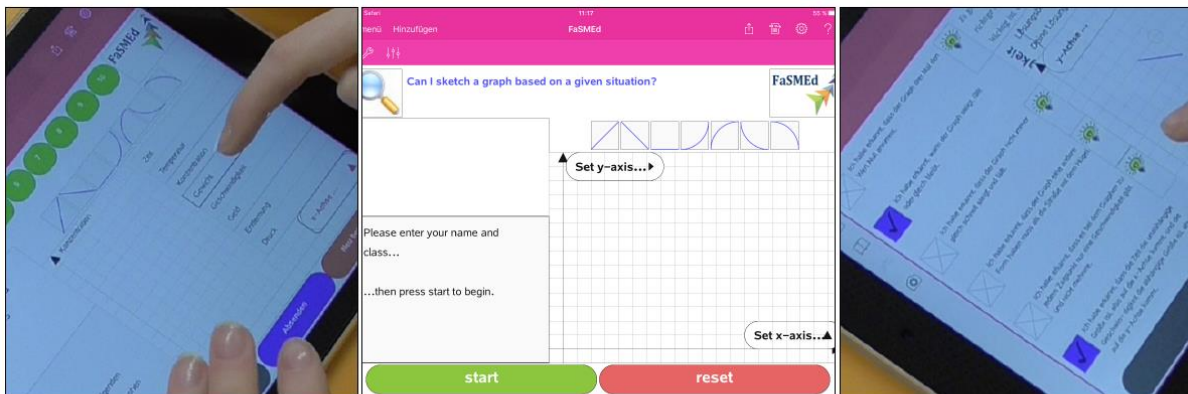


Technology supporting formative assessment - A digital tool for formative self-assessment



Hamburg, 29th July 2016

Hana Ruchniewicz

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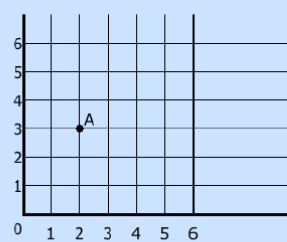
Aim

Technology enhanced self-assessments often look like this:

„Self“ refers mostly to the organization of the assessment

Question

Q1: Which of the following is the co-ordinates of the point A given in the graph below ?



Answer

- A. ☐ (3,2)
- B. ☐ (3,3)
- C. ☒ (2,3)
- D. ☐ (2,2)

Evaluation is based on two categories: right or wrong

Well Done!

Technology takes on the role of the assessor

◀ Previous Next ▶ Show Topics

(www.wwolt.com)

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BUT:

- active involvement of students is a key aspect of formative assessment
- investigating their (mis-)conceptions helps students to:
 - * gain sensitivity for their strengths and weaknesses
 - * use metacognitive strategies
 - * adopt responsibility for their own learning process

Aim: Develop a digital tool that allows students to become assessors themselves!



(Black & Wiliam 2009, Wiliam & Thompson 2007, Heritage 2007)

- Context: EU-Project FaSMEd
- Theoretical Background & Research
- Digital Self-Assessment Tool



**FaSMEd = Raising Achievement through Formative Assessment
in Science and Mathematics Education**



- Introduction and investigation of technology enhanced formative assessment practices
- design-based research
- 2014 - 2016
- 9 partners in 8 countries: FR, IE, IT, NL, NO, UK, ZA, DE

Final Toolkit will be available 12/16 : www.fasmed.eu



online learning communities

quick polls

connected classroom

Hamburg, 29th July 2016

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Theoretical Background

Formative Assessment (FA)

**“Assessment can be considered formative
only if it results in action by the teacher and
students to enhance student learning.”**

(Bell & Cowie 2001, p.539)

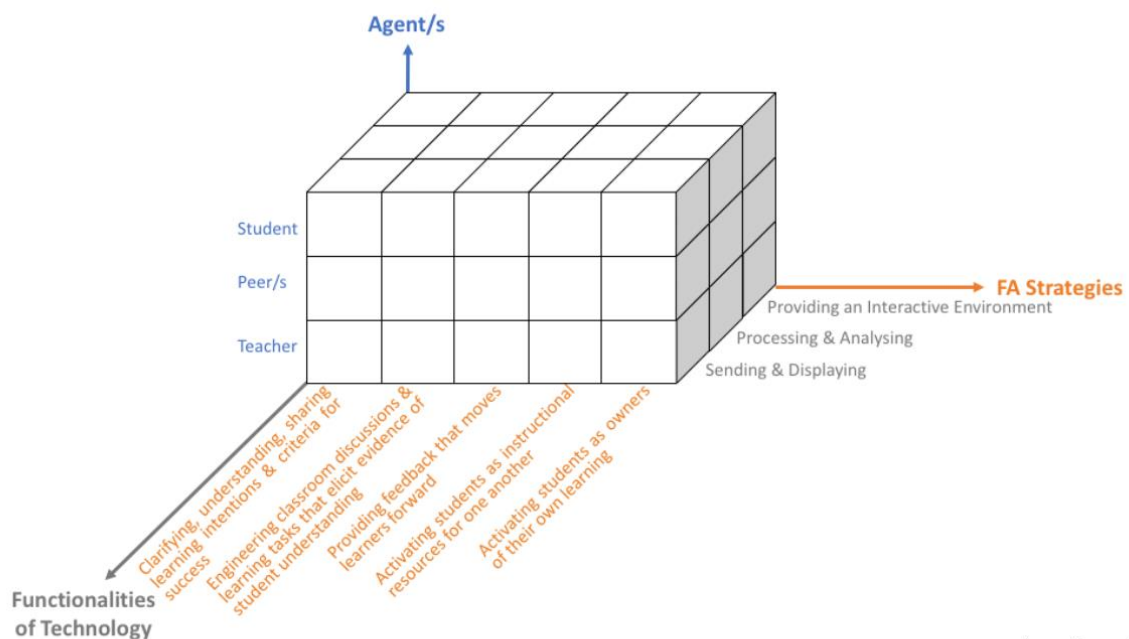
Conceptualizing formative assessment

William & Thompson 2007 conceptualize FA in **5 key strategies**:

	Where the learner is going	Where the learner is right now	How to get there
Teacher	1 Clarifying learning intentions and criteria for success	2 Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding	3 Providing feedback that moves learners forward
Peer	Understanding and sharing learning intentions and criteria for success	4 Activating students as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	5 Activating students as the owners of their own learning	

(Black & William 2009, William & Thompson 2007)

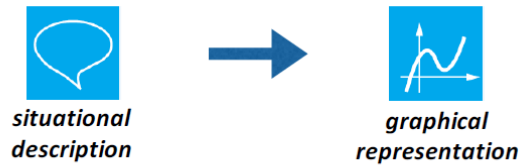
Conceptualizing formative assessment - FaSMEd framework



(www.fasmed.eu)

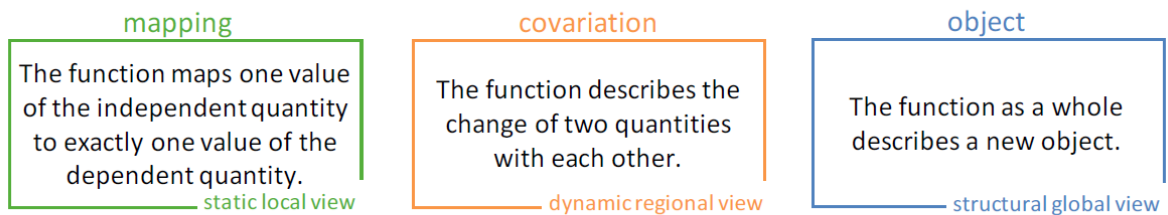
The concept of functions

Transformation of representations:



(Barzel 2009, Duval 2002)

Mental mathematical representations of functions („Grundvorstellungen“):



(Blum 1998, Dubinsky & Harel 1992, Tall 1996, Vollrath 1989, Vom Hofe & Blum 2016)

Typical misconceptions:

- Graph as a picture
- Swap axes
- ...

(following Busch 2015, Clement 1985, Hadjimetriou & Williams 2002, Leinhardt et al. 1990)

Methodology:



- Design-based research
- Case studies: task based interviews & class trials
 - * Pilot: pen-&-paper version: 11 students, grade 8 (2 schools)
 - * Pre-run: digital version: 18 students, grade 10
 - * Cases (Dec 15): 2 students + classes, grade 10 (2 schools)
 - * Cases (May 16): 2 university students (2nd semester)

Hypothesis: A digital tool with a hyperlink structure based on typical misconceptions can support students' formative self-assessment.

Open assessment task „Test“

Can I sketch a graph based on a given situation?

Test

For the following situation, sketch a graph to show how the speed changes as a function of the time.

Niklas gets on his bike and starts a ride from his home. He rides along the street with constant speed before it curves up a hill. On top of the hill, he pauses for a

view solution reset

Identify learning intentions

Elicit evidence of student understanding

Check

There are many right answers to the test task

What is important is ...

Sample solution ▶

Your solution ▼

Set y-axis...▶

back submit reset

Understand criteria for success

Elicit evidence of student understanding

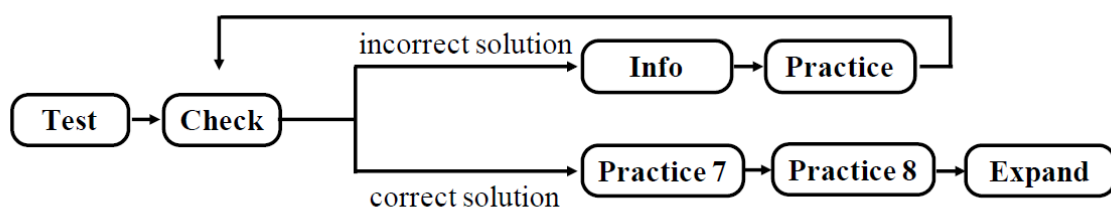
Support to formulate feedback

Structure

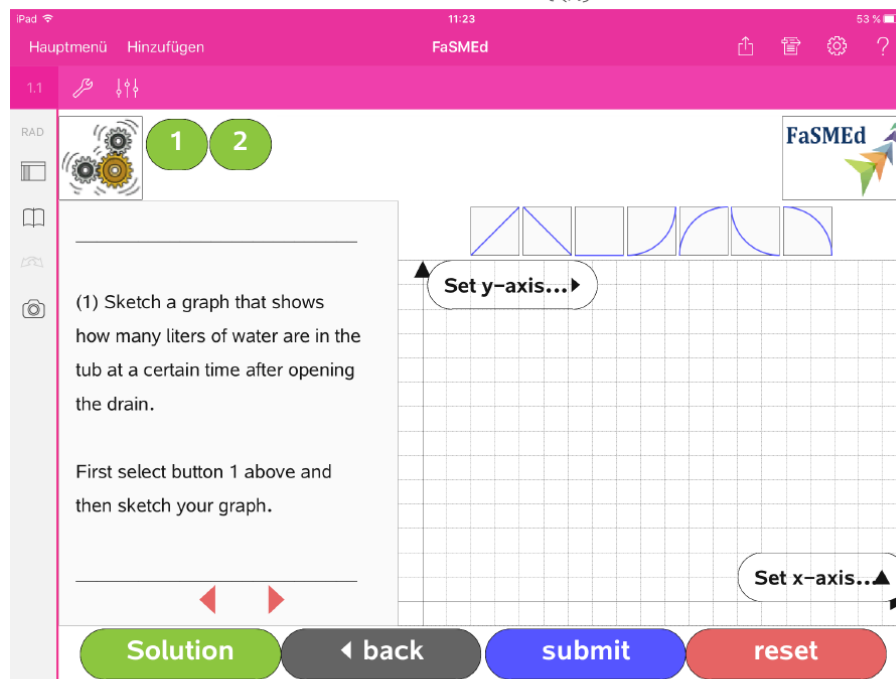


Activates students as owners of their own learning

Structure

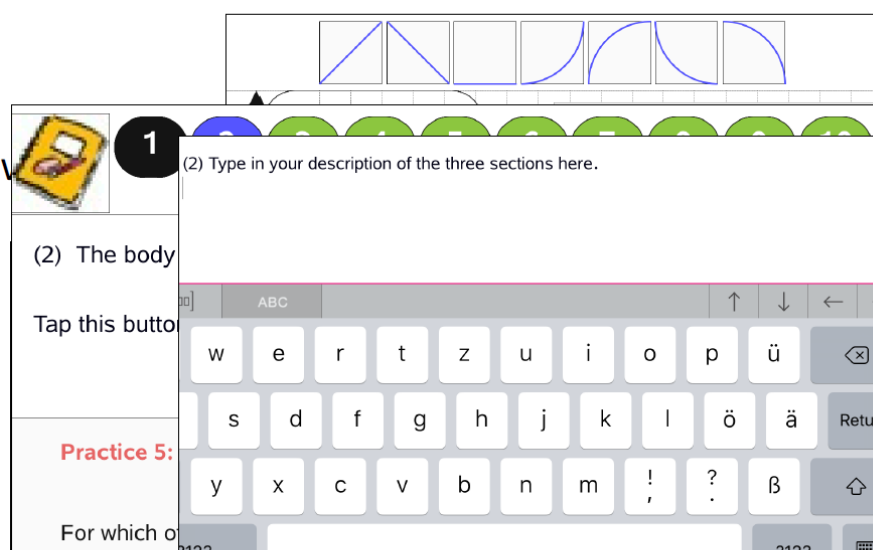


Expand



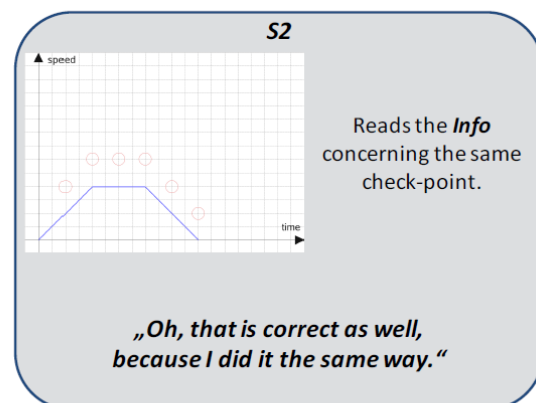
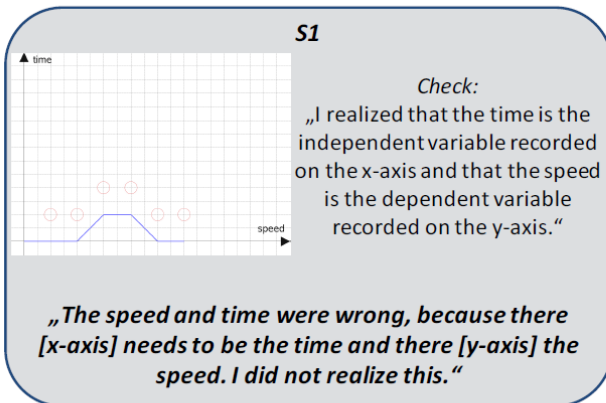
Task types

1. Graphing
2. Matching
3. Selecting
4. Open answer



We can reconstruct processes of FA as students are able to:

- identify mistakes based on the check (S1)
- identify correct aspects of their work (S2)
- decide to take further steps in their learning
- reflect upon their work
- formulate self-feedback



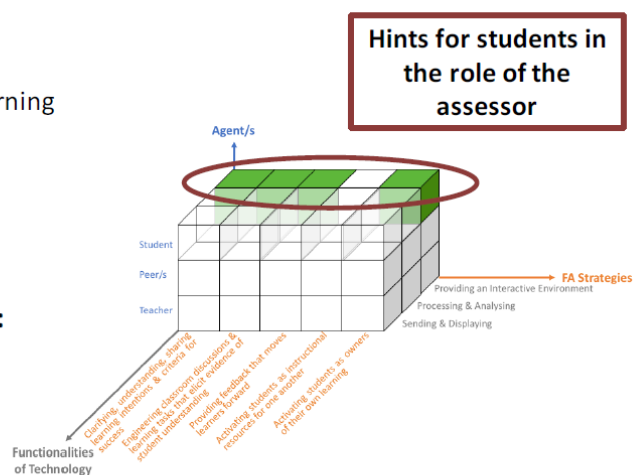
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These FA processes can be characterized:

Self-assessment is difficult for students:

- expect feedback from tool or teacher → need for instruction & training
- don't identify all of their mistakes → need for enhancement of tool
- don't overcome all of their mistakes → need for deeper analysis of learning processes



questions?

comments?



Thank you
for your attention !

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www.fasmed.eu

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