

# Effective Instruction and the Science of Learning

Drawing on the findings of cognitive science, [Goodwin, Gibson, Lewis, and Rouleau \(2018\)](#) outline three distinct mental operations that must take place for deep learning to occur:

## Attention

Making the initial connection

## Concentration

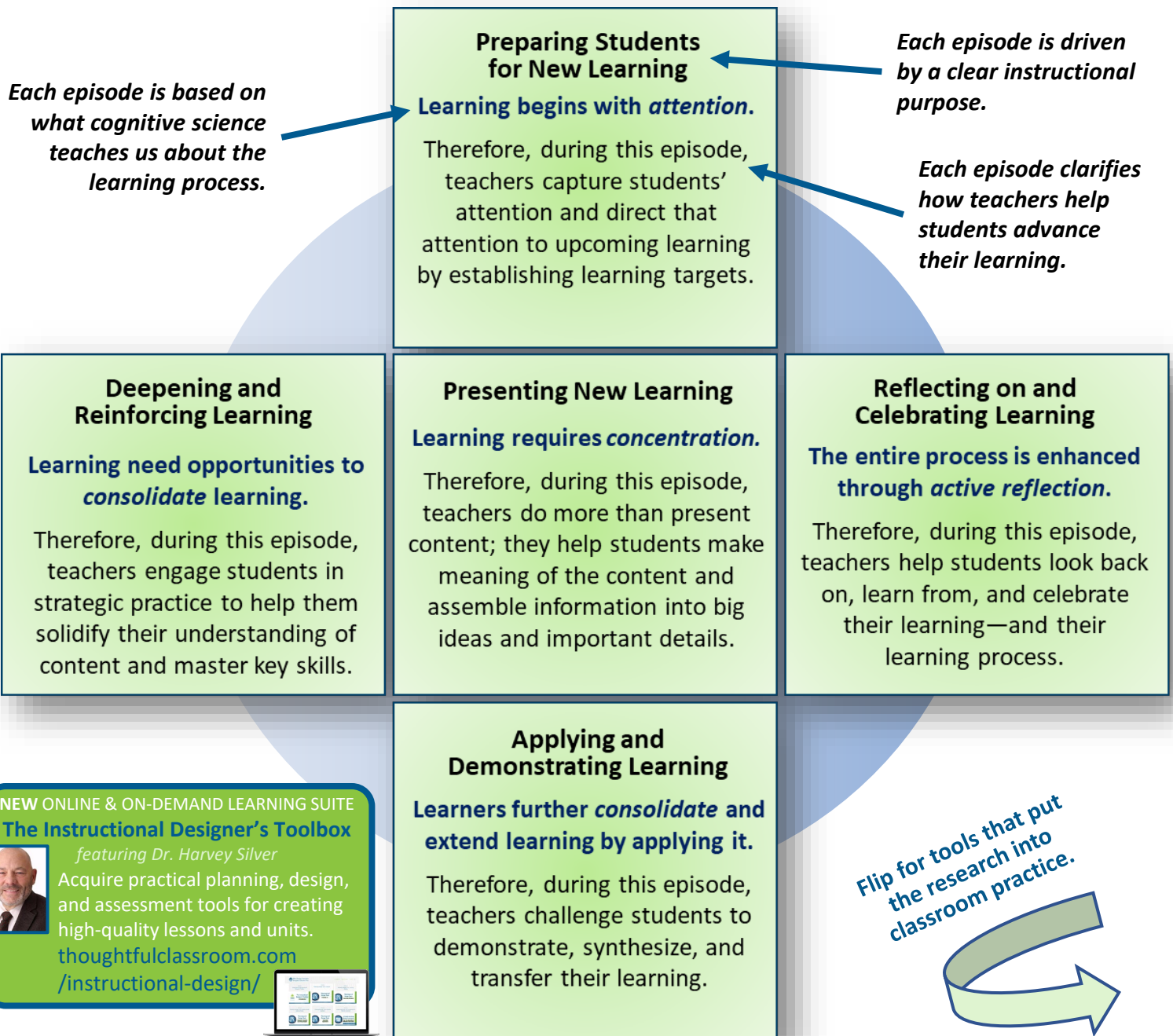
Working with and actively processing learning

## Consolidation

Practicing, elaborating, and making learning personally meaningful

The **Five Episodes of Effective Instruction** makes it easy for teachers to design and deliver instruction based on the science of learning. It also synthesizes a wide body of research on instructional design, derived from the most highly regarded instructional frameworks ([Hunter, 1984](#); [Wiggins & McTighe, 2005](#); [Marzano, 2007](#); [Dean, Hubbell, Pitler, & Stone, 2012](#)).

## The Five Episodes of Effective Instruction



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### The Instructional Designer's Toolbox

featuring Dr. Harvey Silver



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# TOOLS to Put Research into Practice

Each episode is rooted in research on learning and principles of instructional design. More important, we help teachers answer the question, “How do I turn the research into practice?” by providing a set of classroom-ready instructional **TOOLS** that help teachers put the research to work.

## RESEARCH BASE

### Preparing Students For New Learning



## TOOLS THAT HELP

#### Creating conditions that engage curiosity

📖 Goodwin, 2018; Loewenstein, 1994

#### Activating prior knowledge

📖 National Research Council, 2000; Spires & Donley, 1998

#### Establishing clear learning targets/Posing essential questions

📖 Chappuis & Stiggins, 2016; Hattie, 2012; McTighe & Wiggins, 2013

#### Pre-assessment/Goal Setting

📖 Richland, Kornell, & Kao 2009; Midwest Comprehensive Center, 2018

- ✂ Hooks and Bridges/Curiosity Catalysts
- ✂ K-W-L Jump-Start/What Comes to Mind?
- ✂ Power Previewing
- ✂ Vocabulary Knowledge Rating (VKR)
- ✂ Student-Friendly Learning Targets
- ✂ Post-Discuss-Reference
- ✂ Essential Questions
- ✂ Goal Cards/In My GRASP

## RESEARCH BASE

### Presenting New Learning



## TOOLS THAT HELP

#### Active meaning making

📖 McTighe & Silver, 2020; Willingham, 2021

#### Building conceptual understanding/How experts organize knowledge

📖 National Research Council, 2000; Erickson, Lanning, & French, 2017

#### Dual coding/Linguistic and nonlinguistic representation

📖 Clark & Paivio, 1991; Dean, et al., 2012

- ✂ Reading for Meaning
- ✂ S-O-S Graphic Organizers
- ✂ Concept Attainment/Procedural PRO
- ✂ Jigsaw/Think-Pair-Share
- ✂ Inductive Learning/Mystery
- ✂ Window Notes/Interactive Note Making
- ✂ Don't Just Say It, Display It

## RESEARCH BASE

### Deepening and Reinforcing Learning



## TOOLS THAT HELP

#### Interleaving/Distributing practice over time

📖 Dunlosky, et al., 2013; Rohrer, 2012

#### Elaborative rehearsal

📖 Khalil & Elkhider, 2016; Goodwin, et al., 2018

#### Formative assessment/Effective feedback/Growth mindset

📖 Wiliam, 2018; Dweck, 2016; Hattie & Clarke, 2019

- ✂ Repetition, Variation, Depth of Thought (RVD)
- ✂ Graduated Difficulty
- ✂ Questioning in Style/Comprehension Menus
- ✂ Forced Choice/Because
- ✂ 4-2-1 Summarize
- ✂ Personal Best
- ✂ Fine-Tune Your Feedback/Glow & Grow

## RESEARCH BASE

### Applying Learning



## TOOLS THAT HELP

#### Learning and transfer

📖 National Research Council, 2000, 2012

#### Authentic assessment/Real-world thinking skills

📖 Wiggins & McTighe, 2005; Silver, Boutz, & McTighe, 2022

#### Writing for college and career readiness/The writing process

📖 Conley, 2007; Graves, 2003

- ✂ GRASPS/Guiding & Grading Rubrics
- ✂ From Challenges to Controversies
- ✂ Task Rotation/Assessment Menus
- ✂ The Write Way to Motivate
- ✂ Arguments: A TREAT to Write
- ✂ PEERS/Writer's Club
- ✂ Knee-to-Knee Conference

## RESEARCH BASE

### Reflecting on and Celebrating Learning



## TOOLS THAT HELP

#### Reflection

📖 Helyer, 2015; Larsen, London, & Emke, 2016

#### Celebrating learning

📖 Berger, Rugen, & Woodfin, 2014; Farr, 2003

#### Metacognition

📖 Costa & Kallick, 2008; Cambridge International (UCLES), 2019

- ✂ What? So What? Now What?
- ✂ Reflection Stems
- ✂ A Job Well Done
- ✂ Portfolios to Be Proud Of
- ✂ Test Feedback
- ✂ Effort Tracker

For the full references of all cited works, go to [www.ThoughtfulClassroom.com/5-episodes-research](http://www.ThoughtfulClassroom.com/5-episodes-research).

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