

ED 4161 The Teaching of Mathematics in the Intermediate and Secondary School. *Instructor: Dr. Margo Kondratieva.*

Planning, acting, and reflecting.

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1. **Before** starting teaching a course, unit or lesson, teachers need to ask themselves:
 - What are the most important things (concepts, procedures, facts) for students to learn from this course/unit/lesson? Why they are important? (Goals, objectives.)
 - What type of experiences have these students already had with this topic? (Prerequisite knowledge.)
 - In what order should the key concepts be presented? (Sequencing.)
 - What kind of experiences should the students have to help them learn these concepts and procedures? (Problems selection.)
 - How much of in-class time do I need to accomplish my goals? How much time students need to spend out of class doing their assignments, projects, journals etc to master the material?
 - What material do I need to support the lesson? (Tools.)
 - How and when I am going to assess and evaluate students' understanding? (Assessment.)
 - Once we have completed this course/unit/lesson what is the next logical step in the students learning experience?

Teachers need to have a **conceptual map** and be aware of various explicit and implicit **connections** with other topics and units in order to be able **to revisit and reinforce** the concepts in the future.

2. **After** finishing teaching a course, unit or lesson, teachers need to ask themselves:
 - Did I teach the way I planned? Why did I plan to do it this way?
 - Did I accomplish my goals? How do I know that?
 - What have I learned about myself and my students that will help me to be a more effective teacher tomorrow?

3. **During** teaching a course, unit or lesson, teachers need to ask themselves:

- Am I giving **worthwhile mathematical tasks**?
Do I develop students' understanding? Skills? Reasoning or memorization? Problem solving of mechanical procedures? Connections of ideas? Do I ask open or closed questions? Do I balance the use of mental calculations and use of calculator?
- What is **my role** in the classroom?
Am I a sole authority for the right answer? Do I engage the students in learning? Do I guide them? Motivate them? Do I use "*teachable moments*" to respond to students' remarks.
- What is the **students' role** in the classroom?
Do the students form a learning community or are simply a collection of individuals? Do they just passively copy notes or initiate questions and discussions?
- What **tools** I am using to enhance the discourse?
Chalk and blackboard? Manipulatives? Technology? How often and why?
- Do I create **learning environment** for development of each student?
Do I structure learning activities? Do I teach my students to check their answers? Do I teach them how to approach problem solving? Do my students work well independently? Do I also promote *cooperative learning* in order to enhance their academic achievements, social and psychological goals? Do I allow a "*free play*" time to let students explore and experiment? Do I ask students to prove their conjectures in order to foster their ability to reason mathematically?
- Do I **analyze the affect of my teaching** on students' learning?
Do I observe and assess student in-class responses and progress in their mathematical behaviour? Do I adapt or change tasks and activities to accommodate my observations and goals?