseDiaries

Assess your learning experience

A?



Structure

[>Main](#)

Courses

Here are listed your current courses. However, in this beta version here are courses that are piloting this application. Open the course you are instructed to interact with.

COURSE 37C00100

Management Information Systems

[View Topics](#)

Aalto-yliopisto
Aalto-universitetet
Aalto University

[Courses](#)

TOPIC 2

Assignment: Business Technology Trends

[Assess Learning](#)

TOPIC 3

Collaborative IS and Knowledge Work

[Assess Learning](#)

TOPIC 4

Assignment: Electronic Brainstorming and Voting

[Management Information Systems](#)

...

TOPIC 2

Assignment: Business Technology Trends

[Previous topic](#)[Next topic](#)

Competence

Please select



Difficulty

Please select



Emotion



Excited



Relaxed



Neutral



Bored



Anxious



A?

◀ Management Information Systems

...

Expectations

My expectations/challenges towards this topic... (Shared with other students on course)

Notes

My notes... (For personal use)

Reflection

My thoughts and self-evaluation (Shared with course teachers)

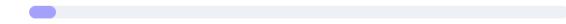
A?

◀ Courses

Topics

Learn better by assessing your learning. You can do this by opening a topic and reflecting your learning experience. You can change your selections at any time. Actually, that's the point!

5 % completed



TOPIC 1

**Introduction to
Management Information
Systems**

Learning Assessed ✓

TOPIC 2

Main mobile app functions

Student can see his/her current courses

Links to course page in MyCourses, Oodi and link to courses.aalto.fi

Student can drill down to see topics taught on the course

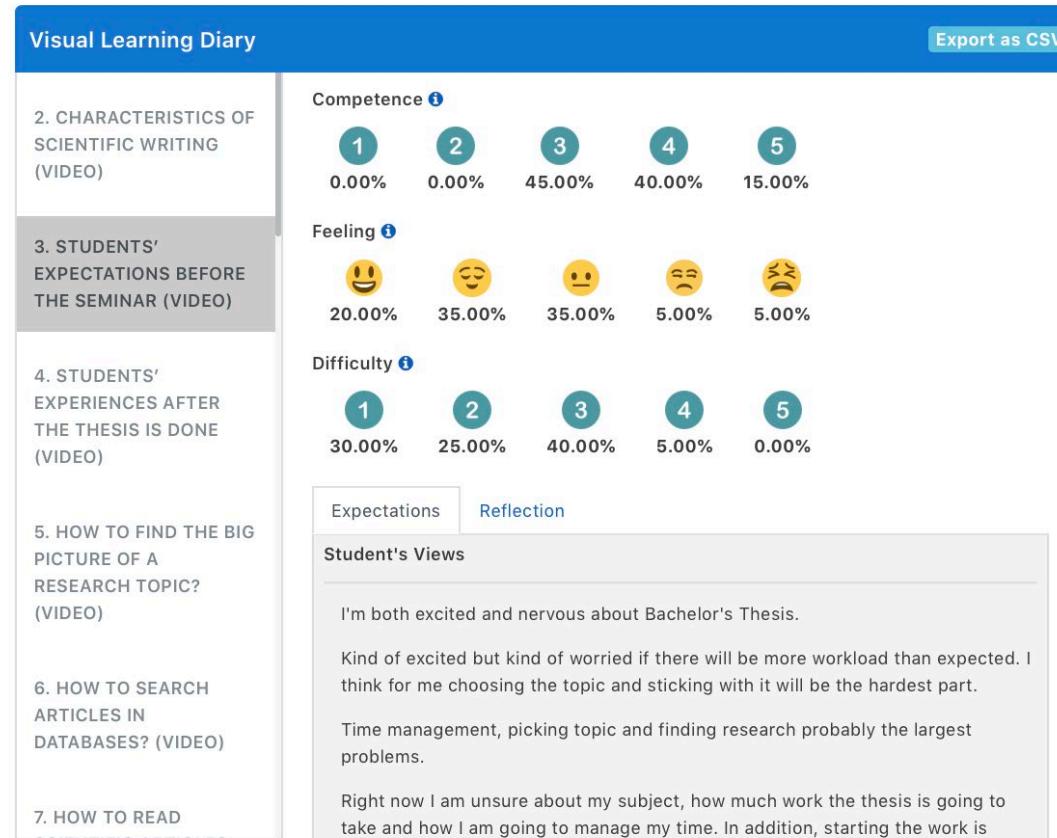
On each topic, student can assess

- *Competence*
- *Difficulty*
- *Feeling*
- *Write about his/her expectations on the topic*
- *Notes on the topic*
- *Reflections on the topic*

Bachelor's Thesis Seminar, 21.01.2020-19.05.2020

Assignments Choices Dynamic Feedbacks Forum

99902 - bachelor's thesis seminar / Course home page / visual learning diary



Teacher's experiences

What were your goals?

- I wanted to know what's happening on my course students' heads. I think it's important to get some kind of response during the course from students. Do they think they are learning or not? I was also interested in reading about their expectations. That really helps to prepare for the lectures when you already know what students are thinking about the topic you're going to be talking about.

Teacher's goals continue...

- Immediate feedback during the course
- Compare expectations with final opinions
- Hands-on touch on my students approach to the course
- Does my teaching have any effect?
- Improve deep approach learning on my course
- Get almost real-time feedback from lectures and assignments

What changed on your course?

- I managed to change contents or to re-address some topics. As well as to identify a critical situation with one student very early.
- Students increase their self-awareness and have a conscious relation with the study materials (comparing to just gliding through without any second thought at all).
- All in all, I found the tool extremely useful as I was able to re-visit the topics that students felt most nervous/unsure. Especially the "emotions" part proved extremely useful in this as I was also able to show students that they are not alone in this feeling.

Did ACD have effect on your regular course feedback?

- I didn't experience any effect.
- I think it impacted positively the course feedback cause I addressed problems earlier, without waiting for the end of course feedback.
- Far more accurate and useful information especially when maintained as a quick and light checkpoint. The regular course feedback system is pretty useless, because it's too generic.
- Haven't received the course feedback yet. All in all, students seemed to think the Course Diaries was an easy system to use, but needed clear instructions (where to answer and when, and from what perspective).

I recommend this should be used...

In every course where they are the **responsible teachers** who also conduct most of the teaching sessions: in this way they can truly **react to the Course Diary feedback** and re-visit topics that were too difficult at first time/need clarification. Course Diary does not work on the courses where responsible teacher just plans the course schedule beforehand and someone else does the teaching/advising of labs etc. as in this case it would be far too stressful for the "teacher conducting the teaching" as he/she would get feedback but is not able to act on it. **In mass courses** - where there are for example parallel exercise or lab sessions conducted with various course assistants- I would suggest using **Course Diary only for lectures where the responsible teacher is actually teaching**; for example if certain topic taught this week is found difficult (based on Course Diary) teacher has the possibility to plan and adjust the following week, e.g. **can take 10-15 mins from next week's lecture and explain the most important concepts of this difficult topic again**. In order this to be possible, teacher must be also the **one who has the power to make this decision**, i.e. he/she is the responsible teacher **and is also the one conducting the teaching in the parts that are selected to Course Diary topics**.

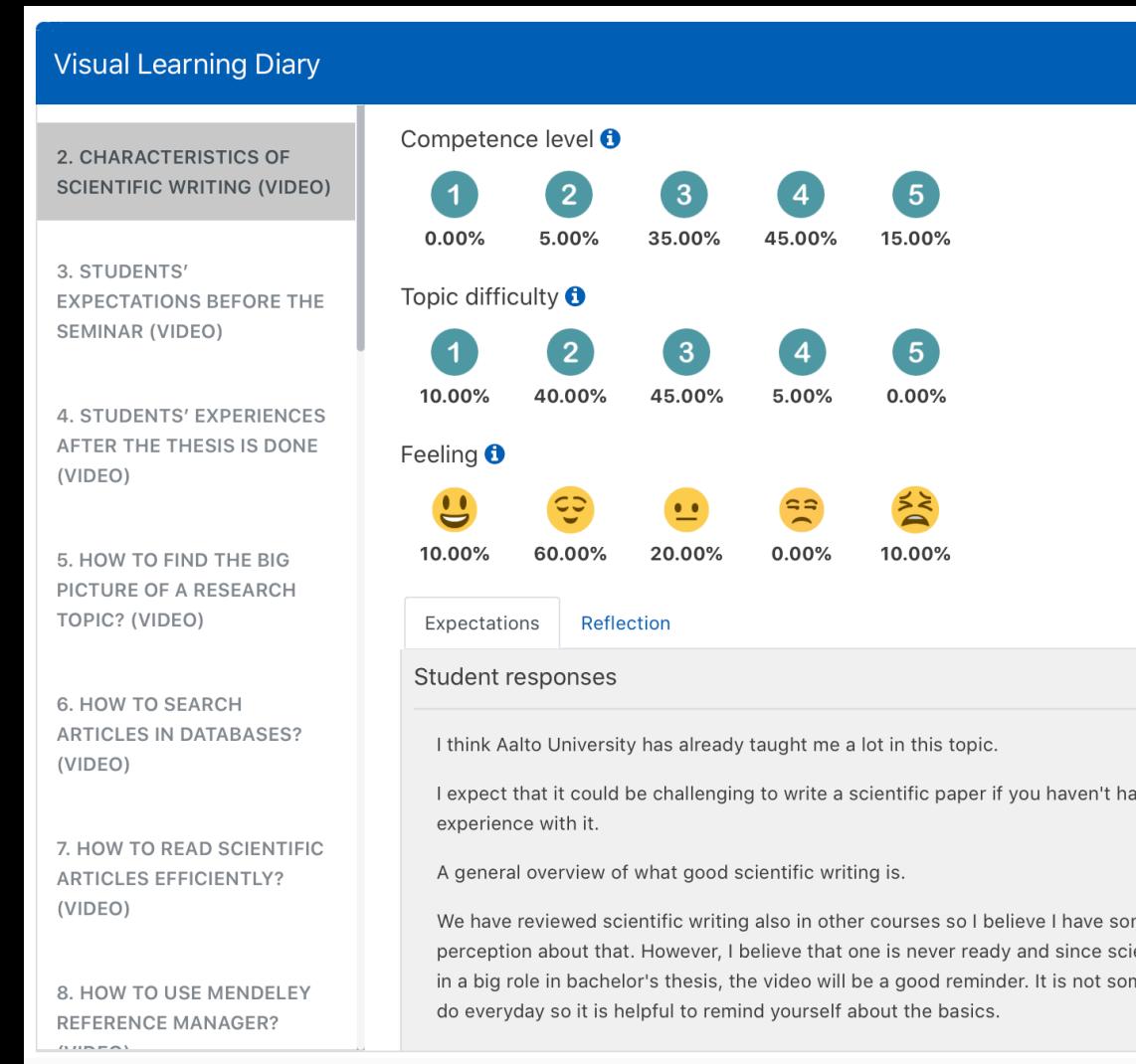
I recommend... continue

- great tool for situations where you want to know what's happening
- Getting better prepared for the lectures
- The both course diaries and course feedback are required. They are working in different time span.
- This is important since interaction between teacher and student is very important and limited e.g. in remote teaching.
- When formative feedback discussions are not otherwise easy to organize.
- courses that contain a challenging element and you want to engage your students to perform to the best of their abilities and also take responsibility of their own learning
- If you require that students watch videos, it is a good way to ensure that they really watch them, by requiring course diary entries from each.

The tool lists student's courses and their intended learning outcomes as simplified short topics.

On each topic, a student can assess his/her learning experience weekly through

- **three fixed scale items**
 - competence, difficulty, feeling
- **three open-response items:**
 - expectations, notes, reflection
- **Summary views for teacher and participating students**



Teacher's aims and results on tool

Aims	Count	Results	Count
Student monitoring	5	Adapted course content	4
Preparing for teaching	4	Insights	3
Promoting deeper learning	2	Teacher's metacognition	2
		Student's thinking	1

Effects on regular feedback and teacher's recommendations for future use of the tool

Effect on regular course feedback	Count	Results	1	2	3	4	5	6	7
Positive effect	4	Cognitive Support (CS)	X	X	X	X	X		
Extremely positive	2	Presentation al Support (PS)			X	X			X
No effects	1	Communication Support			X		X	X	
		Mixture (CS plus PS)		X	X				

Summary

- **Technology + education = better learning, especially in feedback activities**
- **Best is to combine cognitive and presentational support**
- **Teachers are now demanding tools to see how their students are learning (and feeling)**
- **Giving teachers free hands to use the tool yeilded positive versatile results**
- **Tool use was probably not optimal for all teachers → training / workshops needed?**

Student perspective

Usability assessed

[--] findings showed that having this new **dynamic way of giving feedback** and for some students, a new way of **assessing their own learning**, is **welcomed by students**. It has **many positive aspects**, at least compared to traditional, very static way of giving feedback. In addition, having the Aalto Courses -app on this course **showed to the students that the responsible teacher cares about the feedback and highly appreciates students' opinions** in developing the course further. For students, their **voices and experiences being heard**, is **one of the key things for them to feel satisfied** with the course and **could possibly also motivate** them in learning and lead to better learning results.

Tiina Haato, Master's thesis, School of Business, 2019.

Ways of collecting data matters

Table 11: Sharing data with teachers

Statements (sharing with teachers)	Average score (5= strongly agree, 1=strongly disagree)
1. In general, I am willing to share data with my teachers on my competence in course topics when self-assessed	4,57
2. In general, I am willing to share data with my teachers on my competence in course topics when recognized from my digital footprint	4,38
3. In general, I am willing to share data with my teachers on my emotions during learning when self-reported	4,48
4. In general, I am willing to share data with my teachers on my emotions during learning when collected with facial expression recognition	3,14
5. In general, I am willing to share data with my teachers on my emotions during learning when collected with physiological sensors	2,67
6. In general, I am willing to share data with my teachers on my learning process when described in a learning diary	3,33
7. In general, I am willing to share data with my teachers on my learning process when recognized from my digital footprint	4,14

Table 12: Sharing data with other students

Statements (sharing with other students)	Average score (5= strongly agree, 1=strongly disagree)
1. In general, I am willing to share data with other students on my competence in course topics when self-assessed	3,86
2. In general, I am willing to share data with other students on my competence in course topics when recognized from my digital footprint	3,38
3. In general, I am willing to share data with other students on my emotions during learning when self-reported	3,67
4. In general, I am willing to share data with other students on my emotions during learning when collected with facial expression recognition	2,43
5. In general, I am willing to share data with other students on my emotions during learning when collected with physiological sensors	2,19
6. In general, I am willing to share data with other students on my learning process when described in a learning diary	2,19
7. In general, I am willing to share data with other students on my learning process when recognized from my digital footprint	3,29

Tiina Hahto, 2019



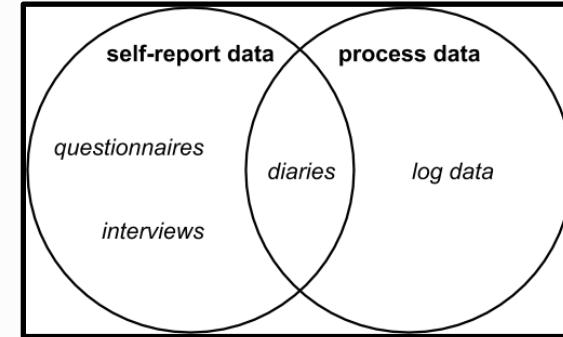
Self-regulated learning and epistemic cognition

Understanding learners' conceptual changes during learning is the key to enhance learning. With new education technology applications this can be done at scale. Future relies heavily on our capability to learn new things throughout our lives.

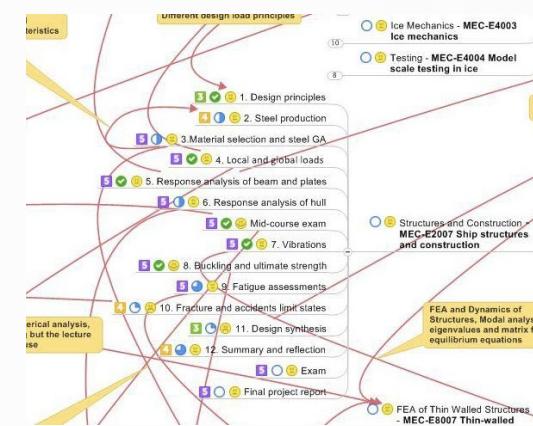
Higher level epistemic cognition is needed to understand complex phenomena with contradicting evidence and in new knowledge creation. Learner can regulate his/her actions. Epistemic cognition and self-regulatory skills can be taught and these skills predict academic achievement and success in work-life.

This research aims to better understand these cognitive constructs and utilize findings into learning analytics applications.

Wicked engineering problems need problem solvers that are equipped with higher level meta-cognitive skills. Through a new level of teaching informed by research and applications in meta-cognition, universities can produce even better problem solvers.



Diary type of data can boost new generation of instruction applications



Connecting new learning with previously learned enhances learning

Mobile applications offer a quick but powerful way for collecting meta-cognitive data.



FURTHER READINGS

Pesonen, J. A., Ketonen, E. E., Kivimäki, V., & Ihantola, P. (2020). Does Using Structured Learning Diaries Affect Self-regulation or Study Engagement? An Experimental Study in Engineering Education. In 2020 IEEE Frontiers in Education Conference (FIE 2020), Uppsala, 2020 (Frontiers in Education Conference : Proceedings). IEEE. <https://doi.org/10.1109/FIE44824.2020.9274163>

Kivimäki, V., Pesonen, J., Romanoff, J., Remes, H., & Ihantola, P. (2019). Curricular Concept Maps as Structured Learning Diaries: Collecting Data on Self-Regulated Learning and Conceptual Thinking for Learning Analytics Applications. *Journal of learning analytics*, 6(3), 106–121. <https://doi.org/10.18608/jla.2019.63.13>

Kivimäki, V., & Pesonen, J. (2019). *Dynamic Feedback System supporting self-regulation, adaptive teaching and program level curricular development*. 157-158. Learning Analytics & Knowledge 2019, Tempe, United States. http://solaresearch.org/uploads/LAK19_Companion_Proceedings.pdf



THANK YOU!

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