The implementation of formative assessment strategies in the mathematics classroom in the context of professional development program

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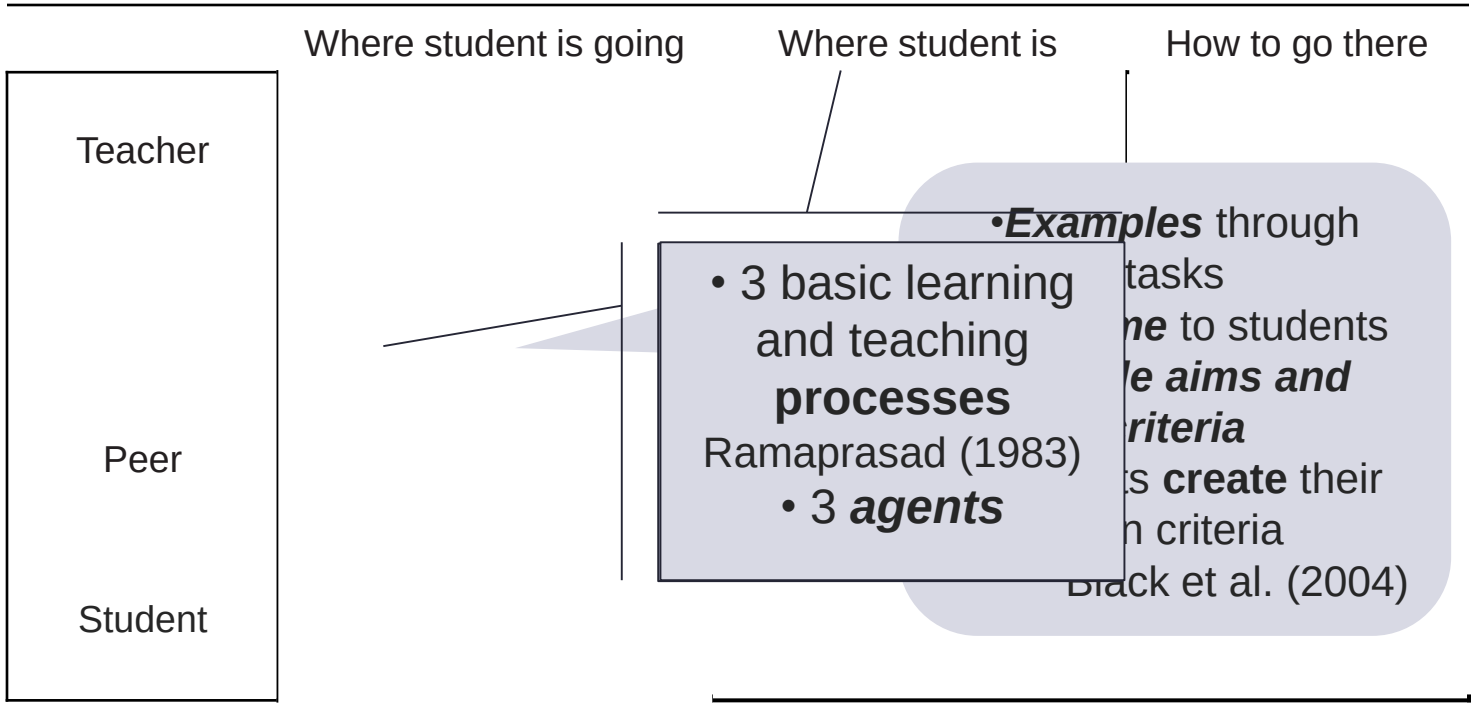
Conceptual Framework

https://medium.com/@group_19546/some-inspiring-activities-for-student-led-formative-assessment-70a7238d66ec

Definition of formative assessment

Bloom et al. (1971)	***Different type*** of assessment ***Helps*** the participants (students, teachers, policy makers) to ***improve*** want they want to achieve.
Sadler (1989)	Assessment of students' ***answers*** thought ***feedback*** ⇒ Configurations and improvement of their achievment Elimination of **random** results and ineffective learning
Black & Wiliam (2009)	***Evidence*** about students' ***achievement*** are *elicited, interpreted and used from* ***teachers, students and their peers*** ⇒ ***Decisions*** are made for the next teaching steps
Santos & Semana (2014)	***Everyday practices*** in the classroom Elicit and interpret evidence about student's learning ⇒ ***Decisions are made*** about teaching ⇒ ***Aim:*** Support students learning

Formative assessment practices framework



Black & William (2009), pp. 8

Formative assessment practices framework

	Where student is going	Where student is	How to go there
Teacher	**1.** ***Clarify*** the aims and success criteria	**2.** Effective classroom discussions and other learning tasks that elicit evidence about students understanding	
Peer	***Understand*** the learning aims and success criteria		
Student	***Understand*** the learning aims and success criteria		

Questions in the classroom
Critical for the development of students' ***understanding***
Aim →emergence of information teachers search for Black et al. (2004)

Black & William (2009), pp. 8

Formative assessment strategies

	Where student is going	Where student is	How to go there
Teacher	**1.** ***Clarify*** the aims and success criteria	**2.** Effective classroom discussions and other learning tasks that	**3.** Provide feedback that helps learners move forward
Student	learning aims and success criteria		

+ Adjusted teacher instruction
Aim: Learning improvment **without** oral or written feedback
e.g. personalised tasks or excersises
Andersson (2017)

Black & William (2009) pp. 8

Formative assessment strategies

	Where student is going	
Teacher	**1.** ***Clarify*** the aims and success criteria	students understanding
Peer	***Understand*** the learning aims and success criteria	**4.** Activate students as instructional resources for each other
Student	***Understand*** the learning aims and success criteria	**5.** Activate students as owners of theirown learning

Self-assessment, **Peer-assessment**

Essential *understanding of success criteria and learning aims*
(Black & Wiliam, 2009)

Black & William (2009) pp. 8

Teachers and assessment

Framework measuring teacher's ***assessment skills*** → 4 types of behavors regarding assessment Christoforidou et al. (2014)

Different ***approaches*** and ***ways*** of integrating ***strategies*** in the classroom practice for the implementation of formative assessment according to each teacher (Watson, 1999; Wiliam, 2007)

The formative assessment practice enactment can be affected from teachers' **beliefs** and **attitudes** about multiple educational issues, like **learning** (*Marshall & Drummond, 2006*) and the **assessment** (Brown, 2004)

Aim and Research questions

Aim and research questions

Research gap	Aim	Research Questions
•Focus on formative assessment •Mathematics teachers in secondary education • Interpretation and implementation of formative assessment in the classroom	The formative assessment practice in the mathematics classroom • ***Implementation*** of strategies from two mathematics teachers •Context **professional development program**	**Which** formative assessment **strategies** are used and ***Who*** those strategies are implemented in the classroom by two teachers in secondary education in the context of professional development program?

Methods

Objects of the study

Qualitative study

Case studies

Yin, (2003)

Similarities and differences within the cases

Baxter & Jack (2008)

Professional development program

2nd group ⇒ some formative assessment skills

Possible changes in the enactment of the formative assessment practice

Group 2

2 secondary mathematics teachers

Diferrent work setting

Actively engaged in previous professional development programs

Object of the study

Mary

•16 years teaching experience

• last 2 years in secondary public school

•Grades 8 and 9 (ages 13- 15)

• Participation in other professional development programs

John

•25 years teaching experience

•5 years in experimental secondary school

•Grade 9 (ages 14-15)

•Participation in the design of curriculum of secondary education and in professional development programs

Formative assessment

No previous training

No formal institutional directions or support

Practical knowledge from:

Personal searching

Other professional programs

Participation in the curriculum design

The context of the study

Promoting Formative Assessment: From Theory to Policy and Practice (FORMAS)

Group 2

some formative assessment skills

	Content
1nd	Multiple assessment techniques
2rd	Assessment criteria and students engagment in assessment process
3rd	Result- evidence record of multiple assessment techniques
4th	Feedback

Basic tool

Individual action plan

- Aims
- Actions - activities
- Time schedule - duration
- Tools
- Reflection

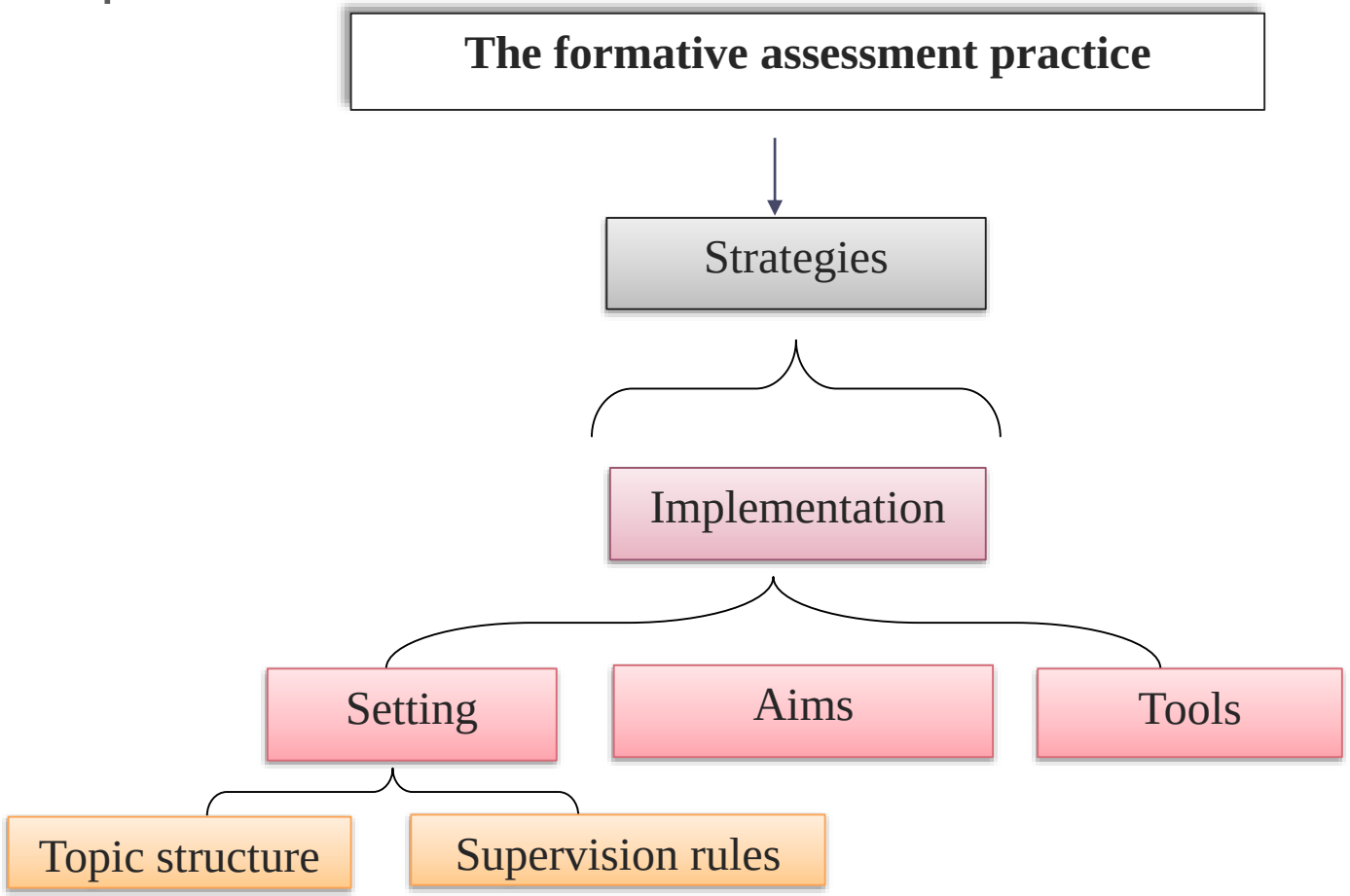
Pre and in COVID19 period
Face to face or
video conferencing platform

Data collection and analysis

Data collection	Data generation	Data analysis
• Observation of the PD meetings • Semi-structured interviews and informal discussions Before the action plan Self-reflection independent strategies • Classroom observations • Classroom material	Video recording ⇒ Transcription (*focus on the objects of the study*) Video-record or audio-record ⇒ Full transcription Field notes Action plan Teaching material	•Read data- focus on the objects • Sensitizing questions -> formative assessment data • Line by line coding ***Strategies*** *(bibliography)* ***Implementation*** *(in vivo codes)* •Check and group codes → συστημικό δίκτυο

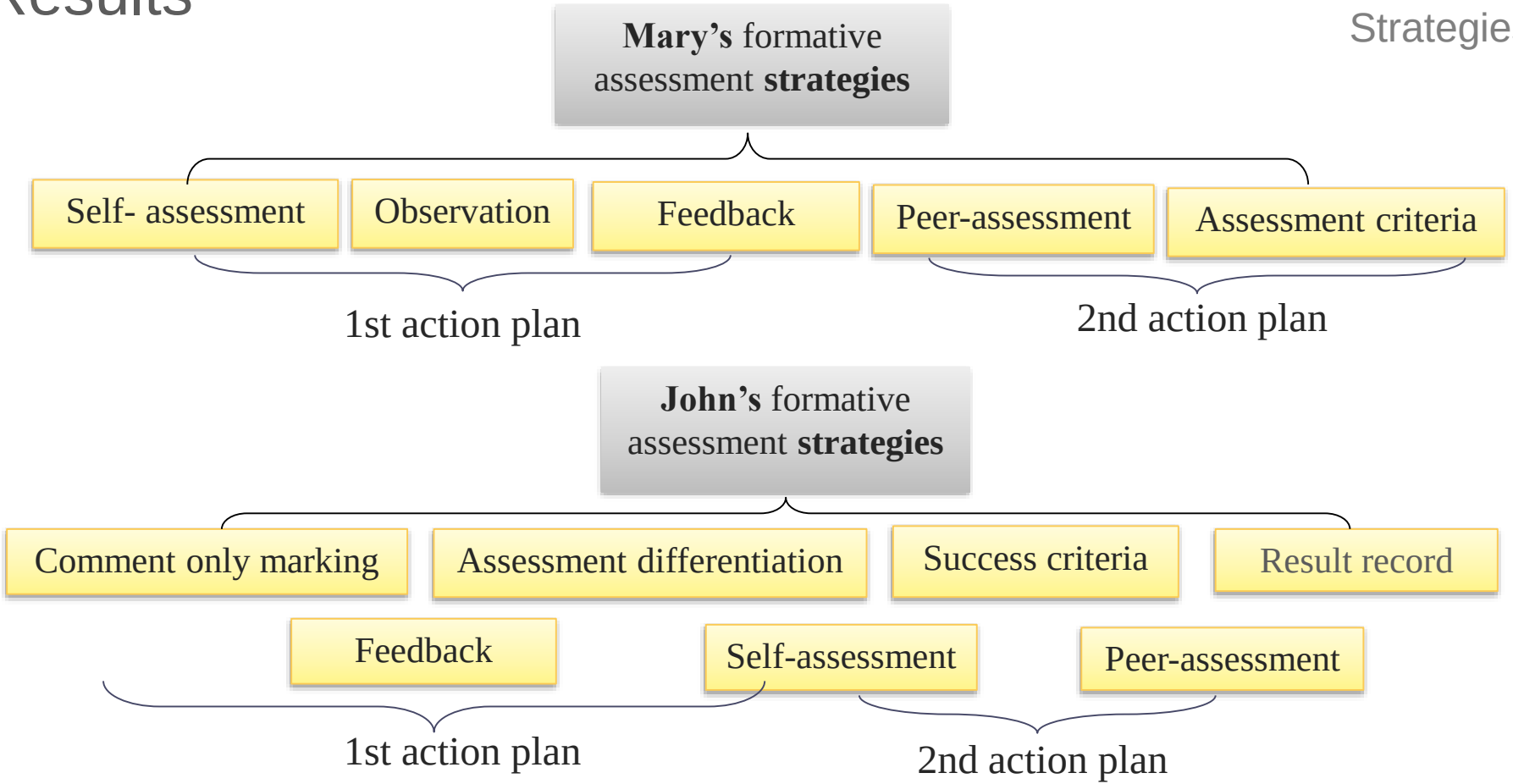
Results

Result map


The formative assessment practice
Strategies
Implementation
Setting
Aims
Tools
Topic structure
Supervision rules

Results

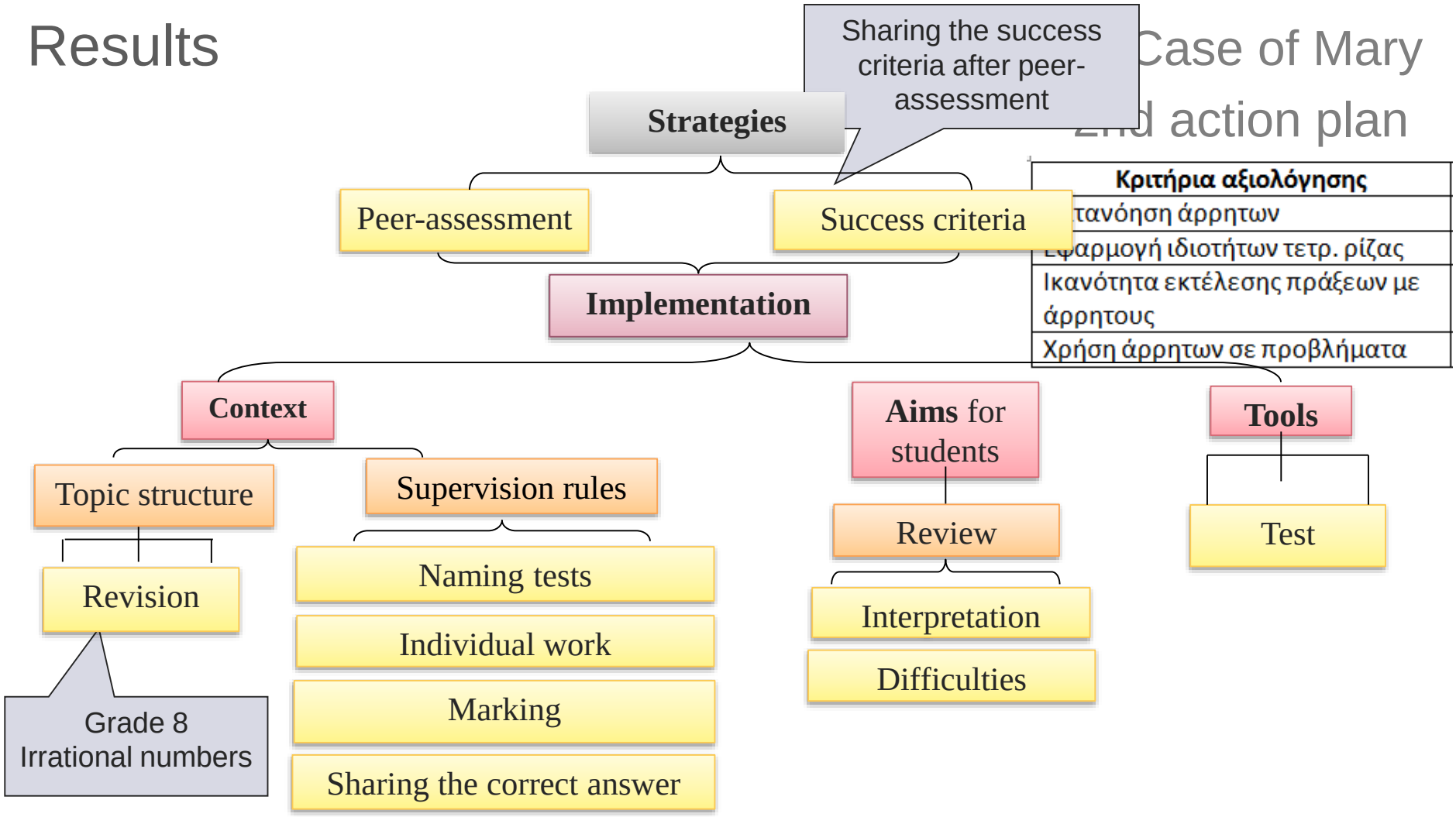
Strategies



Results

Case of Mary

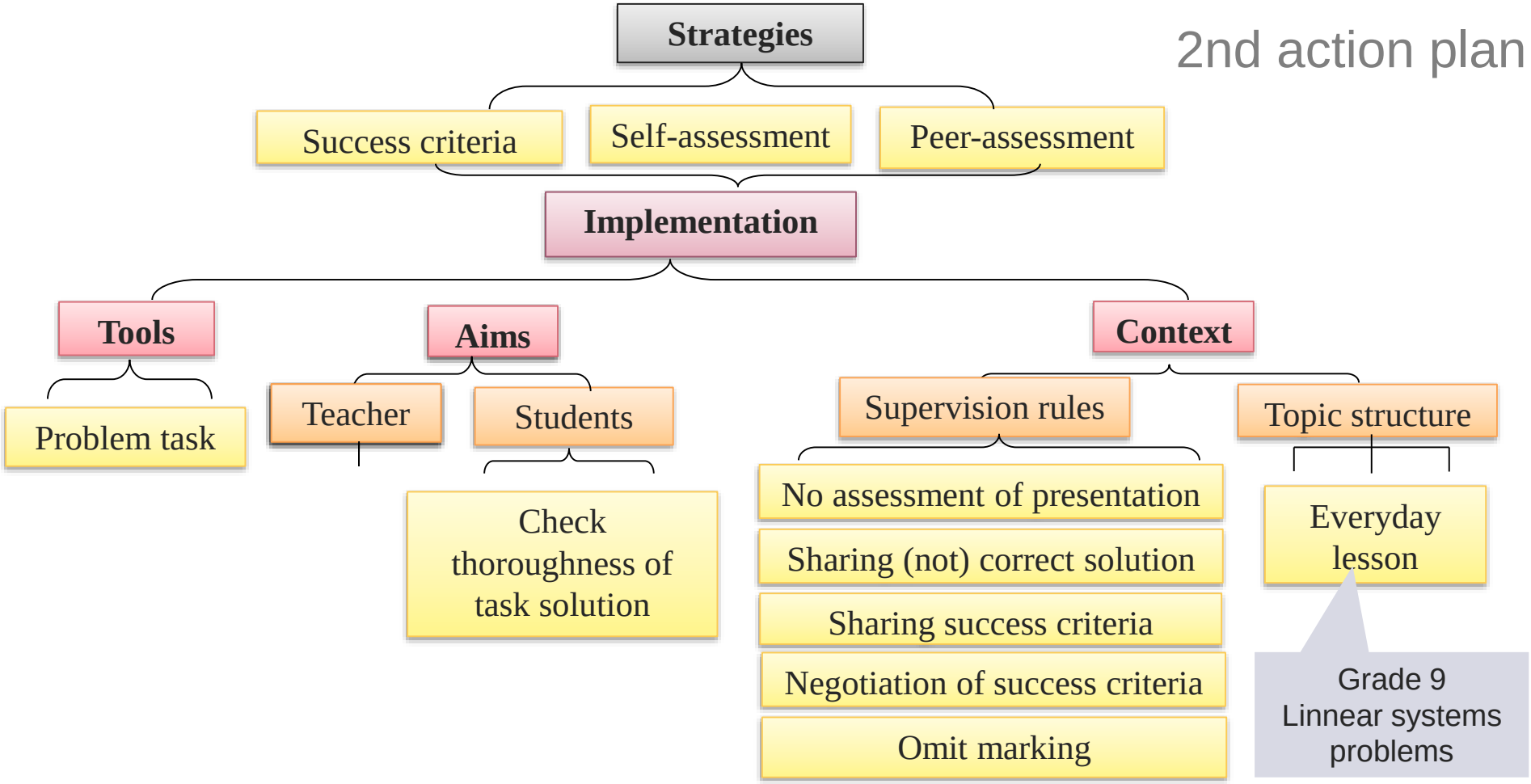
2nd action plan



Κριτήρια αξιολόγησης
τανόηση άρρητων
Εφαρμογή ιδιοτήτων τετρ. ρίζας
Ικανότητα εκτέλεσης πράξεων με άρρητους
Χρήση άρρητων σε προβλήματα

Αποτελέσματα

Case of John
2nd action plan



Concluding remarks

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Strategies

Part of the program
Self assessment
Peer assessment
Sharing success – assessment criteria
Feedback

Not part of the program
Students observation
Feedback through grading

Assessment differenciation

Implementation

Different interpretation and use of the PD material with a formative aim

Incorporate the PD material either with summative assessemnt tools or in the everyday lesson

Summative and formative assessment integration in the classroom (Black et al., 2004) → Mainly in revision sessions

Formative strategies mostly aimed to:

- Engage students with assessment and
- Active them as owners of theirown learning Black & William (2009)

Concluding remarks

Limitations and extension of the study

Limited observations in the mathematics classroom

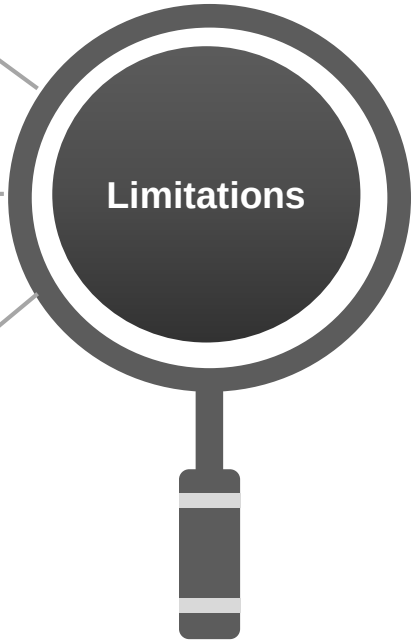
01

Study focused on teachers with similar assessment skills

02

03

Evidence only about teachers engagement with formative assessement in the PD context



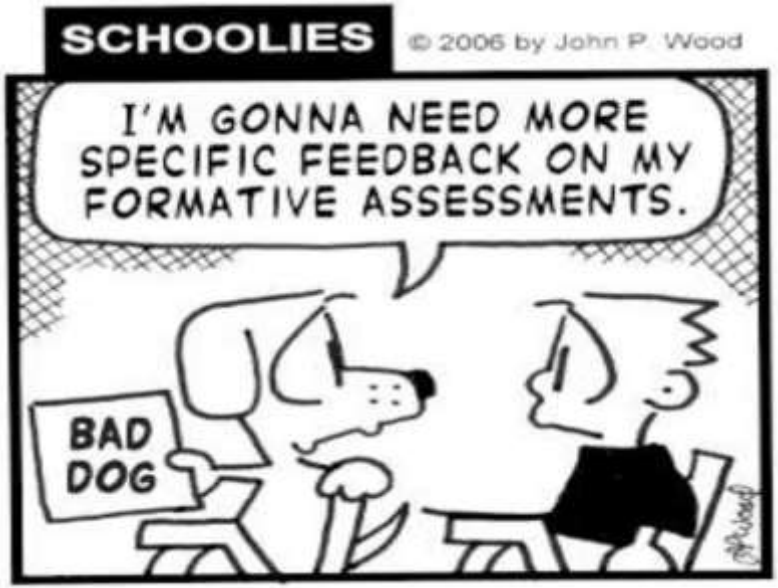
Extension #1

Extension of observation period

Continue after the PD program

Extension #2

In similar context, study teachers with different assessemnt skills



Thank you for your time!