SELF-REGULATED LEARNING IN MEDICAL AND HEALTH PROFESSION EDUCATION

Case Illustration

Student A

- Has no **study goal** in mind – just trying to do as well as she could
- Did not use any **learning strategies** – ended up cramming the night before
- Has no **self-evaluative standards** to measure her preparations
- **Attributes** her learning difficulties to the way the teachers explain the materials
- Has **little confidence** in her ability
- **No intrinsic value** in understanding the topics

Student B

- Has set her **goal** before studying –wants to comprehend all the basic concept
- Selected **learning strategies** she felt suited for accomplishing the goal
- Set milestones she needs to reach and periodically **evaluate** her learning
- **Attributes** her learning difficulty to the unsuitable learning strategy she chose and adjust it accordingly
- **Believe** in her ability to reach the goal
- Has **interest** in the topics

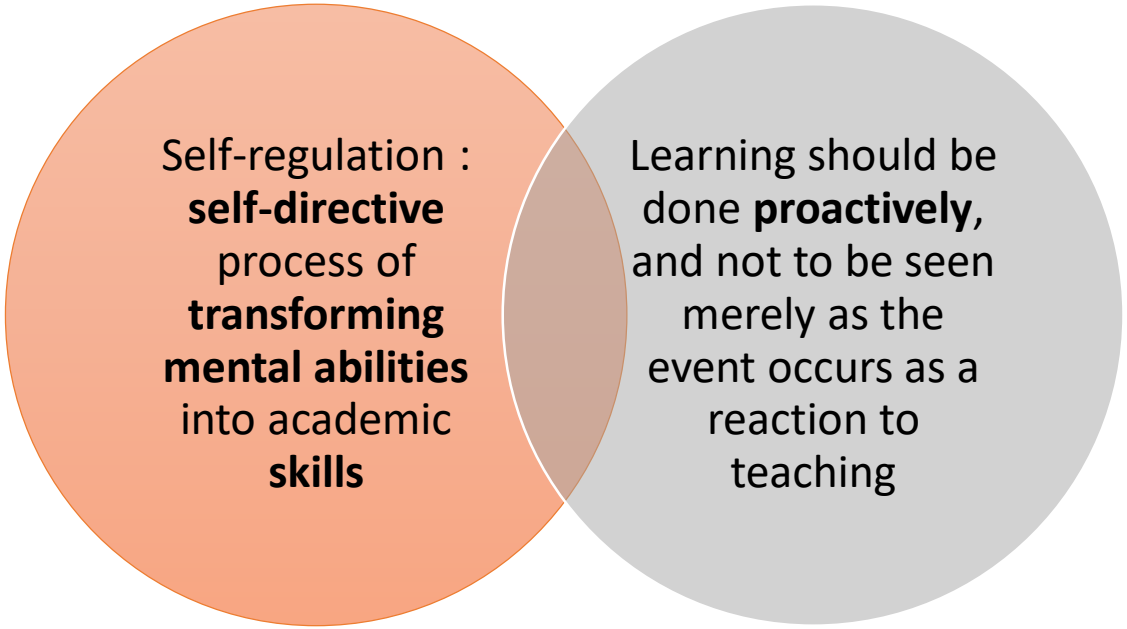
- Student A and B were facing summative exam in their module

What differentiate these two?

Outline

- **What** is Self-Regulated Learning?
- **Why** is Self-Regulated Learning important?
- **What factors** influences Self-Regulated Learning ability?
- **How** can Self-Regulated Learning be taught?

What is Self-Regulated Learning?



- Self-generated thoughts, feelings, and behaviors that are oriented to attaining goals (Zimmerman, 2000)
- Becoming aware of one's learning, making motivational and behavioural adjustment to attain and implement knowledge effectively (Colthorpe, 2019)

Zimmerman B. Becoming a self-regulated learner: an overview. Theory into Practice 2002;41(2):64-70

Colthorpe K, et al. Effect of metacognitive prompts on undergraduate pharmacy students' self-regulated learning behavior. American Journal of Pharmaceutical Education 2019;83(4):526-36

What is Self-Regulated Learning?

- The role of ‘metacognition’
  - The need for awareness and knowledge of one’s own thinking
  - Knowing one’s personal limitation and able to strategically take corrective actions
- Social cognitive aspects
  - Social influences in the development of self-regulation

Zimmerman B. Becoming a self-regulated learner: an overview.
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What is Self-Regulated Learning?

Models of Self-Regulated Learning:

- Zimmerman's Cyclical Phases Model
- Boekaerts' Dual Processing Model
- Winne and Hadwin's Model
- Pintrich's Model
- Efklides' Metacognitive and Affective Self Regulated Learning (MASRL) Model
- Jarvela and Hadwin's Socially Shared Regulation of Learning (SSRL) Model

Panadero E. A review of self-regulated learning: six models and four directions for research. Frontiers in Psychology 2017;8(422)

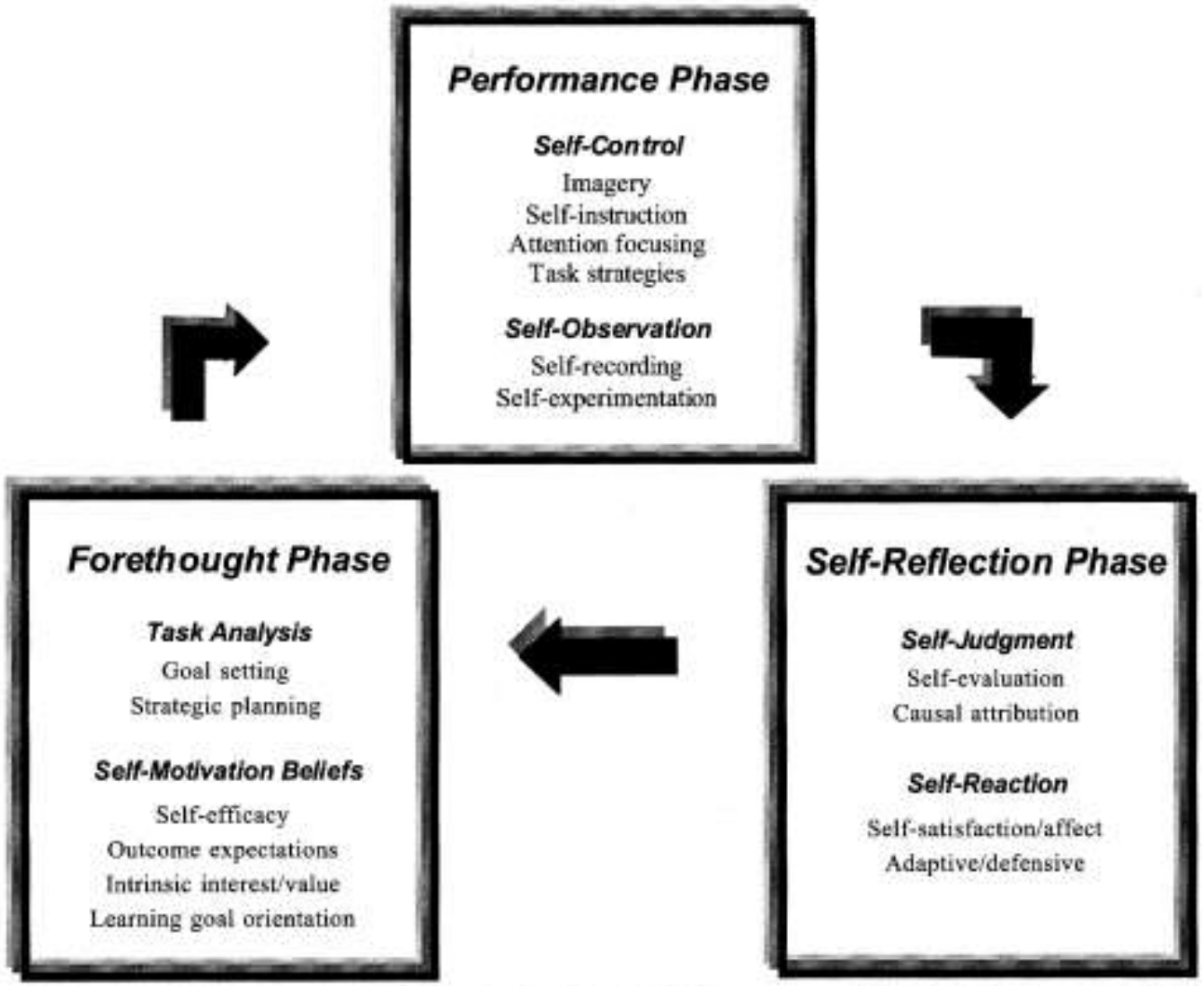

Figure 1. Phases and Subprocesses of Self-Regulation. From B.J. Zimmerman and M. Campillo (in press), "Motivating Self-Regulated Problem Solvers." In J.E. Davidson and Robert Sternberg (Eds.), *The Nature of Problem Solving*. New York: Cambridge University Press. Adapted with permission.

Zimmerman's Cyclical Phase Model

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Forethought Phase

- ✓Task Analysis
  - Goal settings
  - Strategic planning
- ✓Self-Motivation Beliefs
  - Self-efficacy
  - Outcome expectations
  - Intrinsic interest/value
  - Learning goal orientation

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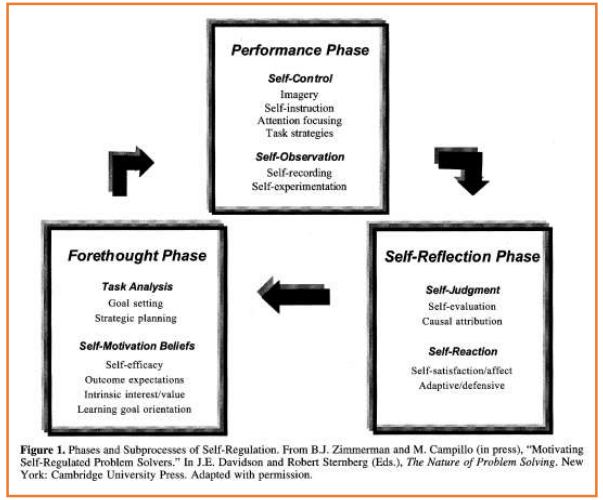
Zimmerman's Cyclical Phase Model



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Performance Phase

- ✓Self Control
  - Imagery
  - Self-instruction
  - Attention focusing
  - Task strategies
- ✓Self Observation
  - Self-recording
  - Self-experimentation

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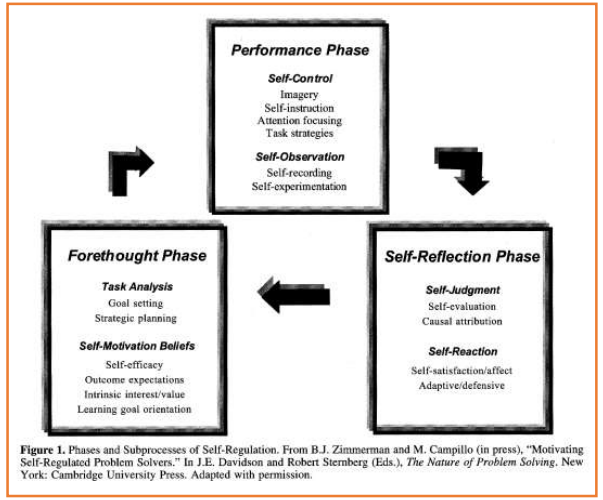
Zimmerman's Cyclical Phase Model



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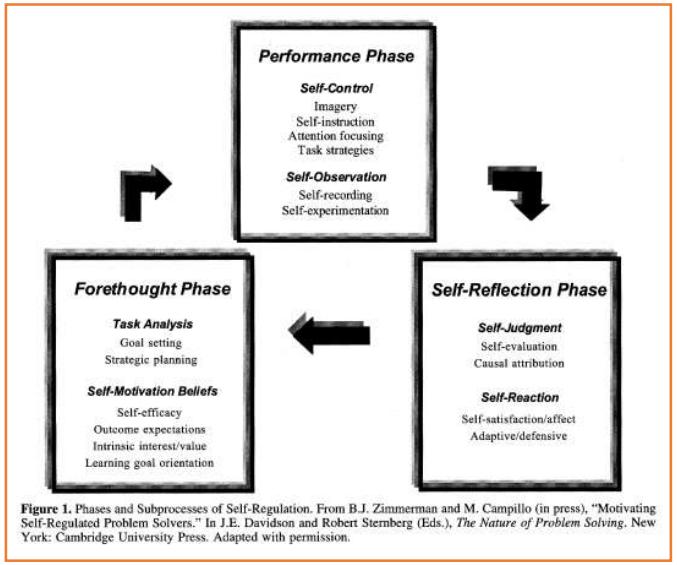
Self-reflection Phase

- ✓Self-Judgment
  - Self-evaluation
  - Causal attribution
- ✓Self-Reaction
  - Self-satisfaction/affect
  - Adaptive/defensive

Zimmerman's Cyclical Phase Model



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Novice VS Expert in conducting SRL

Novice

Conduct SRL reactively

- (-) set specific goals (tend to rely on comparison with others)
- (-) self-monitor systematically
- Attribute causation to non-changeable aspects
- Ended up with lower satisfaction and defensive reaction

Expert

Conduct SRL proactively

- High self-motivation
- Set hierarchical goals (process goals leading to outcome goals)
- Plan powerful strategies
- Self-evaluate performance against personal goals
- Attribute causation to method and strategy
- Greater satisfaction
- Enhanced self-efficacy and intrinsic interest

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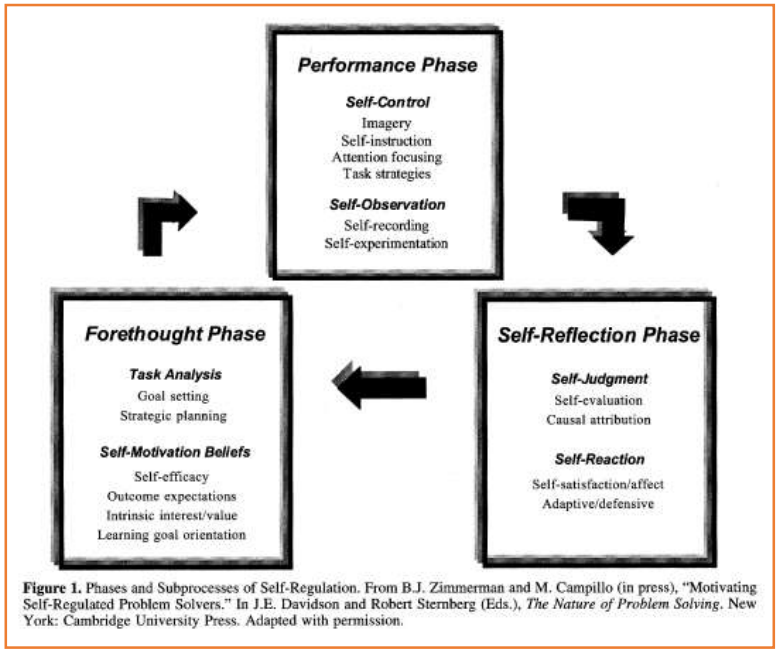

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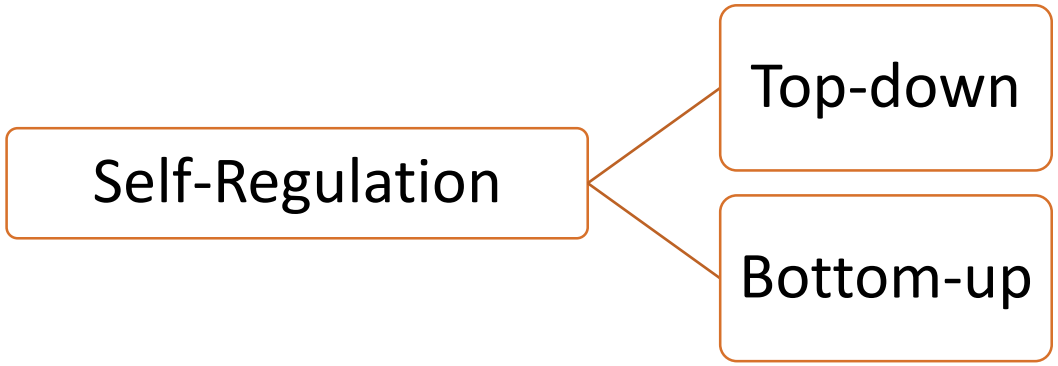
Boekaerts' Dual Processing Model

- Emphasize the role of emotion
- Tasks and opportunities for learning that are favourable (interest, efficacy, feeling of relevance) → activate the **Growth Pathway**
- Difficulties, disinterest, and stress → activate the **Well-Being Pathway**



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Boekaerts M. Self-regulation in the classroom: a perspective on assessment and intervention. Applied Psychology 2005;54(2):199-231

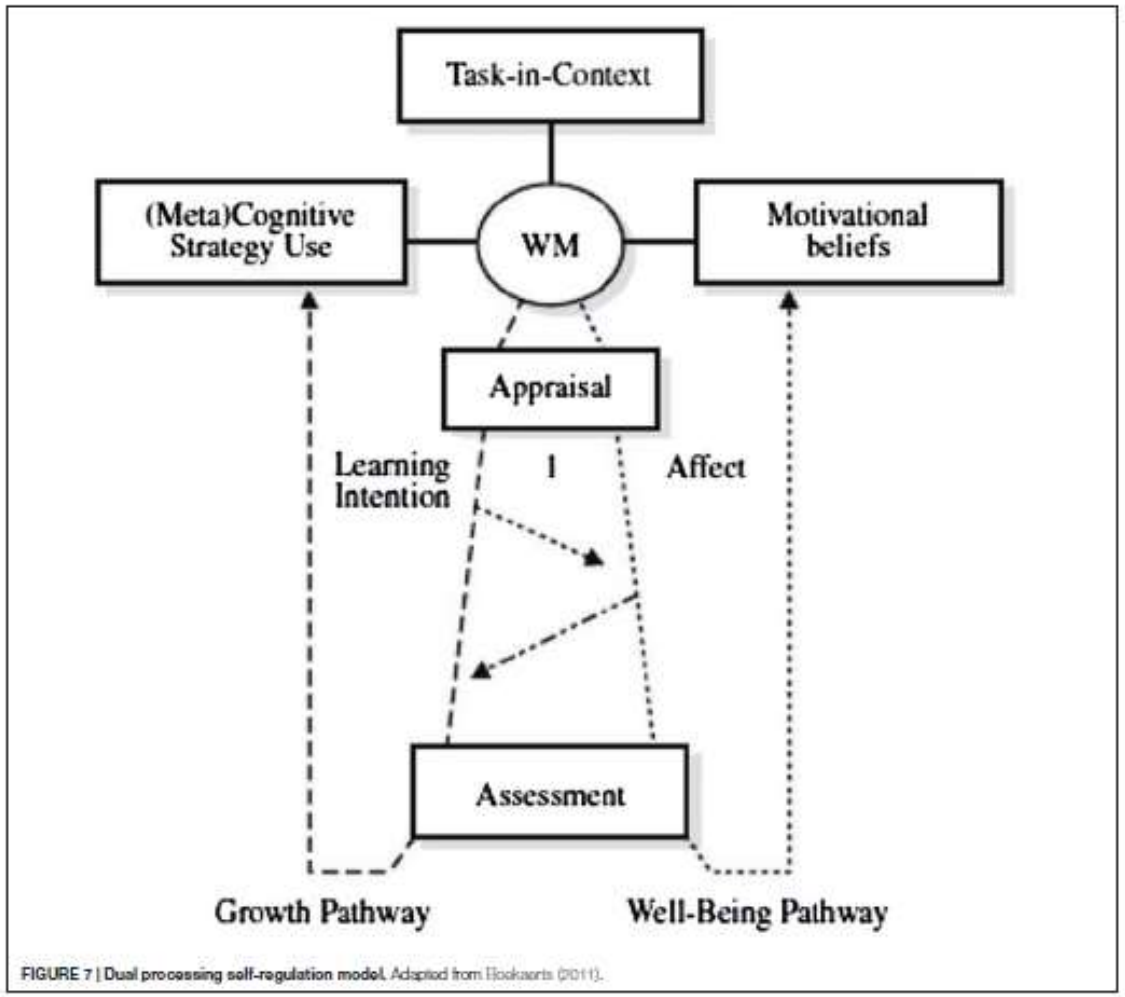
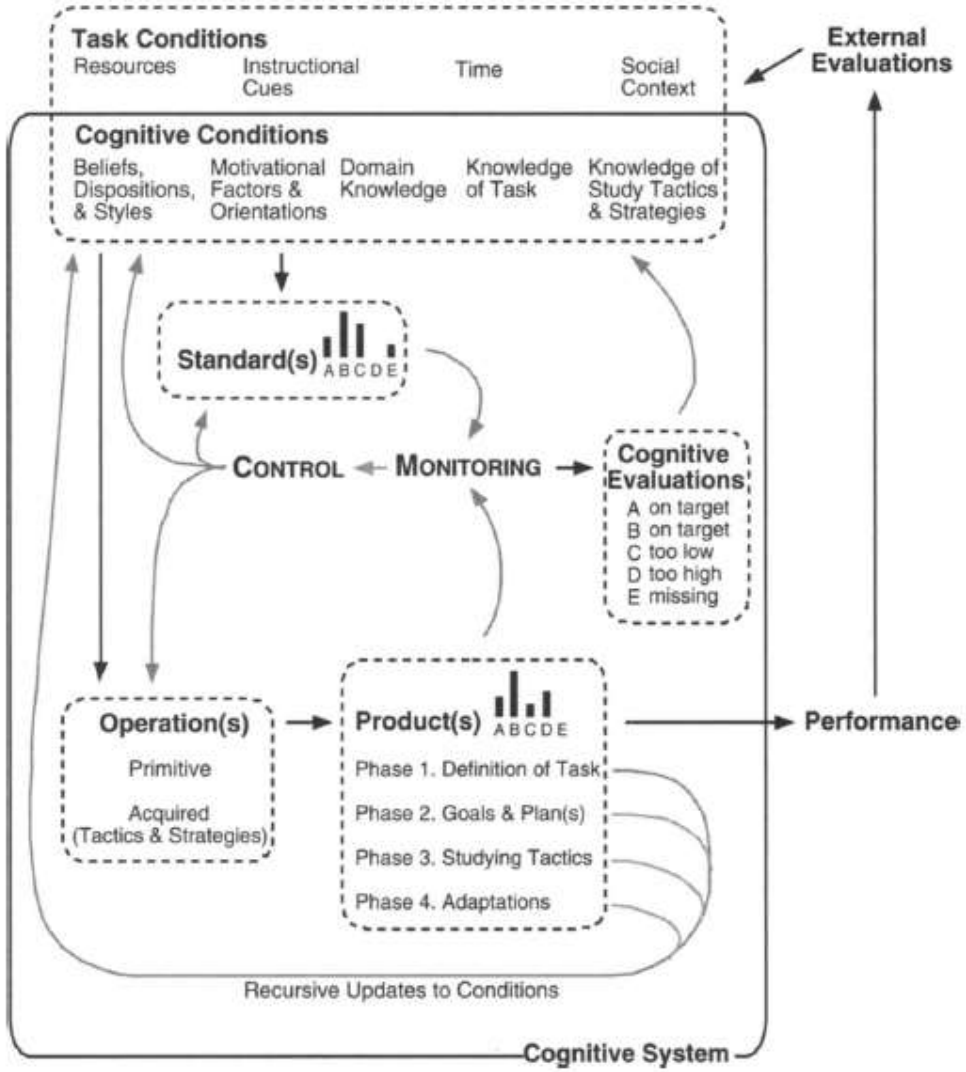


FIGURE 7 | Dual processing self-regulation model. Adapted from Boekaerts (2011).

Winne and Hadwin's Model



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Green A, Azevedo R. A theoretical review of Winne and Hadwin's Model of Self-Regulated Learning.Review of Educational Research 2007;77(3):334-72

Four phases:

1. Task Definition
2. Goal Settings + Planning
3. Studying Tactics
4. Adaptation to Metacognition

Use of COPES (Condition, Operation, Product, Evaluation, and Standards) in each phase

	Cognition	Motivation/Affect	Behavior	Context
Phase 1 Forethought, planning, and activation	Target goal setting	Goal orientation adoption	Time and effort planning	Perceptions of task
	Prior content knowledge activation	Efficacy judgments	Planning for self observations of behavior	Perceptions of context
	Metacognitive knowledge activation	Perceptions of task difficulty	Task value activation	Interest activation
Phase 2 Monitoring	Metacognitive awareness and monitoring of cognition	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help	Monitoring changing task and context conditions
			Self-observation of behavior	
Phase 3 Control	Selection and adaptation of cognitive strategies for learning, thinking	Selection and adaptation of strategies for managing, motivation, and affect	Increase/decrease effort	Change or renegotiate task
			Persist, give up	Change or leave context
			Help-Seeking behavior	
Phase 4 Reaction and reflection	Cognitive judgments Attributions	Affective reactions Attributions	Choice behavior	Evaluation of task Evaluation of context
Relevant MSLQ Scales	Rehearsal	Intrinsic Goals	Effort Regulation	Peer Learning
	Elaboration	Extrinsic Goals	Help-Seeking	Time/Study Environment
	Organization	Task Value	Time/Study Environment	
	Critical Thinking	Control Beliefs		
	Metacognition	Self-Efficacy		
		Test Anxiety		

Phases and Areas for Self-Regulated Learning (Pintrich, 2004) Areas for regulation

Pintrich's Model

- Each of the four phases have four areas for regulation
  - Cognition
  - Motivation
  - Behavior
  - Context
- Development of MSLQ intrument

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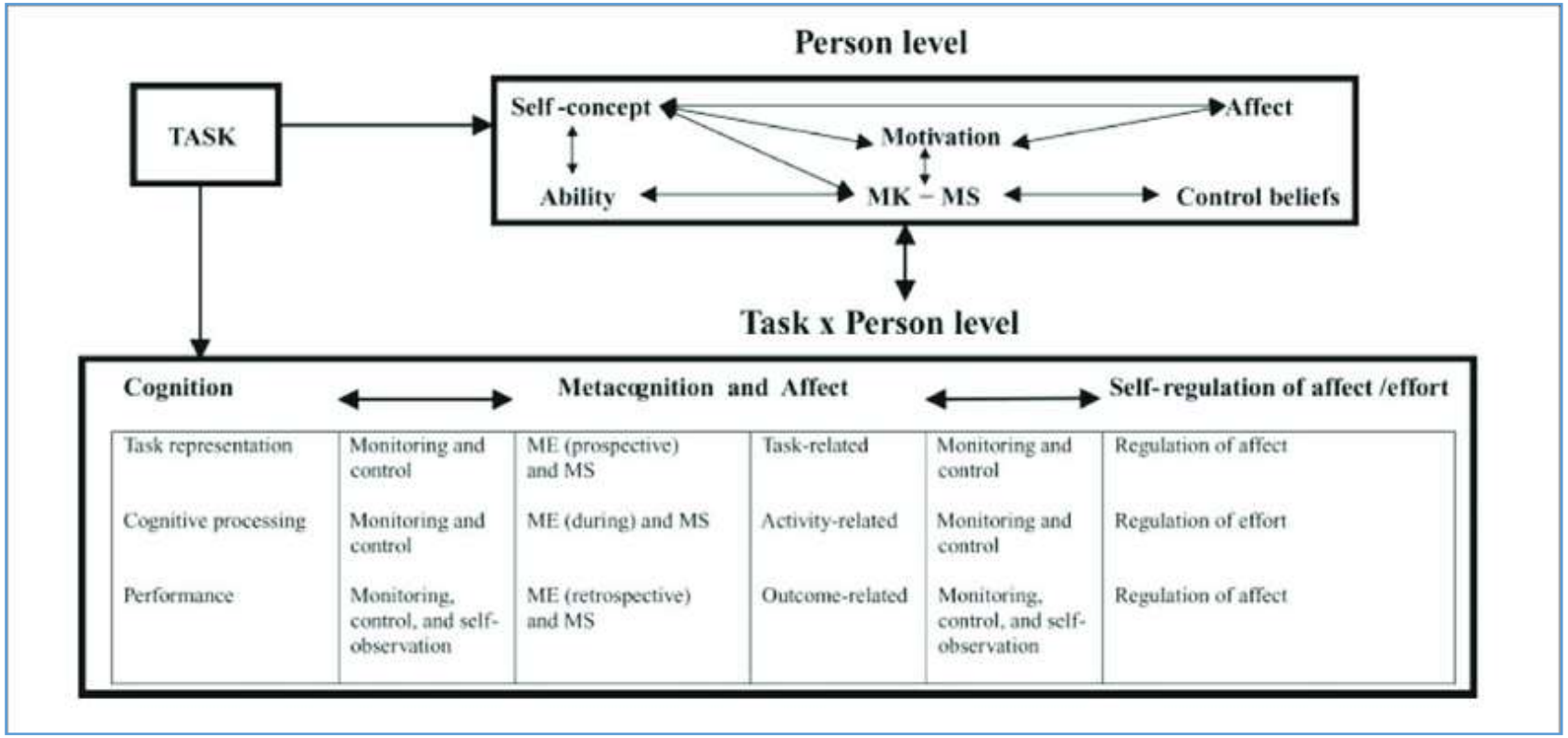
Efklides' MASRL Model

- The Person level (top-down):
  - Learner's goals guides cognitive process and the amount of effort they invest
- The Task x Person level (bottom-up):
  - Interaction between the type of task and learner's characteristics



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Verma P, et al. Past and present of Self-Regulated Learning in Digital Learning Environment. Journal of Computer Engineering and Information Technology 2018;7:4

Hadwin, Jarvella, and Miller's Socially Shared Regulation of Learning Model

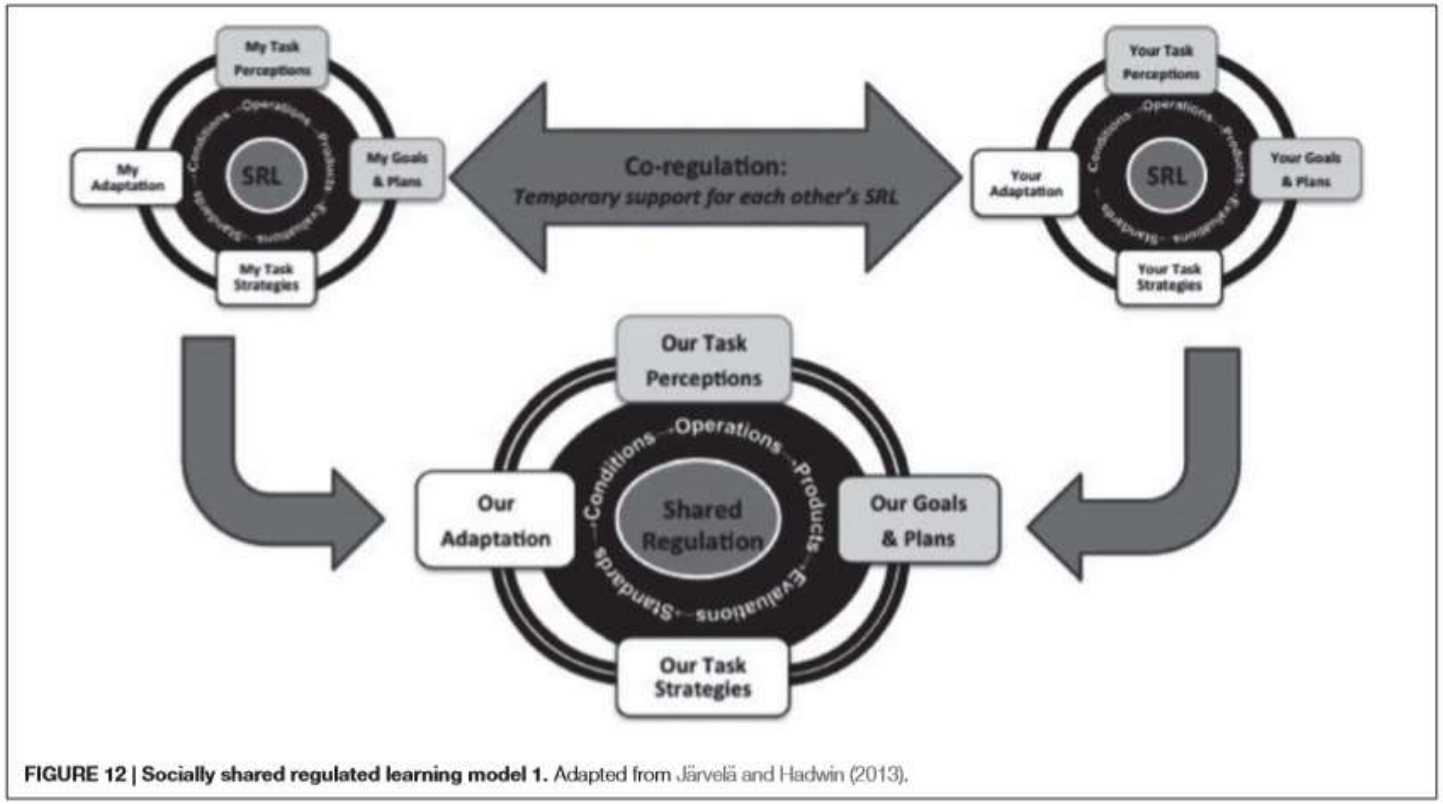

FIGURE 12 | Socially shared regulated learning model 1. Adapted from Järvelä and Hadwin (2013).

- In collaborative settings, SRL occurs in 3 levels:
  - SRL
  - Co-SRL (co-regulation)
  - SSRL (socially shared)

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Why do we need Self-Regulated Learning?

1. Individual with SRL ability tend to use deep aproach in learning (Varunki, 2017)

   1st year pharmacy students:

   - Students with good SRL ability (take more responsibility in their learning, strive to maintain their motivation, have learning expectation or goal regarding the course) tend to use deep approach
   - Students requiring more external support for their learning and no specific goal set by themselves tend to use surface approach

Varunki M, et al. First year students' approaches to learning, and factors related to change or stability in their deep approach during a pharmacy course. Studies in Higher Education 2017;42(2):331-53

Why do we need Self-Regulated Learning?

2. Individuals with SRL ability tend to perform better

In written exam and diagnostic skills (Sobral, 2000)

- Using reflection-in-learning: students with high perceived competence for SRL showed higher GPA and diagnostic ability

In biomedical examination – 1st year medical students (Gandomkar, 2016)

- Higher self-efficacy, task-specific process for metacognitive monitoring and causal attribution were associated with high performers

In final written examination – 2nd year pharmacy students (Colthorpe, 2019)

- Using meta-learning tasks: significant positive relationship between quality of **self-satisfaction**, **self-efficacy**, **goal-settings**, **self-evaluation**, and **adaptive reactions** regarding the course and students' academic achievement

Cho K, et al. The self-regulated learning of medical students in the clinical environment: a scoping review. BMC Medical Education 2017;17:112
Gandomkar R, et al. Self-regulated learning processof medical students during an academic learning task. Medical Education 2016;50:1065-74
Colthorpe K, et al. Effect of metacognitive prompts on undergraduate pharmacy students' self-regulated learning behavior. American Journal of Pharmaceutical Education 2019;83(4):526-36

Why do we need Self-Regulated Learning?

2. Individuals with SRL ability tend to perform better

In OSCE scores – medical students in surgery clerkship (Turan, 2012)

- Using MSLQ: OSCE scores increase in conjuction with increase in self-efficacy

In performing venipuncture skills – 3rd year medical students(Cleary, 2011)

Strugglers tend to:

- Focusing on outcomes (able to obtain blood sample or prevent patient's discomfort) instead of performing the steps or technique correctly
- Less mindful in evaluating their performance and use outcome as standard for their evaluation

Turan S, Konan A. Self-regulated learning strategies used in surgical clerkship and the relationship with clinical achievement. Journal of Surgical Education 2012;69(2):218-25
Cleary TJ, et al. Microanalytic assessment of self-regulates learning during clinical reasoning task. Academic Medicine 2016;91(11):1516-21

Why do we need Self-Regulated Learning?

3. Promotes mental health and well-being

In medical students (Van Nguyen, 2015)

- Using MSLQ and DASS: almost all SRL subscales significanty negatively associated with depression

In high school students (Tavakolizadeh, 2012)

- Using MSLQ and Psychological Well-Being Questionnaire: significant relationship between SRL strategies (cognitive and metacognitive strategies, self-efficacy, goal orientation, and intrinsic value) with psychological well-being

Van Nguyen, et al. The relationship between the use of self-regulated learning strategies and depression among medical students. Psychological Health Med 2015;20(1):59-70
Tavakolizadeh J, et al. The role of self-regulated learning strategies in psychological well-being condition of students. Procedia-Social and Behavioral Sciences 2012

Why do we need Self-Regulated Learning?

4. Supports clinical reasoning and clinical decision-making

In internal medicine residents (Mamede, 2010)

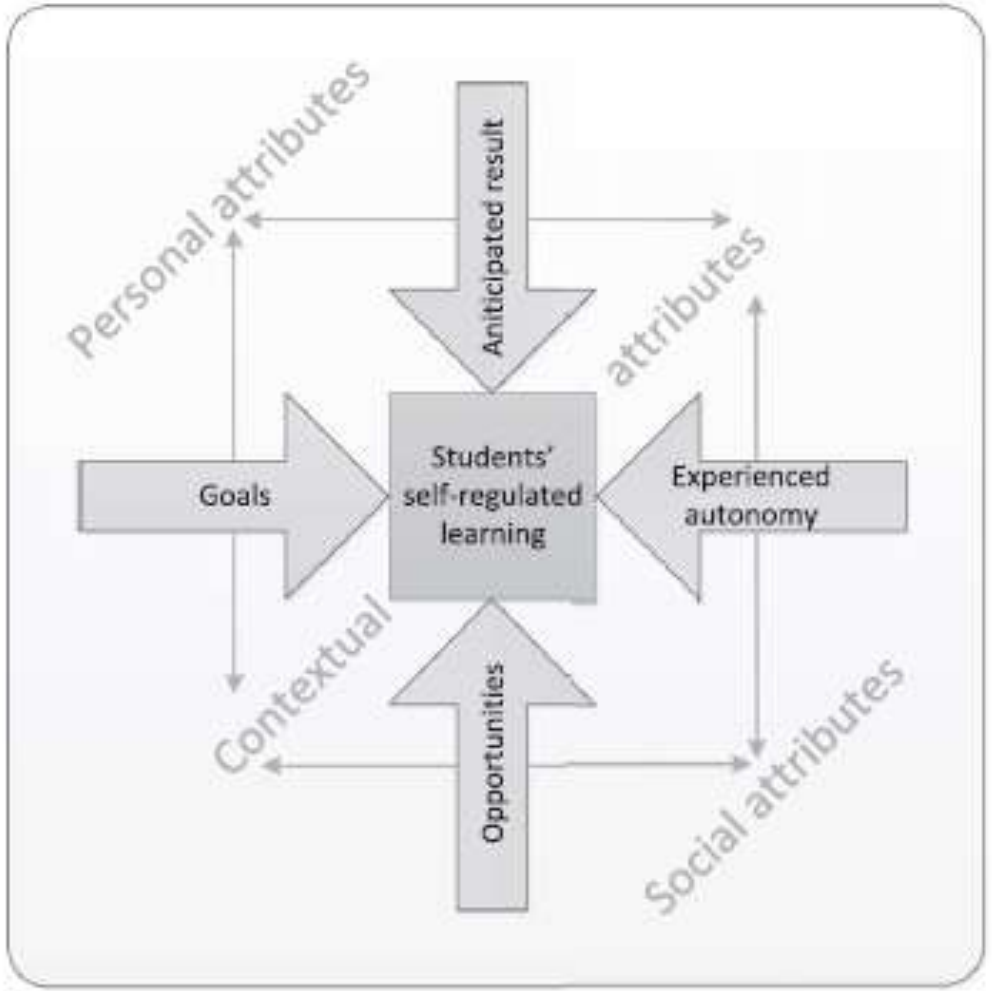
- Reflective reasoning helps improving diagnostic accuracy compared to non-analytical reasoning

Can prevent: (Colbert, 2015)

- learners' overconfidence which might lead to medical errors
- the tendency to stop studying before actually mastering the materials

Colbert C, et al. Teaching metacognitive skills: Helping your metaphysician trainees in the quest to 'know what they don't know'. AAIM Perspectives 2015;318-24
Mamede S, et al. Effect of availability bias and reflective reasoning on diagnostic accuracy among internal medicine residents. JAMA 2010;304(11):1198-24

Factors influencing Self-Regulated Learning in clinical settings (Berkhouse, 2015)

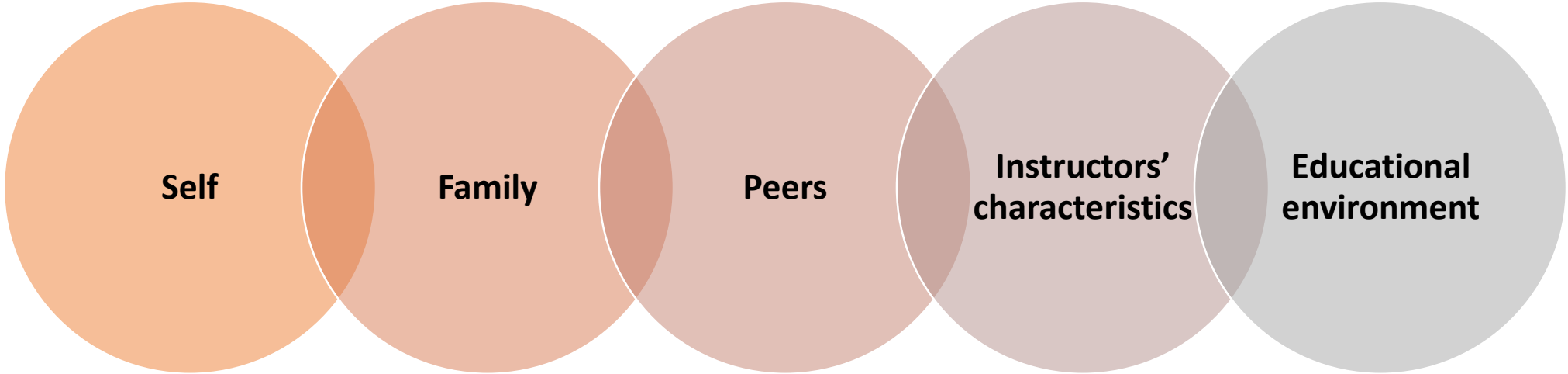


- Personal:
  - Regulation skills (emotion control, attention focusing)
  - Self-efficacy
- Contextual:
  - Curriculum, facilities, educational environment, patient-related factors, time availability
- Social:
  - Familiarity with people in certain settings, types of relationship with them

Berkhouse J, et al. How clinical medical students perceive others to influence their self-regulated learning. Medical Education 2017;51:269-79

Factors influencing Self-Regulated Learning in clinical settings (Jouhari, 2015)

Jouhari Z, et al. Factors affecting self-regulated learning in medical students: a qualitative study. Medical Education Online 2015;20:28694



Factors influencing Self-Regulated Learning in clinical settings

Berkhouse J, et al. Patterns in clinical students' self-regulated learning behaviour. Advance in Health Science Education 2016
Kececi A. Self-regultead learning in nursing: a study from a health education course. International Journal of Human Science 2017:14(4):3380-92

Study in nursing students (Kececi, 2017):

- Tendencies to rely on **external factors/extrinsic goal orientation** associated with students' satisfaction and desire to get higher grades than their peers

Patterns of students' SRL in clinical phase (Berkhouse, 2016)

SRL behavior pattern	Characterized by:
1. Engaged	The student is highly self-regulating and learning oriented. The student is enthusiastic, hardworking, motivated, not afraid to make mistakes, and not easily affected by context
2. Critically opportunistic	The student interacts a lot, is enthusiastic, has little regard for hierarchy and wants to enjoy the clerkships. The student uses little effort, does not structure the learning environment, is critical of the learning environment, and can easily lose motivation
3. Uncertain	The student is overwhelmed by the clinical environment, needs a safe environment to learn and shows little self-regulation. The student behaves passively and is highly dependent on the supervisor
4. Restrained	The student is highly motivated, self-critical, but is afraid to appear inferior to others and therefore wants to learn independently. The student realizes the need for guidance from supervisors, but is afraid to ask questions and ask for feedback
5. Effortful	The student works very hard compared to peers and always comes prepared. The student needs to be told what to do, wants to learn independently, but shows little environment structuring and is afraid to admit being in difficulty

How can Self-Regulated Learning be taught?

- SRL is **not asocial** in nature and origin
- Each SRL process can be learned from **instruction** and **modeling** by parents, teachers, and peers (Zimmerman, 2002)
- Only few teachers effectively prepare students to conduct SRL

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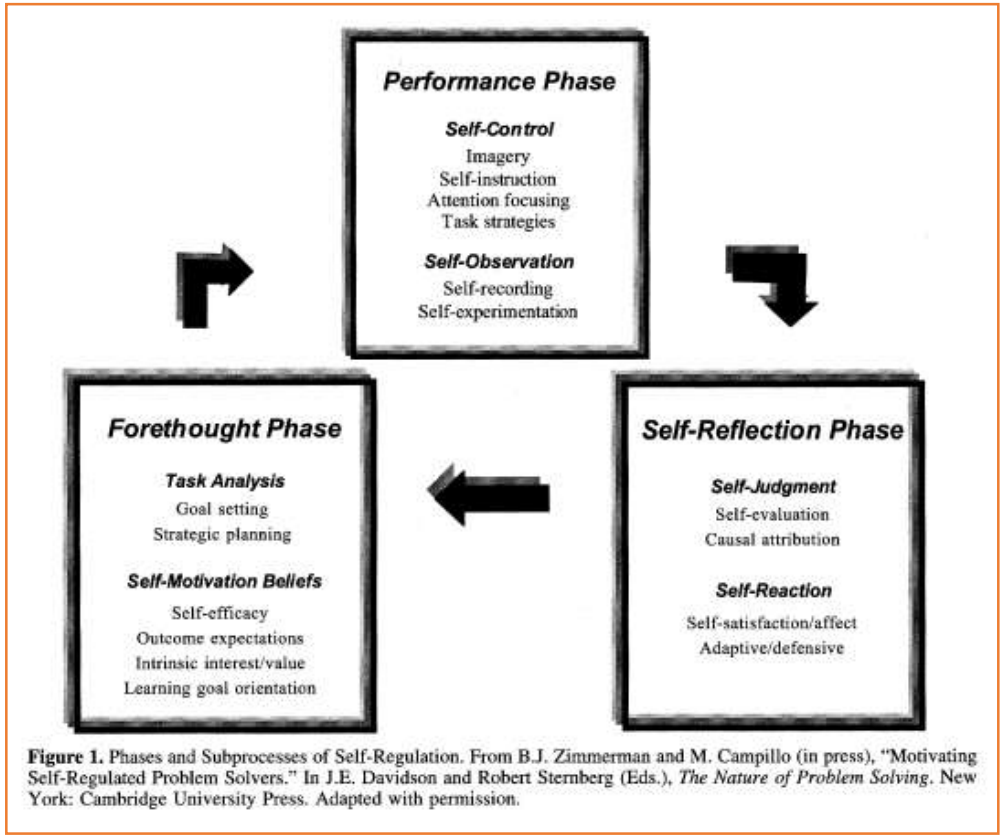
How can Self-Regulated Learning be taught?

- Reflection (Colbert, 2015)
  - Students are encouraged to reflects on their experience
  - Reflections can be modeled by teachers
  - Incorporating reflection in the curriculum
    - ✓ Identifying teaching moments suitable for reflection (i.e: PBL session, debriefing before simulation, morbidity and mortality conference)
    - ✓ Strategies: think-aloud, questioning strategies, the Five Why, aided by graphic organizers
    - ✓ Use of structured workbook to self-monitor performance and record strategies (Nietfeld, 2006)

Colbert C, et al. Teaching metacognitive skills: Helping your metaphysician trainees in the quest to 'know what they don't know'. AAIM Perspectives 2015;318-24



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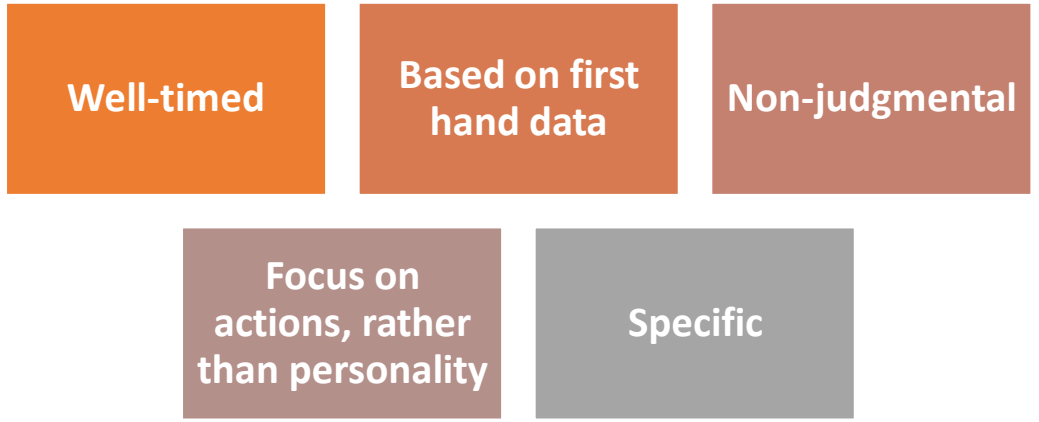
How can Self-Regulated Learning be taught?

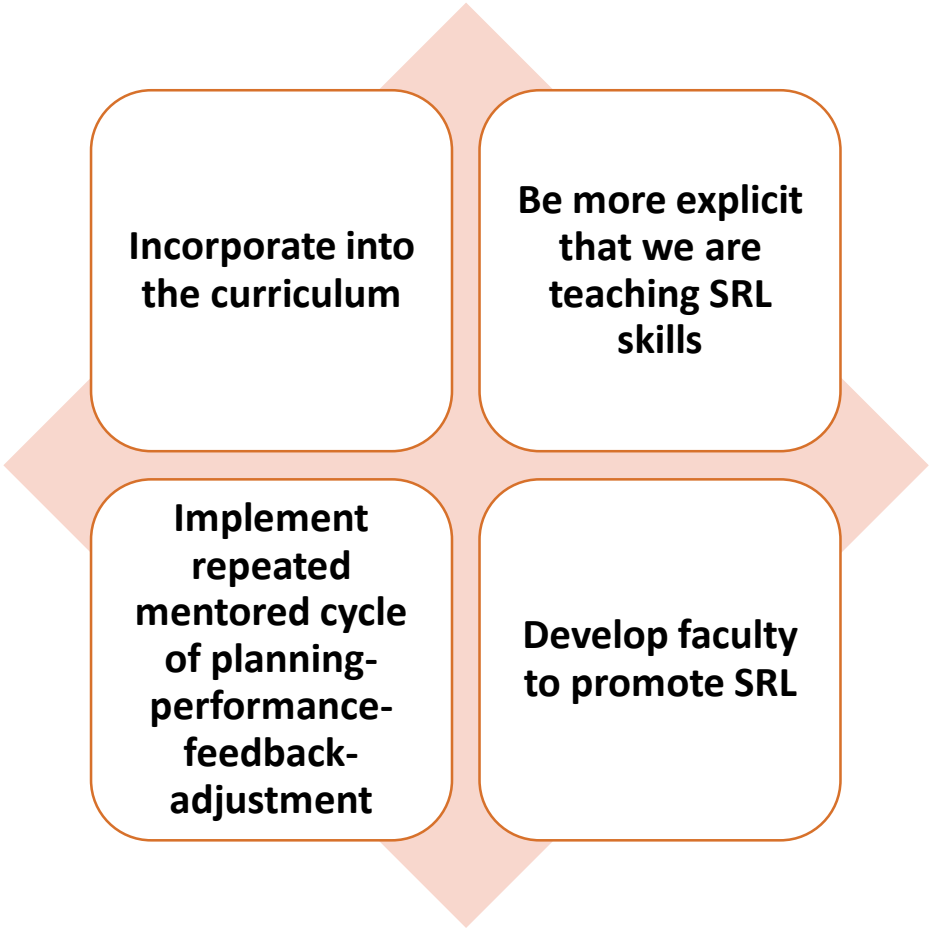
- Feedbacks
  - Feedbacks from credible sources are very important for learners to support their evaluative ability
  - Features of effective and constructive feedbacks need to be implemented (Hesketh and Laidlaw, 2002):
  - The use of formative assessment



Heskeath EA, Laidlaw JM. Developing the teaching instrinct: feedback. Medical Teacher 2002; 24(3):245-8

How can Self-Regulated Learning be taught?

Chen C. Why and how should we teach learners to be self-regulated? Pearls on Educational Principles 2014. University of California San Fransisco.



Forethought

- What is my goal
- What strategy is needed? What resource will I need?
- What is my motivation?

Performance

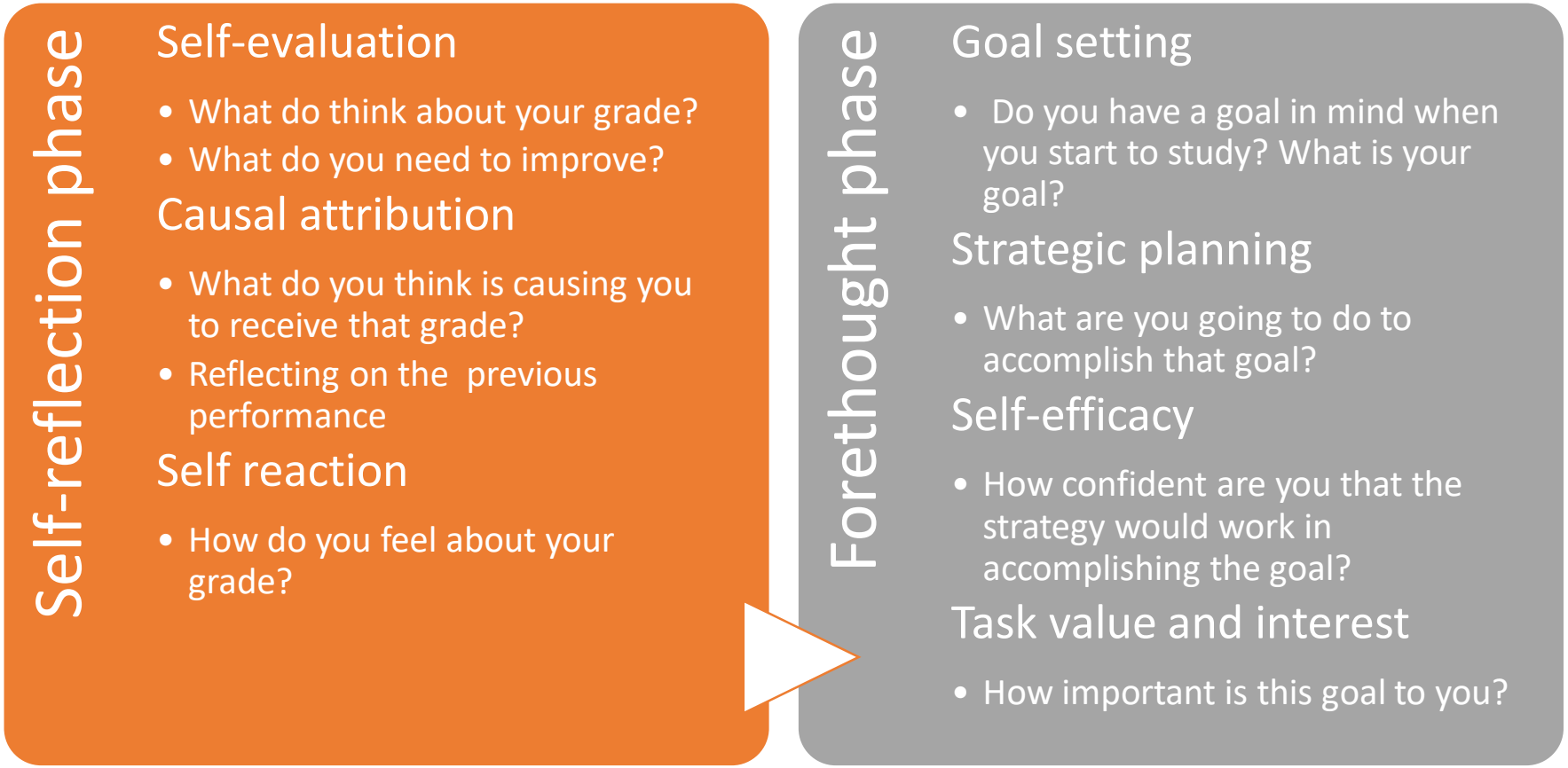
- Do I understand what I am doing?
- Are my goals being reached?
- Any thoughts to modify the environment ?
- Any thoughts to modify my emotion?

Reflections

- Have I reached the goal?
- What worked? What needs improvement?

How can Self-Regulated Learning be taught?

- Using SRL to facilitate mentoring for struggling students (Durning, 2011)



Durning SJ, et al. Viewing "strugglers" through a different lens: how a self-regulated learning perspective can help medical educators with assessment and remediation. Academic Medicine 2011;86(4):488-95

Take home message

- Self-Regulated Learning is crucial leads to better performance and crucial for developing the culture of lifelong learning
- The skills to conduct SRL are teachable by means of role-modeling, teaching reflective skills and providing constructive feedbacks, as well as creating supportive educational environment