

# The science of music performance skill acquisition: Planning, executing, and reflecting for achievement

Dr. Peter Miksza

Associate Professor of Music (Education)

Indiana University Jacobs School of Music

# Overview

Background

Musical expertise

Self-regulated Learning

Forethought

Performance/Motor Skill Acquisition

Self-Reflection

Broader Applications

# Background

A believer, but a perpetually frustrated practitioner

Students who didn't want to practice

Students who didn't know how to practice

Students who had tools but couldn't apply them well

# Background

**We need to teach them music**

**We need to teach them what effective learning is and how to do it themselves**

# Musical Expertise

Deliberate Practice  
K. Anders Ericsson

Effortful  
Intentional  
Specific goals  
Specific, designed strategies  
Outcomes monitored carefully

*Informal practice important as well*



So... what's happening before,  
during, and after  
“deliberate practice”?

# Self-regulated Learning

Barry Zimmerman

Learners as “metacognitive, motivational, behaviorally active participants in their own learning” (Zimmerman & Martinez-Pons, p. 284, 1988)

- A malleable characteristic
- Context-specific set of processes



# Self-regulated Learning

## Covert/Cognitive/Person

- Consciously monitoring and adjusting affective (i.e., motivation) and internal states and metacognitive understanding

## Overt/Behavioral/Behavior

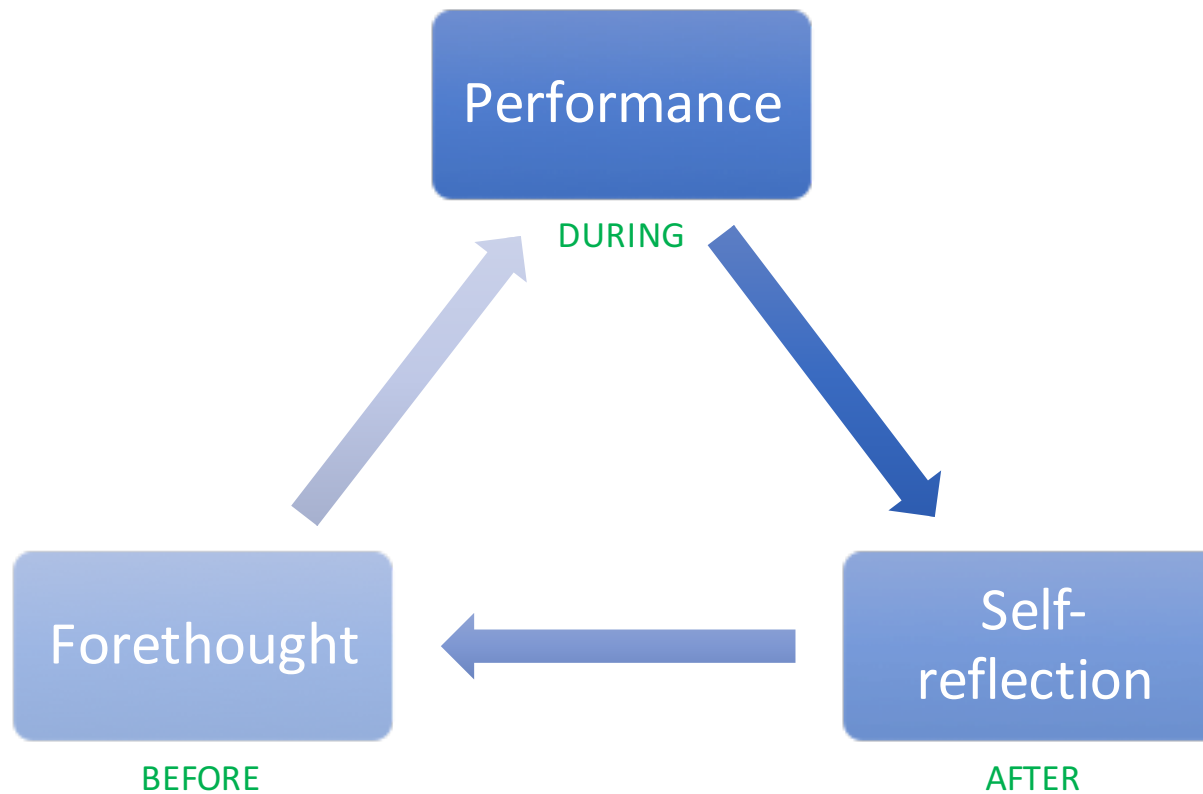
- Choosing and applying strategies
- Adjusting one's performance process

## Between people/Social/Environment

- Observing and adjusting environmental conditions
- Learning from models

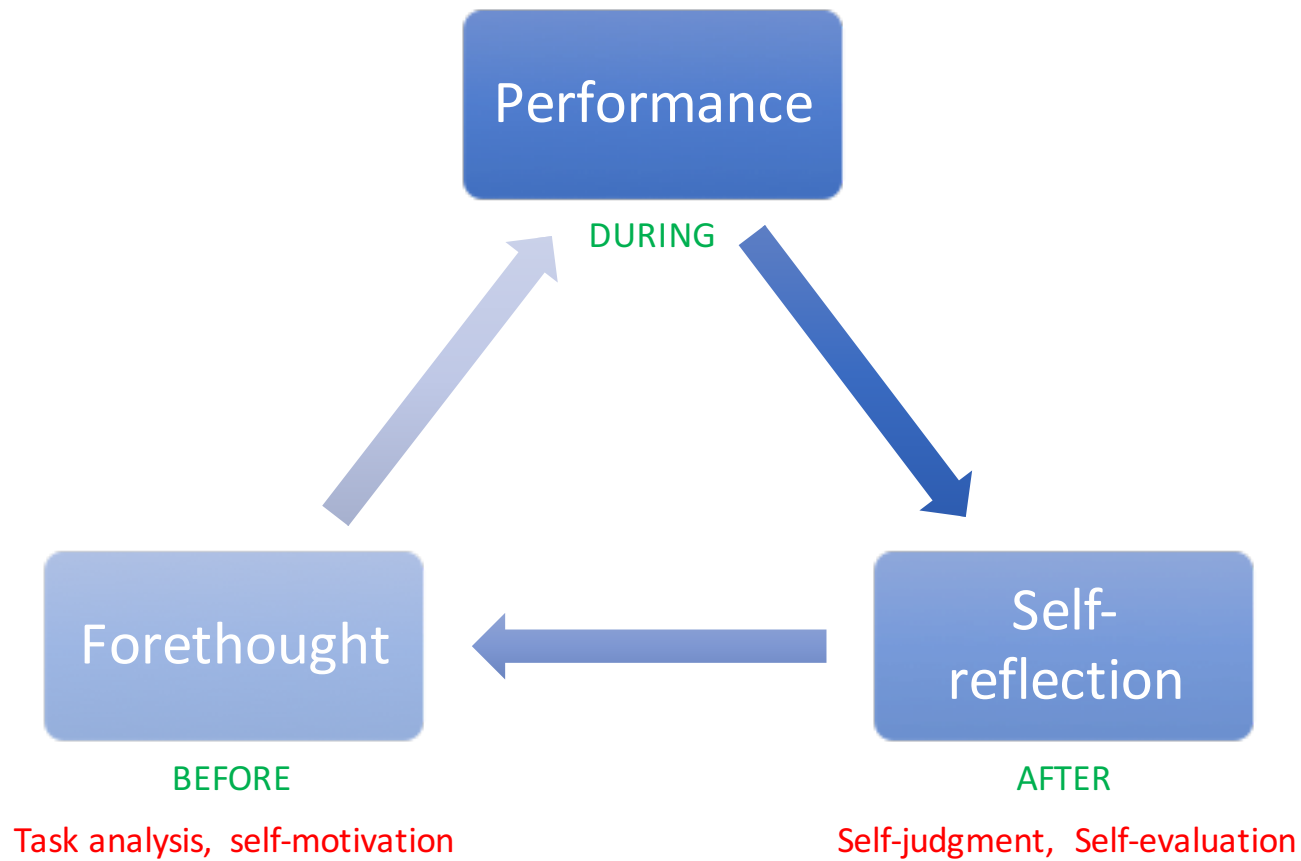


In the moment... a cyclical process

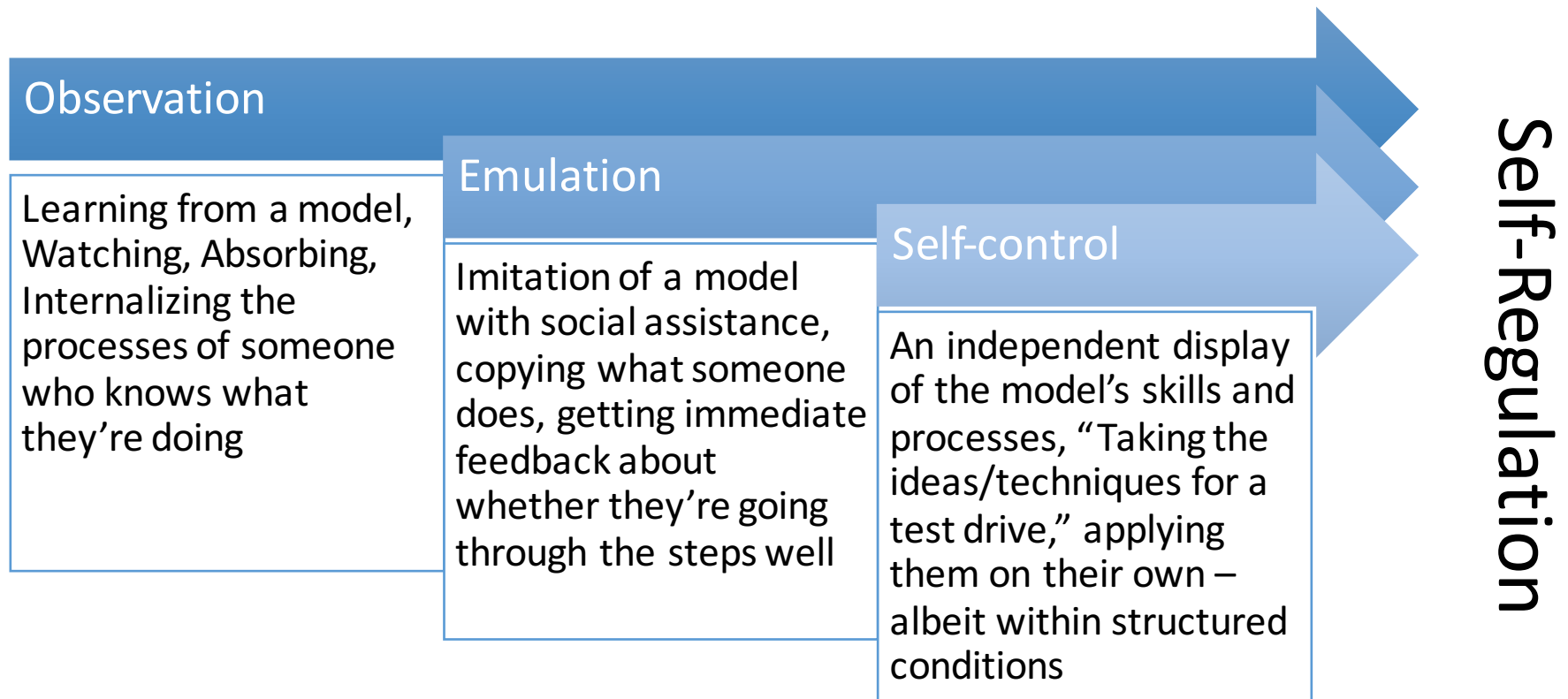


# In the moment... a cyclical process

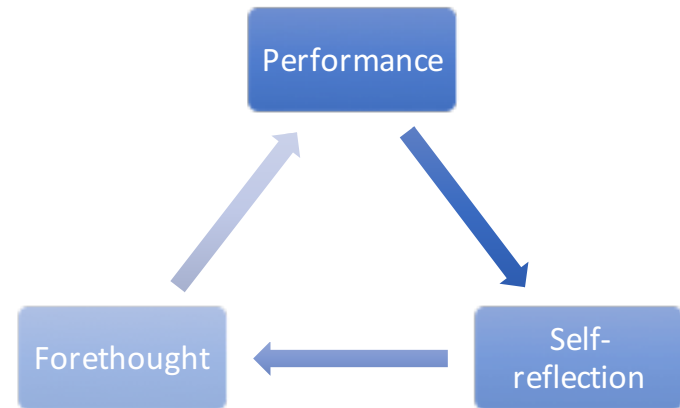
Self-instruction, Concentration, Self-observation



# Developing Self-regulation



# Forethought



# Forethought: Motivation and incentive

## Assignments

Specificity of goals, strategies, criteria – with demonstrations in-class

## Assessment and accountability

Opportunities to demonstrate mastery through multiple attempts

SmartMusic, course management system uploads

Opportunities to demonstrate practice methods

Emphasize growth and process whenever possible

# Forethought: Motivation and incentive

## Choice

Balancing a variety of repertoire with skill drills and exercises

## Peer work

Buddy-system accountability, peer-assessments built into assignments

## Contracts

Students set individualized targets with agreed upon criteria for success and, potentially, some individual- or group-contingent reward

# Forethought: Phasing in autonomy

Two major components that kids need help with...

Analyses and goals

What are the challenges in the music?

Need to teach how to choose which skills, technique, concepts, spots...

What are the best things to focus on right now?

Need to teach how to prioritize and/or “check” before moving on...

# Forethought: Phasing in autonomy

*What we wish we could do...*

- Show them, tell them
- Have them analyze the music and design the goals on their own



# Forethought: Phasing in autonomy

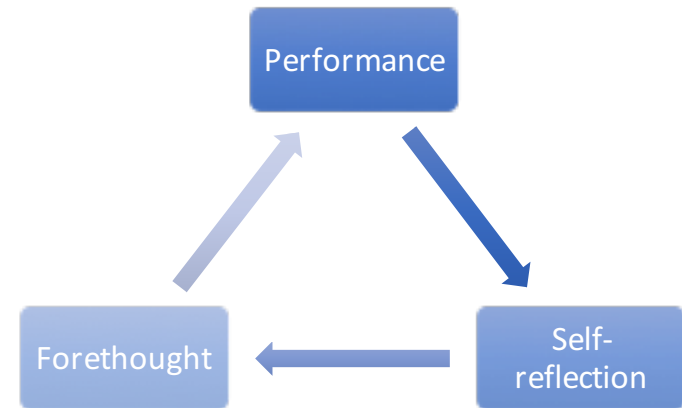
## *What we really need to do...*

- Show them, tell them, have them follow-through with you in-the-moment, assess
- Show them, tell them, have them follow-through on their own, assess
- Show them, tell them, have them gradually transfer to another similar setting, assess
- Show them, tell them, have them gradually transfer to another less similar setting, assess
- Show them, tell them, have them gradually transfer to a new setting, assess
- Have them analyze the music and design the goals on their own

# Forethought: Phrasing in autonomy

## *Ideas for rehearsal*

- What are the musical concepts present in the piece?
- What are the new/challenging rhythmic or tonal patterns?
- What idiomatic challenges are present in their parts?
- What are the criteria for “good” daily, weekly, monthly, etc. progress on the piece?
- Why are you starting the rehearsal “there”?
- Why did you stop “there” during rehearsal?



# Performance and Motor Skills

# Motor Learning: Defined

“Motor learning is a set of processes associated with practice or experience leading to relatively permanent changes in **the capability for skilled movement.**” (Schmidt & Lee, p. 327, 2011)

Learning is a cognitive process ---- a result of processing information in the mind

We infer whether learning has occurred from what we can observe

**Distinction:** Performance is not learning, learning is lasting

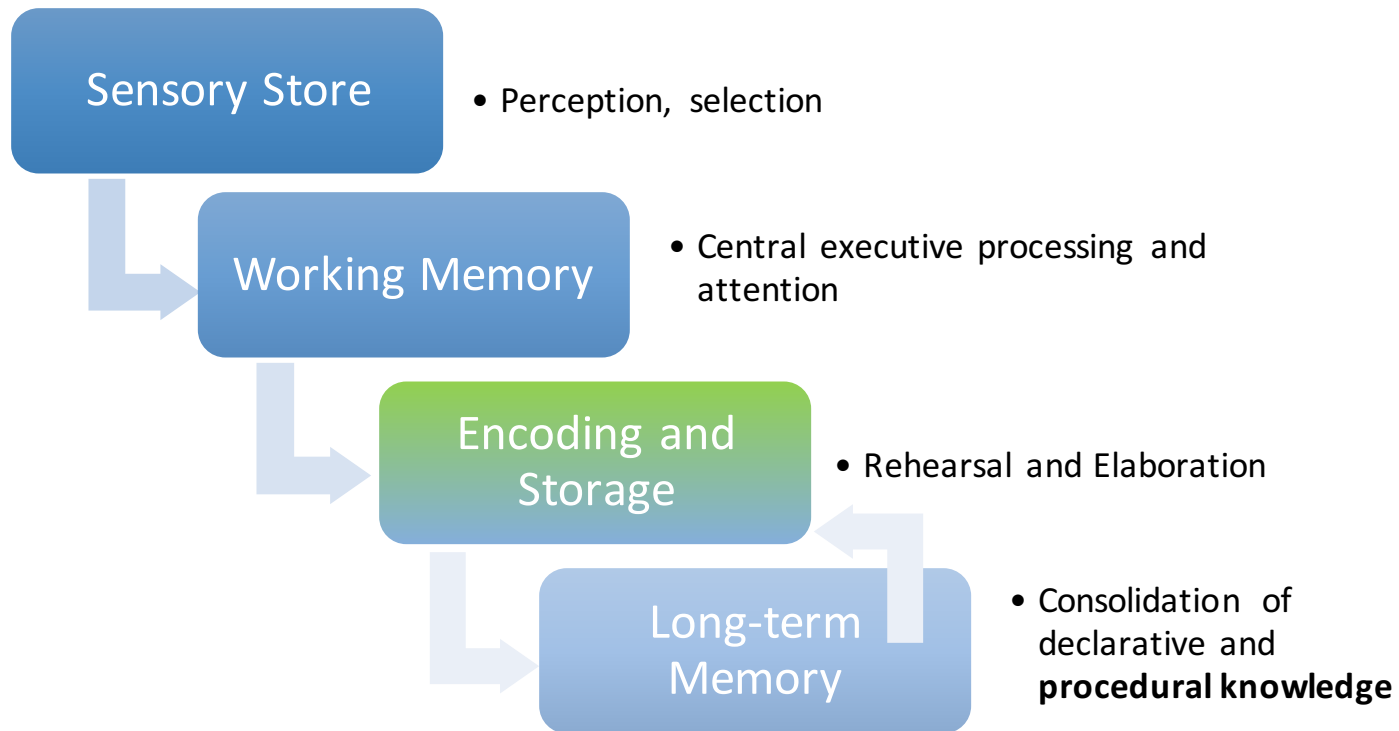
# Motor Learning: Practical concerns

- ✓ How do we get there as quickly as possible while instilling good habits and avoiding future impairment
- ✓ How do we continue to perform at high levels once we're there

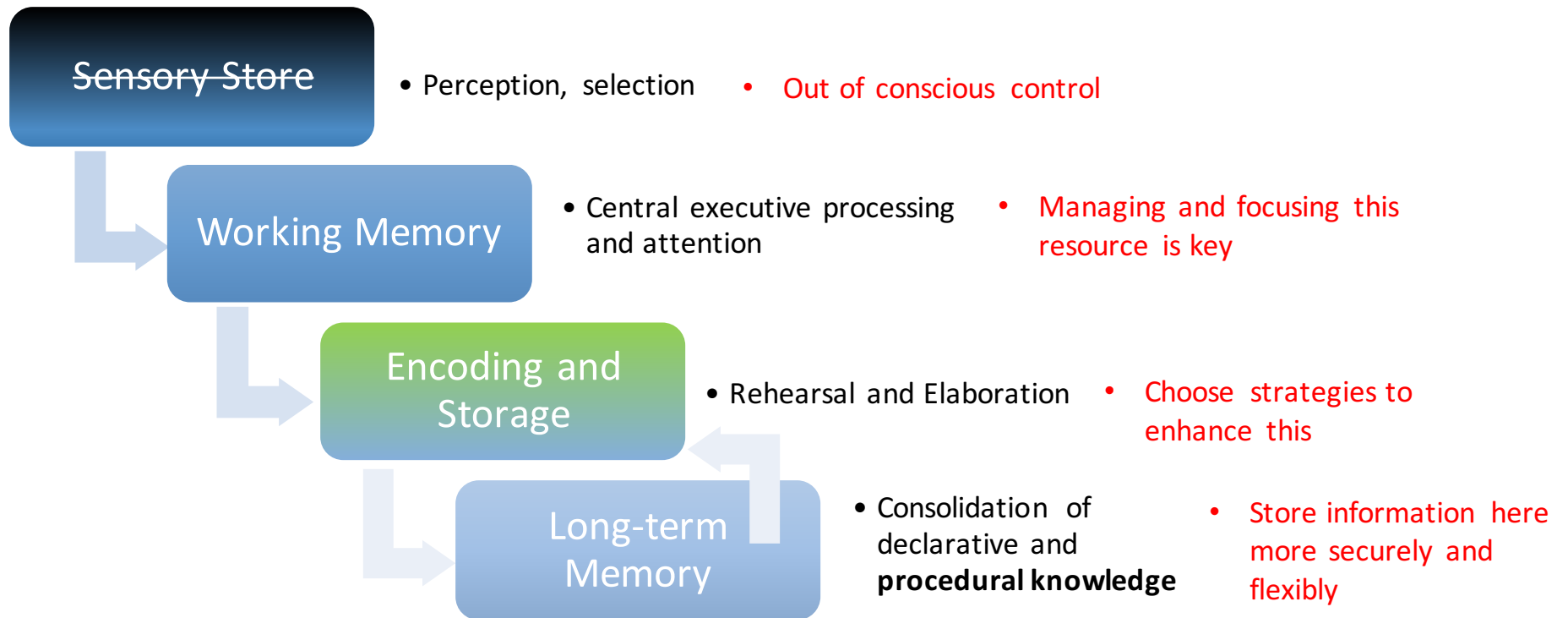
**If learning is cognitive information processing, then fundamentally we need to be concerned issues of attending, encoding, storing, and retrieving information**

# Motor Learning: Memory

Atkinson & Shiffrin; Baddely



# Motor Learning: Memory and teaching



# Motor Learning: Memory and teaching

## Attempts and repetitions

- Encode correct information
- Encourage meaningful elaboration of information
- Connect information when storing
- Test learning by assessing retrieval later on

## Attention and mental resources

- Direct attention to most beneficial focus
- Recognize energy depletion
- Maximize capacity to process but don't overwhelm
- Aim for automaticity, and trust it when it's achieved



Putting knowledge of human  
memory to work

# Performance: Strategy and focus

## Encode correct information

### Use a model

- Play, sing

- Listen to recordings

- Use play-along/music-minus-one features

- Use software for immediate feedback of errors

- Create spotify playlists

# Performance: Strategy and focus

Encode correct information

## Repetition

Slow and accurate repetition with gradual tempo increase

Chunking/chaining manageable challenges to achieve complex outcomes

Repeat larger and larger segments as mastery is achieved

# Performance: Strategy and focus

Encourage effective rehearsal and elaboration

## Repetition

- Whole-part practicing and contextualizing

- Interleave tasks across repetitions (desirable difficulty)

- Vary tasks across repetitions

# Performance: Strategy and focus

## Concentration and mental resources

Recognize cognitive load in the goal/musical challenge at hand

Intrinsic --- the task itself

Extraneous --- extra, unnecessary load we might impose in instruction

Germane --- the processing load necessary to build the skill

K.I.S.S. --- Reduce complexity and simplify

Engage in mental practice

Engage in air-playing

# Performance: Strategy and focus

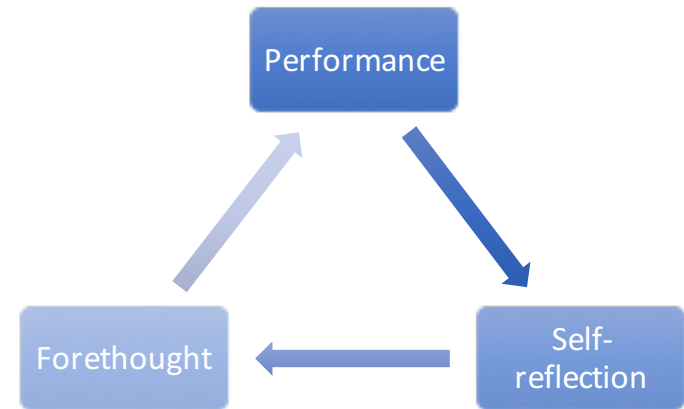
## Concentration and mental resources

### Aim for automaticity

- Work towards a focus of attention that is product-orientated
- Avoid overthinking automated skills (choking)

### Time use

- Approach practice/skill learning as distributed practice rather than massed
- Recognize fatigue and include adequate rest



# Self-reflection

# Self-reflection: Self-evaluation and affect

## Self-evaluation of performance

Children are notoriously poor at this

- Listening to oneself is cognitive overload

- Use recordings

- Peer assessment

Specific criteria and guidelines

- Perhaps the same as the teacher's assessment

Connect back to original objectives



# Self-reflection: Self-evaluation and affect

## Self-evaluation of practice/rehearsal

Children are better at this

Use recordings

Specific criteria and guidelines

Perhaps the same as the teacher's assessment

Connect back to original objectives

# Self-reflection: Self-evaluation and affect

**Affect... how do you feel about yourself**

Choose goals and objectives carefully

“Leap back” and “step forward”

Increase probability of success (Bob Duke)

Deliver feedback with neutrality

Avoid person-directed, Emphasize task-contingent

CAUTION: Accompany corrections with strategies for “fixing” problems

Emphasize effort and potential for growth

CAUTION: Do not deliver empty praise

Begin and end with success

Broader Applications

# Assignments and practice logs

Assess the process in addition to the product

How a student learns to apply themselves towards...

- Goal-setting

- Choosing practice strategies

- Engaging in reflective thought

Is probably more important than...

- How much a student practices (within reason)

And, in the long-run, is nearly as important as...

- How much they improve in the moment

# The Lead Sheet as Rehearsal Tool

Worksheets derived from repertoire – fits any level

Key/Scale

Rhythmic and tonal patterns

Melodic, harmonic, and accompanimental materials

Planned exercises with scaffolded steps

Simple-to-complex

Whole-part instructions

Etudes for challenging technique

Dr. Stephanie Prichard, University of Maryland

# A Routine Guide

An “intervention” for middle school band students:

## Emphasizes

Forethought/Planning

Performance

Self-evaluation/Reflection

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