

**THE USE OF FORMATIVE ASSESSMENT  
IN SPECIAL EDUCATION  
TO  
ENHANCE MATHEMATICAL  
EQUITY, ACCESS, AND EMPOWERMENT**

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Research interests, besides MER

- Formative assessment
- Special education
- Professional development and  
Teacher education



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# AIM AND RESOURCES

- Equity,
- Access
- Empowerment, and
- Mathematical learning

A researcher with knowledge about

- Formative assessment
- Selfregulation and motivation

Special education mathematics teachers (SETMs) with knowledge about

- Special education
- Cooperation with regular teachers



# FORMATIVE ASSESSMENT

- Collect information about students' learning needs to be used to adjust the teaching and learning in the classroom practice to the needs of the students.
- Three sub processes:
  1. Identifying the goal of learning
  2. Identifying the present status of learning
  3. Forming the next step in learning
- Both the teacher and the students can be proactive agents in those sub processes
- Formative assessment can be used in many ways and with varying quality



# FORMATIVE ASSESSMENT FROM THE PERSPECTIVE OF SPECIAL EDUCATION

- Formative assessment instead of categorizing learners (Fuchs & Fuchs, 1986)
- Students' needs are diverse, thus
  - information about these need is required
  - students' success as well as misunderstandings can be used to bring learning forward.
  - + focus on the learning of mathematics
  - + students' involvement in assessment and learning processes
- Potential to approach diverse learning needs as normal and as a resource.



# FRAMEWORKS

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

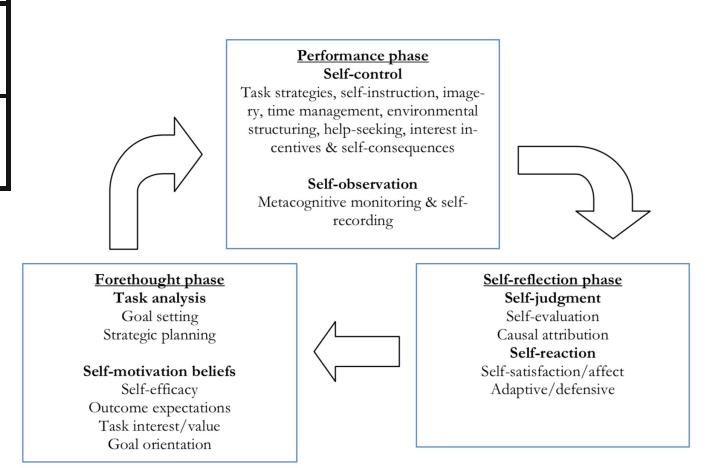
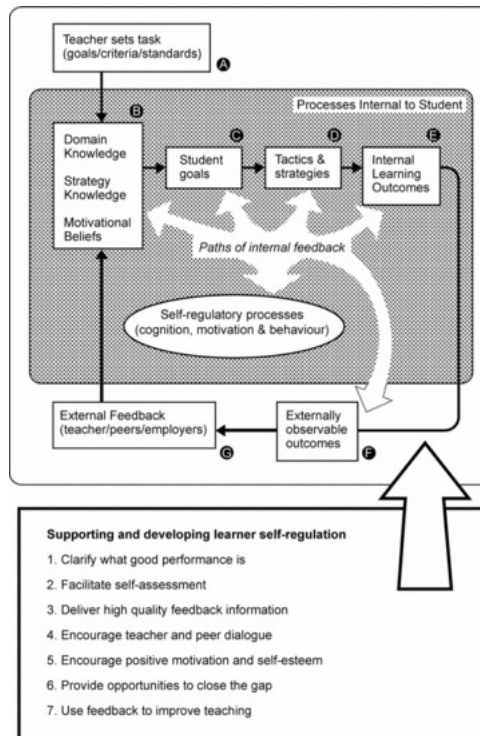


Figure 1. Phases and processes of self-regulation according to Zimmerman and Moylan (2009). © Routledge.

Figure 5. Zimmerman's multi-level model.

| Levels of regulation | Sources of regulation               | Features of regulation      |                       |                       |
|----------------------|-------------------------------------|-----------------------------|-----------------------|-----------------------|
|                      |                                     | Sources of motivation       | Task conditions       | Performance indices   |
| 1 - Observation      | Modelling                           | Vicarious reinforcement     | Presence of models    | Discrimination        |
| 2 - Emulation        | Performance and social feedback     | Direct/social reinforcement | Correspond to model's | Stylistic duplication |
| 3 - Self-control     | Representation of process standards | Self-reinforcement          | Structured            | Automatization        |
| 4 - Self-regulation  | Performance outcomes                | Self-efficacy beliefs       | Dynamic               | Adaptation            |

Extracted from Zimmerman (2013, page 140).



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# INCLUSION

From the teaching and  
learning perspective



Researcher(s)

Special Education Teachers

Classroom

(maybe also Regular Teachers)

Students



# INCLUSION

From the student  
perspective

# INGREDIENTS AND FRAME

- Built on an organised cooperation between SEMTs and regular teachers
- Using reserarch findings regarding:
  - ❖ Formative assessment
  - ❖ Self-regulation
  - ❖ Motivation
- Framed by the concept of inclusion in terms of:
  - ❖ Equity
  - ❖ Access
  - ❖ Empowerment



# DISCUSSION

## ***A general question:***

How can we perform high quality research when the research process is under constant development?

## ***A more specific question:***

How can I design my study? –

When working with special education teachers,  
to systematically document, analyze, evaluate and  
(re)design special education  
that support mathematical equity, access, and  
empowerment



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# TENTATIVE RESEARCH QUESTIONS

- In what way can knowledge about formative assessment be used to organize support of students' learning of mathematics?
- In what way can regular mathematics teachers and SETMs work together to support students in mathematics difficulties? What are the obstacles to achieving such cooperation and how can these obstacles be addressed?
- In what way is the special education inclusive (dynamic, content, participation)? Any change from the beginning of the study to the end of the study?
- What are the students' perspective on inclusion? Any change from the beginning of the study to the end of the study?
- What was the most common support (adaptation)?
- Which didactic and relational adaptations did teachers and special teachers experience work best? Why?
- Did students' motivation, SRL and learning in mathematics increase?

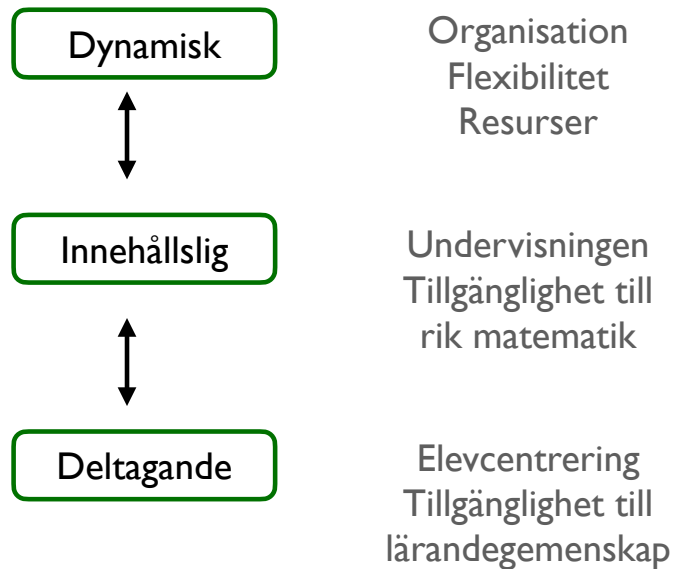


# MODEL OF INCLUSION

## Inkludering, enl. Roos

Lärares sätt att tala om inkludering, som här ses som en deltagandeprocess

### Former för inkludering



### Sätt att stödja inkludering

