Metacognition:
Developing Successful Learners in Remote Learning Environments

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Goals of this session (1)

1. To review some propositions regarding teaching and learning that are fundamental to my perspective.
2. To consider, briefly, how learning happens and what influences it.
3. To propose a 'straightforward' pedagogical perspective on cognition and thinking.

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Goals of this session (2)

4. To consider what we mean by 'metacognition.'
5. To relate cognition to metacognition.
6. To consider the nature of metacognitively oriented learning environments & how these vary between remote and face-to-face situations.

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Goals of this session (3)

7. To explore the information and suggestions we might explicitly provide to students to stimulate metacognitive experiences.
8. To consider Equity, Diversity and Inclusion factors in the metacognitively oriented remote learning environment.
9. For me to try to answer any questions you might have.

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Important Side Note

- I engaged in a lot of self-communication/dialogue, often in the form of self-questions, in thinking about how to construct this presentation. The importance of this self-communication and its relation to metacognition will, I hope, become evident during this presentation.

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Fundamental propositions regarding teaching.

1. Teachers provide information (~~knowledge~~) to students.
2. Teachers shape students' experiences and outcomes by the information they provide and how they provide it.
3. Teachers should be 'learning' role models for students…not just subject content experts. Such a shift involves reflection on the part of the teacher.

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4. Students esp. at university should increasingly become self-regulating, independent, and responsible learners…we all have roles to play in this venture.

5. Quality teaching involves 'seeing' the world through students' eyes, 'being in their heads,' anticipating their difficulties, & providing experiences that help them consciously negotiate those difficulties.

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How learning happens and what influences it (1).

- Students (try to) make sense of the information that teachers provide, using what they know already from their prior experiences to shape their own personal knowledge.
- Their eventual personal knowledge may vary from what the teacher expects, at any point in time.

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How learning happens and what influences it (2).

- When a student makes sense of new information it is because they can make a connection between the new information and what they already know…this is irrespective of the subject area.
- It is this continual reshaping and extending of what is known that I define as learning.

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Key influences on learning (1)

- Extent of students' sufficient and well organized prior knowledge.
- Extent of students' understanding of task requirements & course expectations.
- The quality of teaching practices.
- Students' possession & use of adaptive learning strategies & decision making & study skills. (Relates to Metacognition)

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Key influences on learning (2)

- Students' access to the necessities of life, and life circumstances, inc. time.
- Extent of students' motivation, resilience, and persistence.
- Social and cultural variations and expectations for teaching and learning.
- Students' difficulties with media of instruction.

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There are some influences on learning we can attend to, and accommodate, in a regular 13 week course, and some things that it is more difficult to attend to for many possible reasons.

But we try to be optimistic about & for our students…developing and enhancing students' metacognition is an element of an optimistic outlook.

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How can we talk about Cognition?

- There's no point in talking about metacognition unless we 'share' a way of talking about cognition.
- Often times this is not considered in many (pedagogical) deliberations and suggestions regarding metacognition.

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Anna Sfard (2008)

- "…thinking can be *usefully* (my emphasis) defined as an individualized version of interpersonal communication." (p. 81)
- "…this self-communication does not have to be in in any way audible or visible and does not have to be in words." (p. 82)
- "…the type of human doing that emerges when individuals become capable of communicating with themselves the way they communicate with others." (p. 91)

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So…

...my perspective is that, to change our cognitive/learning processes, we need to know about our self-communication related to those processes, and look at other persons' self-communication to explore if we can adopt (possibly with modifications) some of their self-communication that we might then employ. (We need to become self-aware.)

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Metacognition: A Definition

- Metacognition refers to an individual's **knowledge**, <u>control</u> and *awareness* of their cognition/learning processes and *their knowledge of the learning processes of others*.

This definition reflects the importance of individuals understanding how other people as well as how they, as individuals, learn. This has pedagogical implications at all levels of education.

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In other words:

- Metacognition refers to an individual's knowledge, control and awareness of their self-communication as it relates to their learning processes and everyday decision-making, and *their knowledge of the self-communication of others related to those persons' learning processes and everyday decision-making.*

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So…

…to develop and enhance our students' metacognition we should, through the information we provide them, target <u>explicitly</u> their knowledge, control and awareness of their self-communication as it relates to their cognition/learning processes, and *their knowledge of the self-communication of other persons' cognition/ learning processes.*

(I'll return to this later.)

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Metacognitive Knowledge

- Knowledge and beliefs (conceptions) about the factors influencing the course and consequences of an individual's cognitive enterprises. (All cognition can have metacognition that is related to it.)

- Metacognitive knowledge can be categorized as one of three (3) types:

  1. Declarative 2. Procedural 3.Conditional

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1. *Declarative:*   Learning is………….
                     Thinking is………….
                     Understanding is ……..

2. *Procedural:*   I learn (Chemistry, Music, Languages)
                        by ………
                     I think by…………….
                     I think when I………..
                     They learn by………..
                     I develop understanding by…….

3. *Conditional*:   I use this learning process when……
                     I use this thinking process when……
                     I use this learning strategy at this time
                     because………….
                        I don't use this learning strategy at this
                     time because………….

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Therefore:

- The metacognition related to learning and understanding in any subject area is the knowledge, control, and awareness of the 'self communication' (esp. self-questioning) that individuals engage in when they learn and develop understanding in that area.
- This metacognitive knowledge needs to take the form of information that is explicit and communicable; only then is it teachable.

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Metacognitive Experiences

Conscious (we're aware-of them) experiences related to cognitive endeavors or metacognitive knowledge.

These experiences are keys to developing metacognition as they provide the raw material for **_reflection_** that might lead to the development of metacognitive knowledge. Therefore, we need to target & stimulate such experiences in students.

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Further, and importantly,

- We may not even be aware of or able to articulate our metacognitive knowledge regarding our own learning processes (or any other cognitive process) unless we commit to and engage in such self-reflection. (Often the case with teachers.)
- Self-reflection is at the heart of improving as a thinker and learner.

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How might we stimulate metacognitive experiences that prompt students to reflect on and maybe improve their existing processes?

- We stimulate them to reflect on their own self-communication (cognition) that relates to their learning processes, to become aware of their own metacognitive knowledge…and possibilties.
- We then suggest that they compare their existing metacognitive knowledge with the suggestions of others who might be more experienced & differently knowledgeable about such matters (like their teachers i.e., Us).

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These, for me, are fundamental principles related to teaching, learning, cognition and metacognition that apply across learning environments: face-to-face; remote (synchronous or Asynchronous), or blended.

Now I will turn my attention to the components of metacognitively oriented learning environments.

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Metacognitively Oriented Learning Environments

7 Dimensions (+1)

1. Metacognitive Demands
2. Student-student Discourse
3. Student-teacher Discourse
4. Distributed Control
5. Student Voice
6. Encouragement and Support
7. Emotional Support
8. (Teacher Modeling)

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- **Metacognitive Demands** – the teacher makes explicit demands of students to consider their thinking/learning processes.
- **Student-student Discourse** – students talk with each other about how they learn.
- **Student-teacher Discourse** – students talk with their teacher about how they learn.
- **Distributed Control** – Students engage with teachers to plan their learning.

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- Student Voice – Students are able to voice concerns over issues affecting learning.
- Encouragement and Support – Teachers provide students with encouragement to improve as learners.
- Emotional Support – teachers provide emotional support for students.
- Teacher Modeling - teachers model the thinking and learning processes relevant to learning in their specialist area/s.

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Metacognitive Demands

Q. How do we make explicit demands of students to consider their thinking/learning processes.

A. We use 'prompts.'

Prompt: A request for students to strategically self-question (self-communicate) about their thinking and learning at various stages of a(ny) learning activity.

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Successful learners often use such self-dialogue, but may not be aware of it.

I'm going to distinguish 3 forms of prompts, each one relating to various stages of a learning engagement:

1. Planning for Learning
2. Monitoring Learning Progress
3. Evaluating Learning

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Key Points re: Prompts

- Prompts need to be embedded into the instructions we provide for students about the activities we want them to engage in.
- Prompts should be written in a way that shapes how students would ask the self-question.
- In synchronous environments (inc. f-t-f) the teacher determines precisely when the prompt is initiated. In asynchronous environments the student has to be guided as to when to q. More planning is required.

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Planning for Learning

Planning for learning is about establishing readiness for a learning engagement.

Typical aspects of planning for learning involve, (a) considering the nature of the forthcoming activity, (b) self-assessing prior knowledge that might be relevant, (c) reflecting on past experiences with the content, (d) time allocation, (e) considering how progress in learning might be ascertained.

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Script for students (a)

When you are about to (read this article, watch this video, listen to this podcast), ask yourself the following question/s:

"Have I done this type of activity before?"

"What strategies did I use previously?"

"Was I successful at it?"

"Why was I successful or not?"

"What problems might I encounter?"

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Script for students (b)

When you are about to (read this article, watch this video, listen to this podcast), ask yourself the following question/s:

"What do I think the information in the activity might be about?"

"What do I know about this topic already…should I write this down?"

"Should I have other resources with me to help me if I 'get stuck'?"

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Script for students (c)

When you are about to (read this article, watch this video, listen to this podcast), ask yourself the following question/s:

"Have I been successful with this material in the past? Did I understand it?"

"What might have been difficulties I had in the past with this material? How did I overcome them?"

"Am I prepared to engage with this topic again?"

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Script for students (d)

When you are about to (read this article, watch this video, listen to this podcast), ask yourself the following question/s:

"How long have similar activities taken me in the past?"

"How long is this activity supposed to take?"

"Do I have enough time to do it in one go, or should I break it up?"

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Script for students (e)

When you are about to (read this article, watch this video, listen to this podcast), ask yourself the following question/s:

"How will I know if this is 'making sense'?"

"What are the tasks I need to do to show my learning to my teacher? Am I comfortable with those tasks?"

"What is my plan if I run into difficulties with the material or the task?"

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Monitoring Learning Progress

Monitoring Learning Progress is about students ascertaining whether they are meeting yours and their own expectations for learning and task performance.

Typical aspects of monitoring learning progress involve students, (a) assessing new information and evidence for it against their existing knowledge, (b) creating artifacts that provide a record of new learning, (c), seeking assistance when learning difficulties become evident, &

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…(d) regularly referring to task specifications and requirements; beginning and continuing with the 'end in mind.'

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Script for students (a)

As you are (reading this article, watching this video, listening to this podcast), ask yourself the following question/s:

"How does the information being presented with compare with what I already know?"

"What is the nature and quality of the evidence, argument, & authority on which the new ideas being presented are based?"

"Do I need to seek more evidence for the claims being proposed? If so, from where?"

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Script for students (b)

As you are (reading this article, watching this video, listening to this podcast), ask yourself the following question/s:

"How can I summarize or represent the information being presented to me? Do I sketch, diagram, tabulate, list, mind map, précis, write in my own words, about the information being presented to me?"

"How will I record and remember what I've learned?"

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Script for students (c)

As you are (reading this article, watching this video, listening to this podcast), ask yourself the following question/s:

"If I'm having difficulty, how far am I prepared to proceed before seeking help?"

"What support is available for me if/when I have a difficulty with some part of this task? Teacher, fellow student, past student, other resources: video, text, etc. ?"

"What sort of questions should I ask others?"

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Script for students (d)

As you are (reading this article, watching this video, listening to this podcast), ask yourself the following question/s:

"Am I keeping an eye on how what I am doing relates to the final task/s for this activity?"

"Should I be doing the final task gradually or should I leave it all to the end?

"Can I foresee issues that I might face in the final task as I'm engaging in this activity?"

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Evaluating Learning

Evaluating is about students ascertaining if they have met yours and their own expectations for learning and task performance. Typical aspects of evaluating learning involve students considering, (a) pre-submission, whether their task product, matches your assigned criteria, (b) changes to their knowledge, understanding, &/or skills, (c) on task return, reasons for success (or not), and then reviewing their processes to identify strengths & weaknesses.

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Script for students (a)

As you are considering the assessment requirements, ask yourself the following questions:

"Does my work reflect what I've been asked to do?

"Does my work meet/match the criteria for the assessment to a standard I think is in line with that of my teacher?"

"Are there ways I can check that my work is of a standard that is 'acceptable'?"

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Script for students (b)

As you are finishing the assigned task/s and assessment requirements, ask yourself the following questions:

"What have I learned that I didn't know before? Have I made a record of this?"

"How has what I learned changed my view of the subject area?"

"What am I still unsure of, do I need to still attend to this, and if so how can I do this?"

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Script for students (c)

When your work is returned to you, ask yourself the following questions:

"How did I go? Did my grade/mark match my expectation/s? If not, why not?"

"What have I learned about myself as a thinker & learner in this specific subject area &/or in general?"

'If I was going to do this all over again, what would I do the same/differently? Why?"

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Caveats

These questions can be put to students in any instructional format, f-t-f, blended, synchronous, or asynchronous. When/how you ask them depends on the format. You can make them verbally, in writing, or both depending on the media you choose to use. E.g., If I'm teaching asynchronously, I can embed them in written form on task sheets and/or orally in podcasts or video/s. The more times/ways you express them the more students take notice.

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Student-student Discourse

In terms of inclusion and supporting diversity it is important that students have the opportunity to discuss their thoughts on the 'self-questions' (and content) with others.

I recommend setting up or suggesting students set up synchronous or asynchronous study groups, blogs, Facebook pages, etc. to be able to talk about the way/s they are approaching learning in your courses in the remote environments.

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- In these shared online spaces they can share ideas about the material to be learned and how they are coping/attending to the metacognitive demands you are asking of them.
- Student change is hard, especially if they come from a 'barren place' in terms of this thinking, which is not typically focused on in many high school settings, irrespective of course, country, or culture & despite us knowing that such self-questioning is a key characteristic of good learners.

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Teacher Modeling

You will infer from my presentation that I consider it is not sufficient to simply provide content information to students in our courses.

Students come from numerous backgrounds with varying content knowledge and skill sets. So we shouldn't assume that just because they are at university that the are 'ready to be successful.' They still need to be taught about what 'success' means and looks like, and that is where our modeling becomes important.

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Questions for you, the academic, to ponder?

1. How did I become successful in my field?
2. What thinking have I employed to achieve that success?
3. How did I overcome any learning difficulties I faced in my journey?
4. If I had to explain to another person how I learn in my subject area, what would I say?
5. What does it mean to 'understand' my field of study?

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If you think about your answers to these questions, you come to know yourself more as a learner, and that 'knowing' is very important to do before you can know yourself as a teacher..in any learning environment #empathy

Then, how can you 'story' your answers to those questions…how can you share your metacognition (esp. meta-knowledge) and metacognitive experiences with students?

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Students like to know about how their teachers 'came to know and understand, and what it means to know and understand…this varies across disciplines.'
This sharing is an important element of teaching. It can be done in synchronous and asynchronous remote environments: video, podcast, written. And the more forms you put it in, the more diverse will be your audience and the more inclusive will be your teaching.

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Answering students' questions

When a student has difficulty with a task, ask, "How are you approaching this task?"

When they say they don't understand something, ask, them "Why? Where are you getting 'stuck? What thinking have you done about this?"

When they ask about how to improve, ask, "What things have you considered already? What options do you know of?"

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It is important to explicitly engage students in considering their thinking and learning strategies as they relate to what we want them to learn and understand.

A key element is to improve students as thinkers and learners, to 'lift them up,' & we don't do this well by simply throwing content at them and letting them work it out for themselves. Good teachers do more than that.

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Closing Thoughts

- This presentation has I hope provided an overview and some suggestions for the audience to consider.
- I think, for EDI, it is important to have synchronous and asynchronous remote instruction...more forms provide more and different access for students to you to consider and discuss their learning.
- How to blend them is a key consideration.

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- I would stagger synchronous times to accommodate students' locations, treating them much like office hours, and have much of my course in asynchronous mode.
- I would give clear indications to students on when I will reply to emails for my course/s.
- I would embed my prompts and learning stories in the materials I provide for students in as many forms as possible.
- I would give timelines for as much as possible.

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- I would make it clear to students that planning, monitoring, and evaluation are important…and their responsibility.
- I would set clear guidelines for myself regarding the forms and extent of the assistance I am able to provide for my students in any higher education environment; to preserve my mental health.
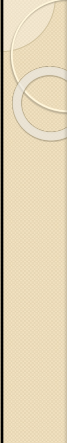- I would try to learn more about how to help students become successful learners.

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For More Information

There is a podcast with Neil Haave and myself on the CTL website in which I provide more ideas at:

https://www.podomatic.com/podcasts/teachingplus/episodes/2020-02-18T09_00_00-08_00

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Thank You!

References

Sfard, A. (2008). *Thinking as communicating: Human development, the growth of discourses, and mathematizing.* New York, NY: Cambridge University Press.

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