2015: an overview of FaSMEd @ DUE

Bärbel Barzel,
Hana Ruchniewicz &
Philipp Schmiemann

FaSMEd

Who we worked with and what we did (Maths)

10 teachers, 4 secondary schools
Evaluation of first pen & paper version of tool (Dez14 – Apr15):
  - 3 single student interviews (grade 8, 13-15 years)
  - 4 partner student interviews (grade 8, 13-15 years)
  - Expert review with 23 colleagues at DUE
Re-Design: second pen & paper version
Implementation of Technology:
  - Sept14-May15: JACK & TI-Nspire Prototypes
  - Mar15: collaboration with Steve Arnold
  - Aug15: first test with 16 students (grade 10, 16-18 years)
  - Dez15: TI-Nspire version finalized
Case Study:
  - 28 students (grade 10, 16-18 years)
  - 2 single student interviews
Formative assessment and technology (Maths)

Digital tool for formative self-assessment (TI-Nspire Navigator)

Test

Check

Formative assessment and technology (Maths)

Structure:

incorrect solution → Info → Practice → Expand

correct solution

Test → Check → Info → Practice 7 → Practice 8 → Expand
Case study 1: Can I sketch a graph based on a given situation?

School context:
- approximately 600 students aged 10-18 (grades 5-10)
- Realschule (lower secondary school; most likely no high achievers)
- urban area, mixed ethnicity

Class:
- 28 students (25 present, 14f/11m)
- grade 10 (16-18 years)
- mixed abilities (few revisiting grade 10, but no special needs students)

Reconstruction of FA processes – S2

Student's solution to the Test-task:

First Check-point: "I realized that the graph reaches the value of zero three times."
S2 doesn't mark off the Check-point (identifies a mistake)
Reconstruction of FA processes – S2

S2 continues with Info 1:

Reflecting her mistake:

„I did not do it like this, I did it so that Niklas rides along the street (points to the first increasing part of the graph) and then here (points to the first segment of the graph that remains constant) he rides along the hill and then he stops, but I did not do it with the second zero, when Niklas stands on top of the hill then he has no speed anymore.“

Reconstruction of FA processes – S2

Practice 1: Story of girl walking home from school.

Students have to decide for all 8 parts weather the graph for this story reaches the value of zero.

S2:
- tests her learning process by working on the task
- solves it correctly
- checks her answer by comparing her solution to the sample solution
- marks off the first Check-point in the Check-list
Case study 2: Science Case

School context:
- Gesamtschule (comprehensive school), founded 2013
- 450 students
- 40 teachers

Used material:
- Self-developed material for science experiment „Who has the juiciest apple?”

Context:
- surface-volume-relationship
- evaporation protection
- experiment
- use of technology (ipad)

Who we worked with and what we did (Science)

Material development:
- Feedback process of materials via phone and mail with teachers

Work with interested teachers:
- Introduction Workshop at DUE (10 participating teachers)

Case Study Implementation:
- Preliminary meeting at case study school (2 teachers)
- Case Study & Student interview
- Teacher interview
Formative assessment and technology (Science)

16 tablet mobile computers (iPad) to take to school

Powerpoint version of
Pen & Paper version:

- Interactive
- Simplify links
- Illustrations
- Further definitions

Self assessment

Diagnostic task

A1

EXPERIMENT
Can I Propose a hypothesis to the given problem?

The students of the seventh class are doing a school excursion in the mountains. Bushi and Sandra got wrapped apples as supplies from their mothers. Bushi doesn’t like the bitter skin so his apple is already peeled. Sandra’s mother however has cut him his peeled apple into bite-sized pieces. During the day the temperature rises to 35°C in the shade. Who is going to have the juiciest apple in the afternoon? Propose a presumption for the stated problem.

A proposal is also called a hypothesis!

A1

Solution

For this specific problem you can propose the hypothesis in various ways. (It doesn’t matter if your hypothesis turns out to be wrong at the end of the experiment.)

How did you proceed?

- I didn’t know what to find out. (A1.2)
- I’ve set up a scientific presumption. (A2)
- I was unable to propose any scientific presumption. (A1.1)
Formative assessment and technology (Science)

Self assessment

A1 Solution

For this specific problem you can propose the hypothesis in various ways.

(1) doesn’t matter if your hypothesis turns out to be wrong at the end of the experiment.)

How did you proceed?

- I didn’t know what to find out (A1.2)
- I’ve set up a scientific presumption (A2)
- I was unable to propose any scientific presumption (A1.1)

Good to know

A1.2 GTK

Imagine you are playing a cake game. Unfortunately you forgot to add the flour after a while. You notice that the cake becomes heavier. You also note that the cake becomes heavier than the one without flour. This process has already begun at the first day. Sometimes it is difficult to discern these differences in the first few minutes.

By using a balance you can determine the weight difference. Please notice that the balance must be set accurately.

Diagnostic Task

A2

After your first scientific assumption you may now design your experiment.

Put your first hypothesis you need two experimental approaches:

- Fix a variable, then something happens
- Fix a variable, then something doesn’t happen

All of the activities are new learning and experimental assumptions. It is good to have a hypothesis before the experiment. Always write down the different results that might occur from your experiment and write down the effect of the factors.

Which one is your chosen variable in this experiment?

Implementation

Images of students working in a classroom setting.
Implementation

In general:
• Positive feedback regarding concept, implementation, interaction and support
• Motivation throughout independence, technology and experiments

Teacher:
• Would like to have more self-diagnostic assessment materials
• Relieving because of structured lesson plan and material

Student:
• Appreciated possibility to get individual answers (GTK, definitions) based on the specific experiment
• Emphasized independence of work