

The Science of How we Learn



Ātātou
pūrākau

Our
stories

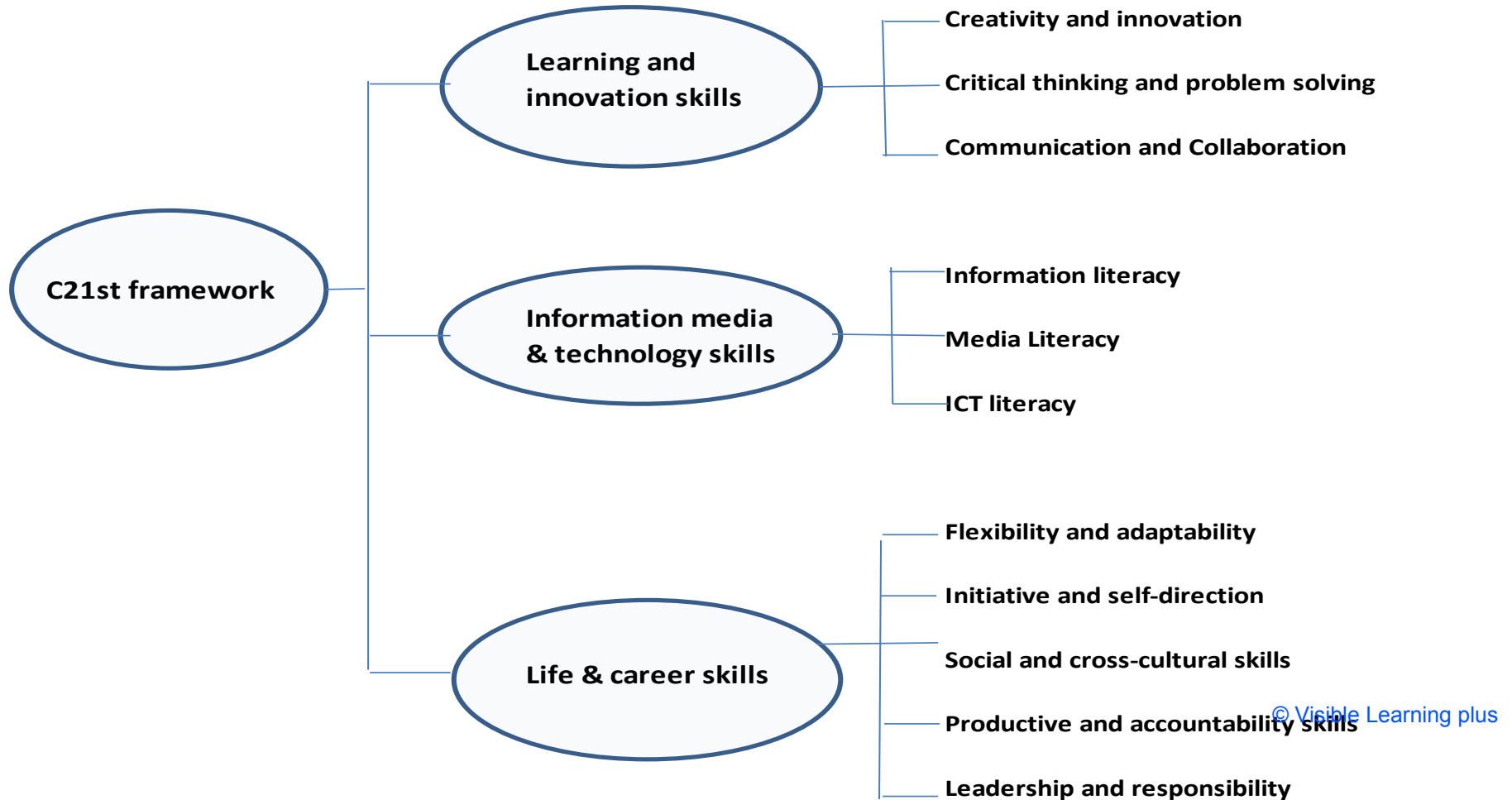


visible
learning^{plus}



Repetition
Reinforcement
Conditioning
Imprinting
Mimicking
Working memory

© Visible Learning plus



The search for strategies = 400+

Brain Gym	Mindfulness
Collaborative problem solving	Mnemonics
Comprehension Monitoring	Monitoring
Concept Mapping	Note taking
Critical thinking techniques	Planning
Discussion groups	Practice / Rehearsal
Distributed Practice	Practice Testing
Elaborative Interrogation	Re-reading
Environmental structuring	Retrieval cueing
Error monitoring	Selecting Main Idea
Examination skills	Self-monitoring
Help-seeking	Self-questioning
Highlighting/Underlining	Self-regulation
Interleaved Practice	Sleep
Keeping records & monitoring	Summarization
Learning Styles	Think Aloud
Listening & Notetaking	Time Management
Memorisation	Underlining/Highlighting

A Model of Learning

Inputs



A Model of Learning

Inputs



The Will: Dispositions

RESILIENCE – emotional strength

RESOURCEFULNESS – cognitive capability

REFLECTION – strategic awareness

RELATING – social sophistication



The Thrill

Inputs



Motivational strategies

Deep, Surface, Achieving: Motives and Strategies

Challenge



Success Criteria

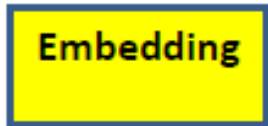
Seeking to understand what success looks like

Having a sense of the standards desired



A Model of Learning

Inputs



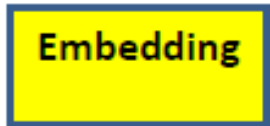
A Model of Learning

Inputs → Surface → Deep



SURFACE (increase in quantity)

One idea
Many ideas



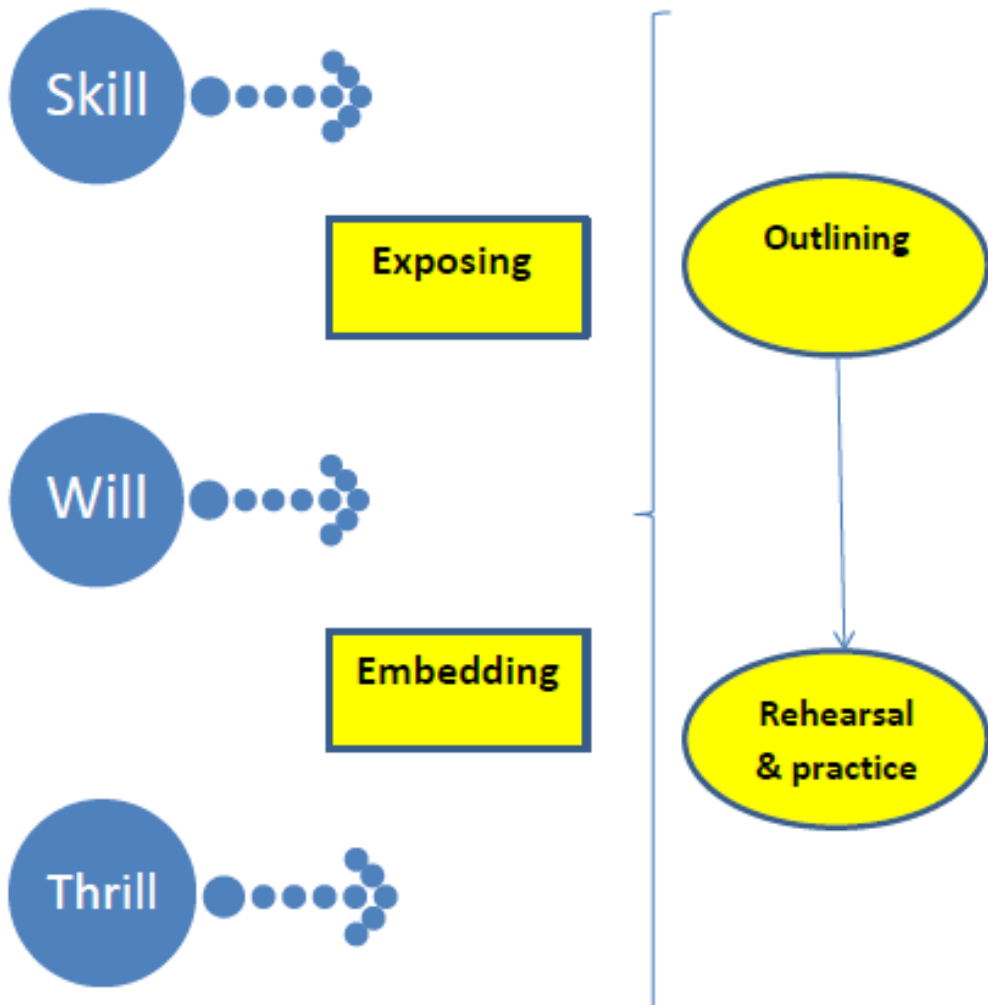
DEEP (change of quality)

Relate ideas
Extend ideas



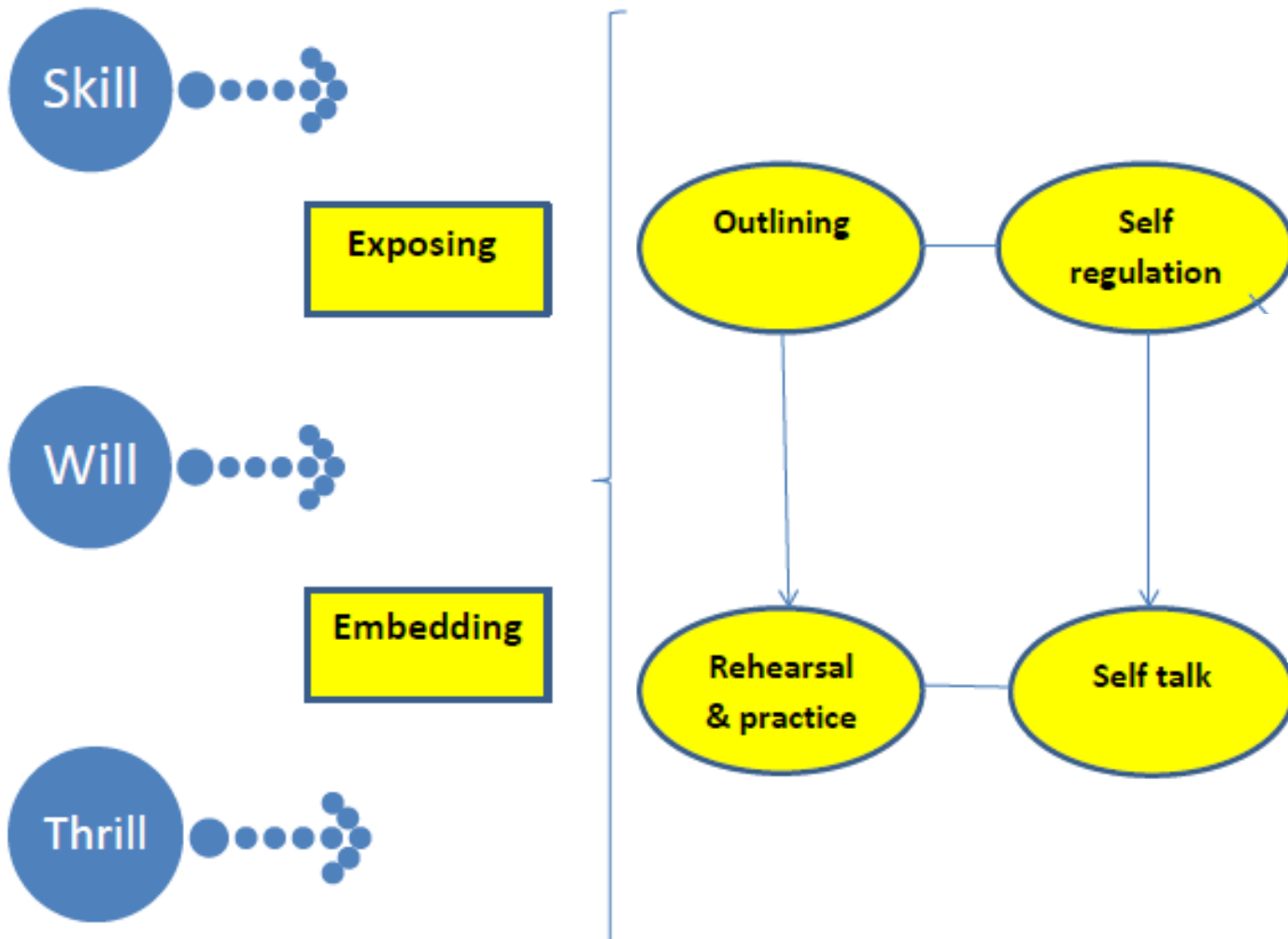
A Model of Learning

Inputs  Surface



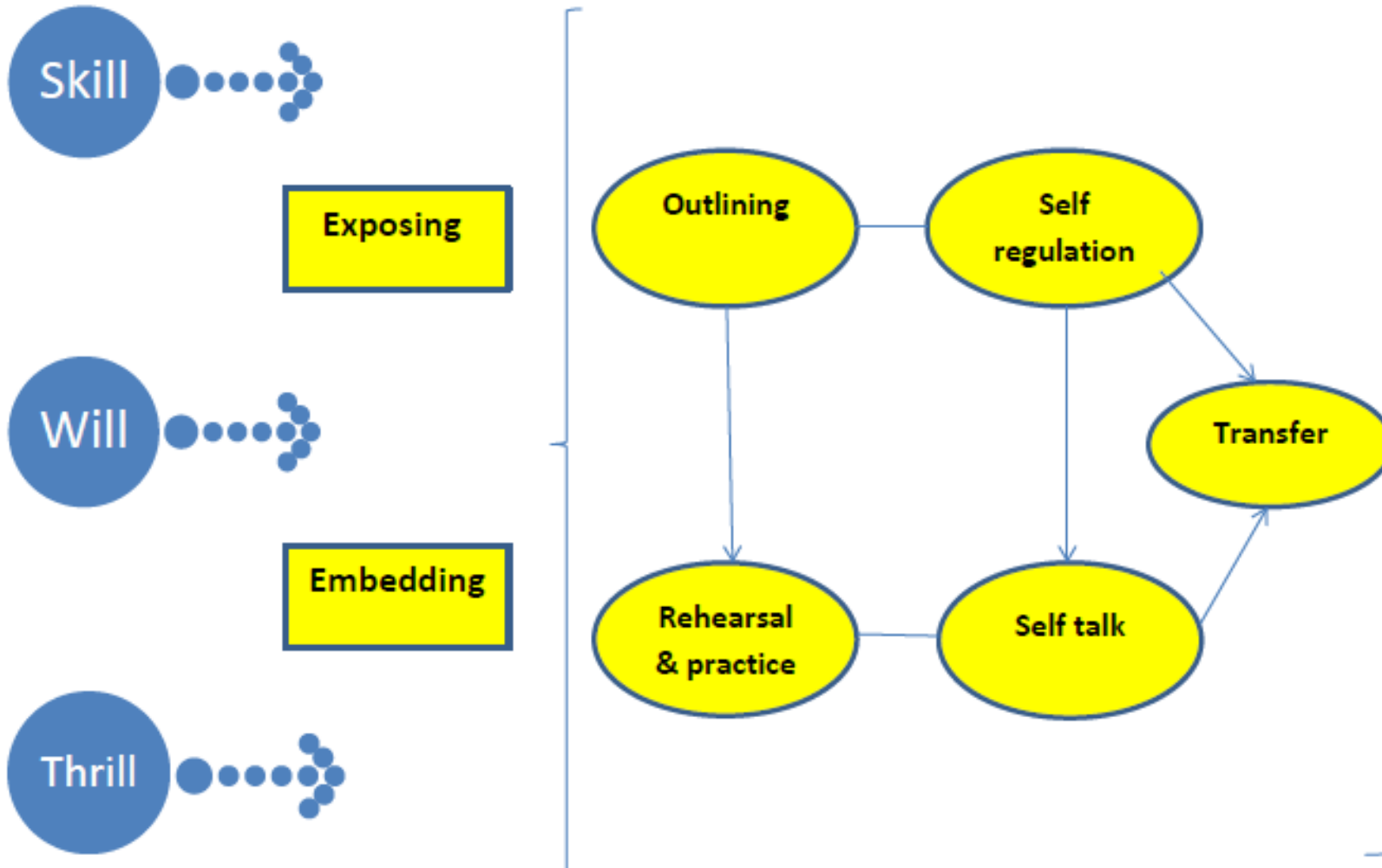
A Model of Learning

Inputs → Surface → Deep



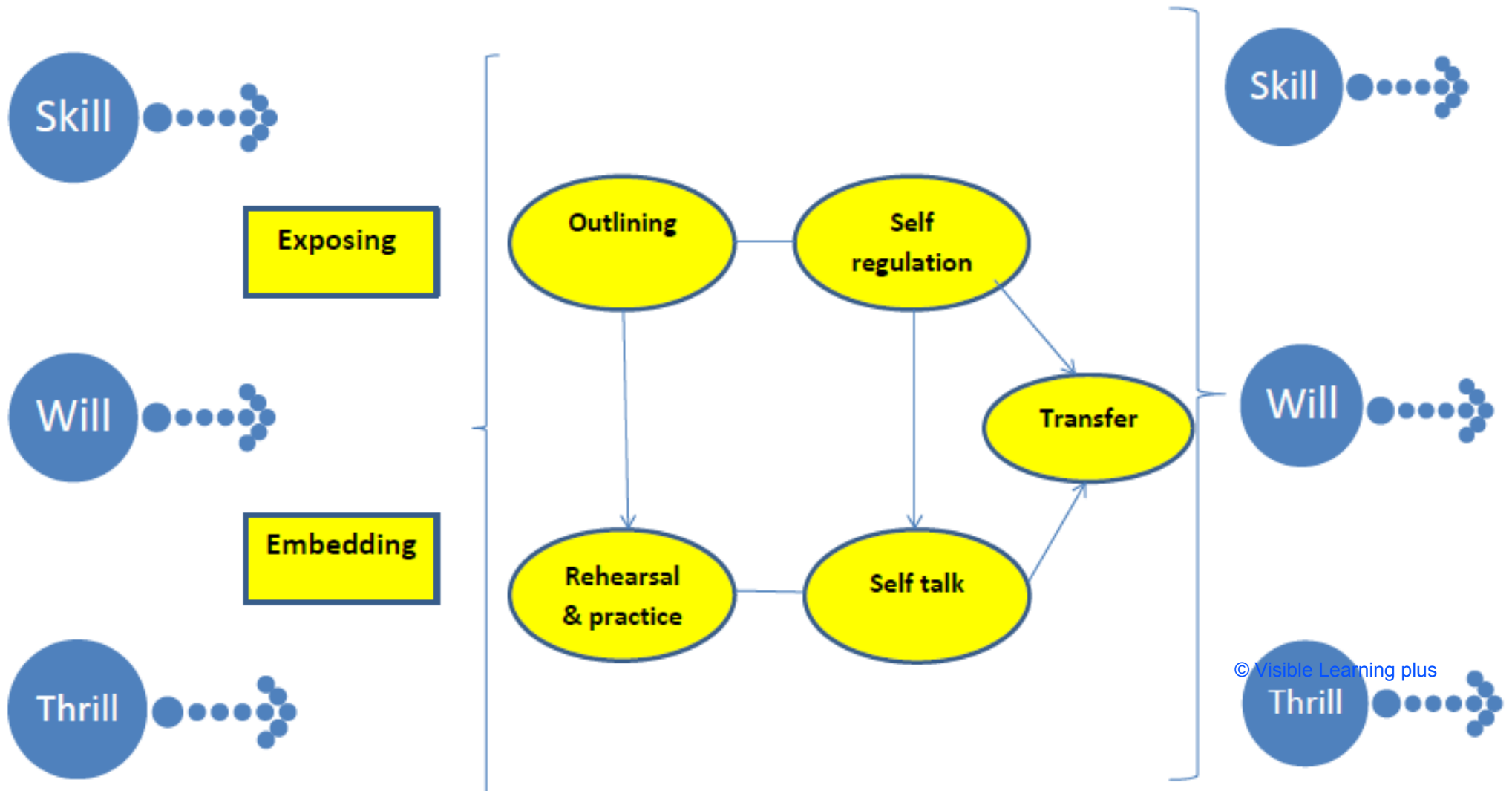
A Model of Learning

Inputs → Surface → Deep → Transfer



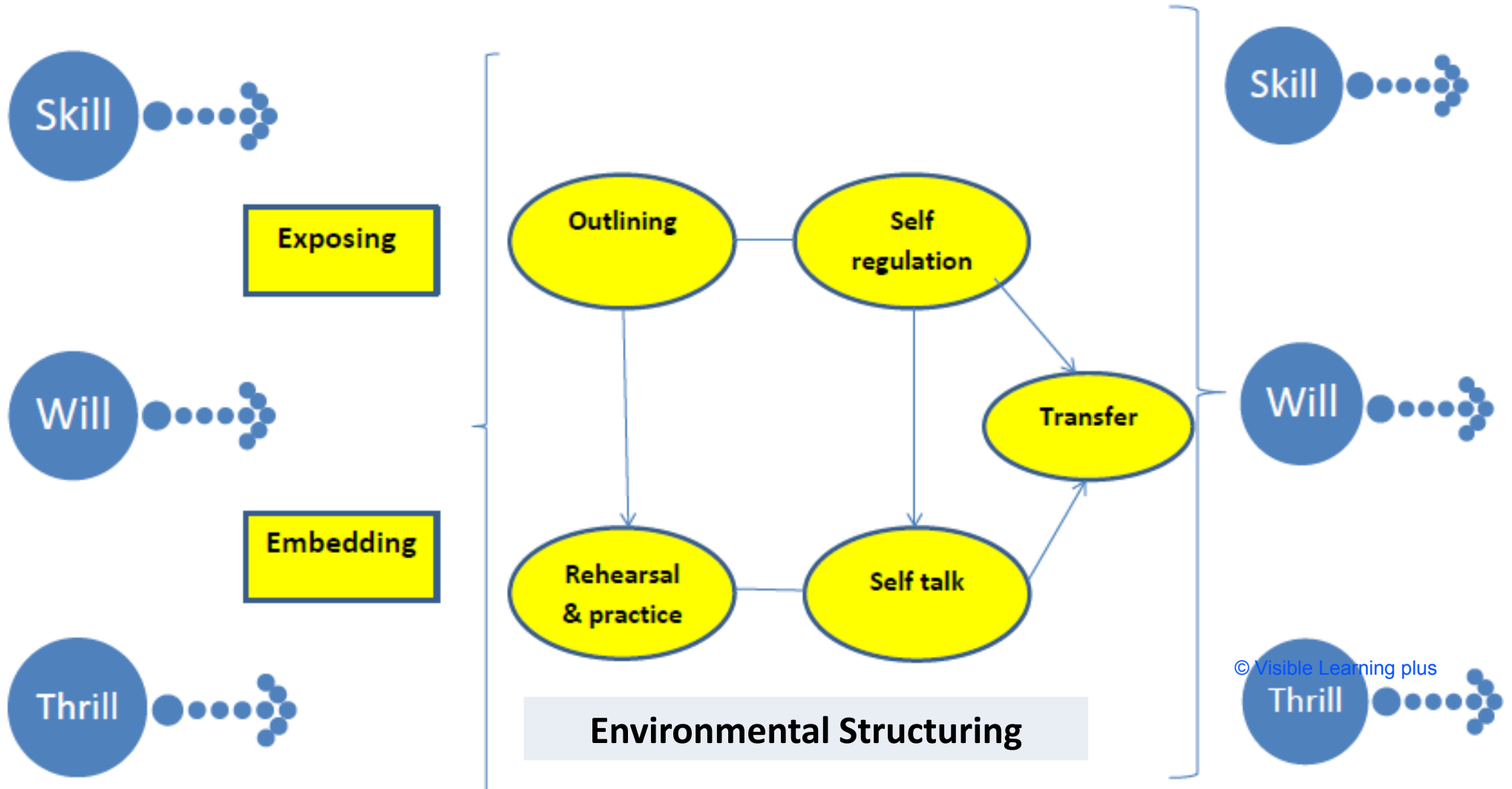
A Model of Learning

Inputs → Surface → Deep → Transfer → Outputs



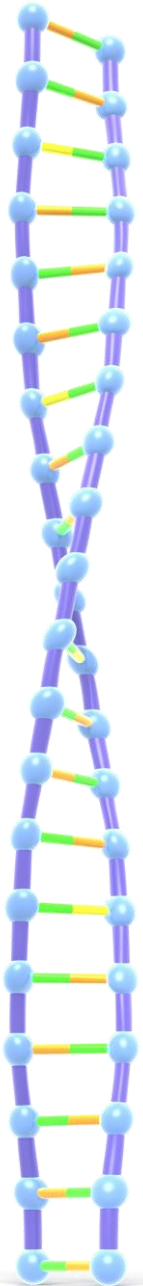
A Model of Learning

Inputs → Surface → Deep → Transfer → Outputs



What is learning?

The *process* of developing sufficient **surface** knowledge to then move to **deeper** understanding such that one can appropriately **transfer** this learning to new tasks & situations



The Evidence

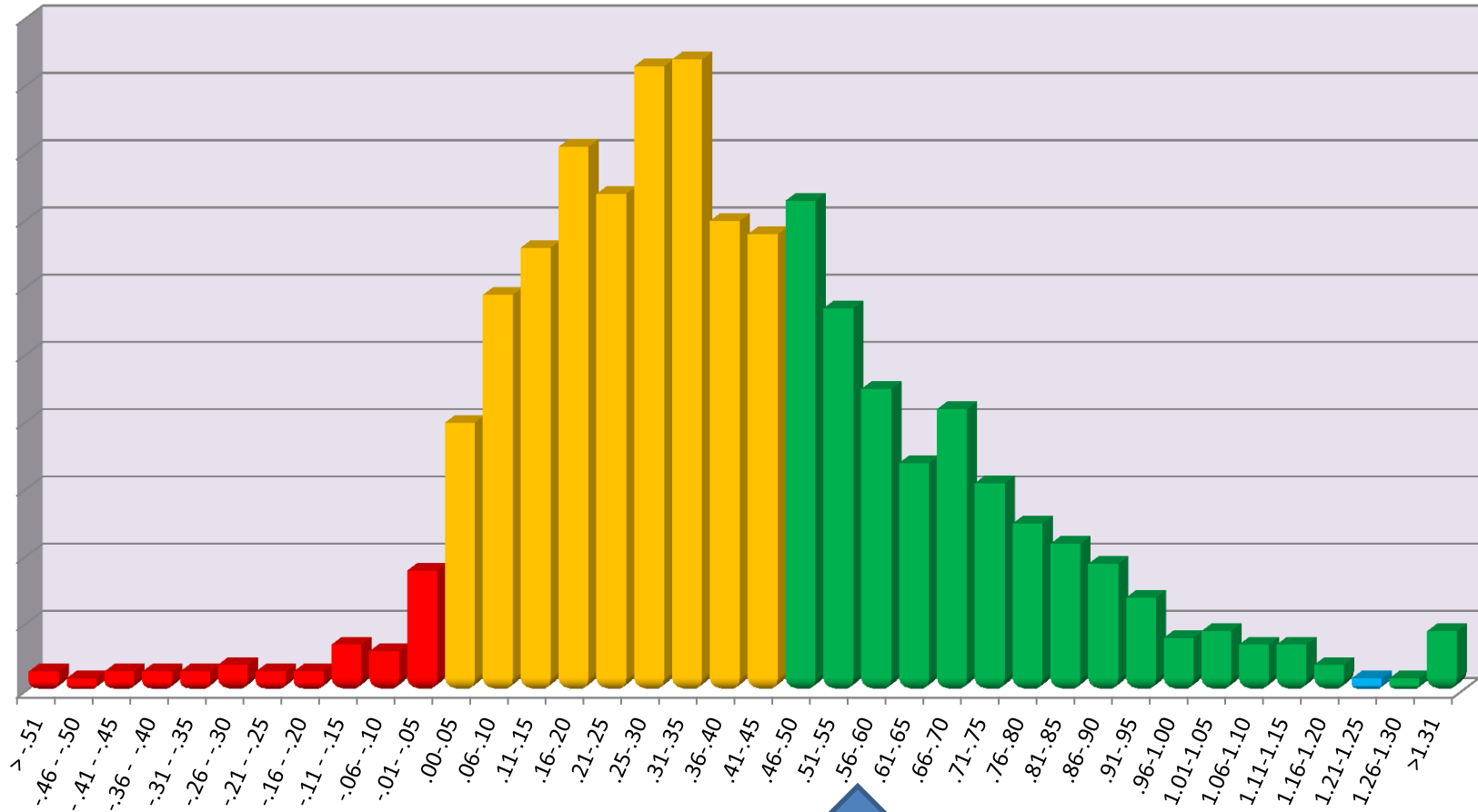


1. **Visible Learning**
2. **Lavery, 2009**
3. **Dutch team**
 - Dignath, Buettner & Langfeldt (2008)
 - Donker, de Boer, Dignath, Kostons & Werf (2013)
4. **Dunlosky, Rawson, Marsh, Nathan & Willingham (2013)**
5. **Hattie, Biggs, & Purdie (1996)**
6. **Our SLRC meta-analysis**

© Visible Learning plus

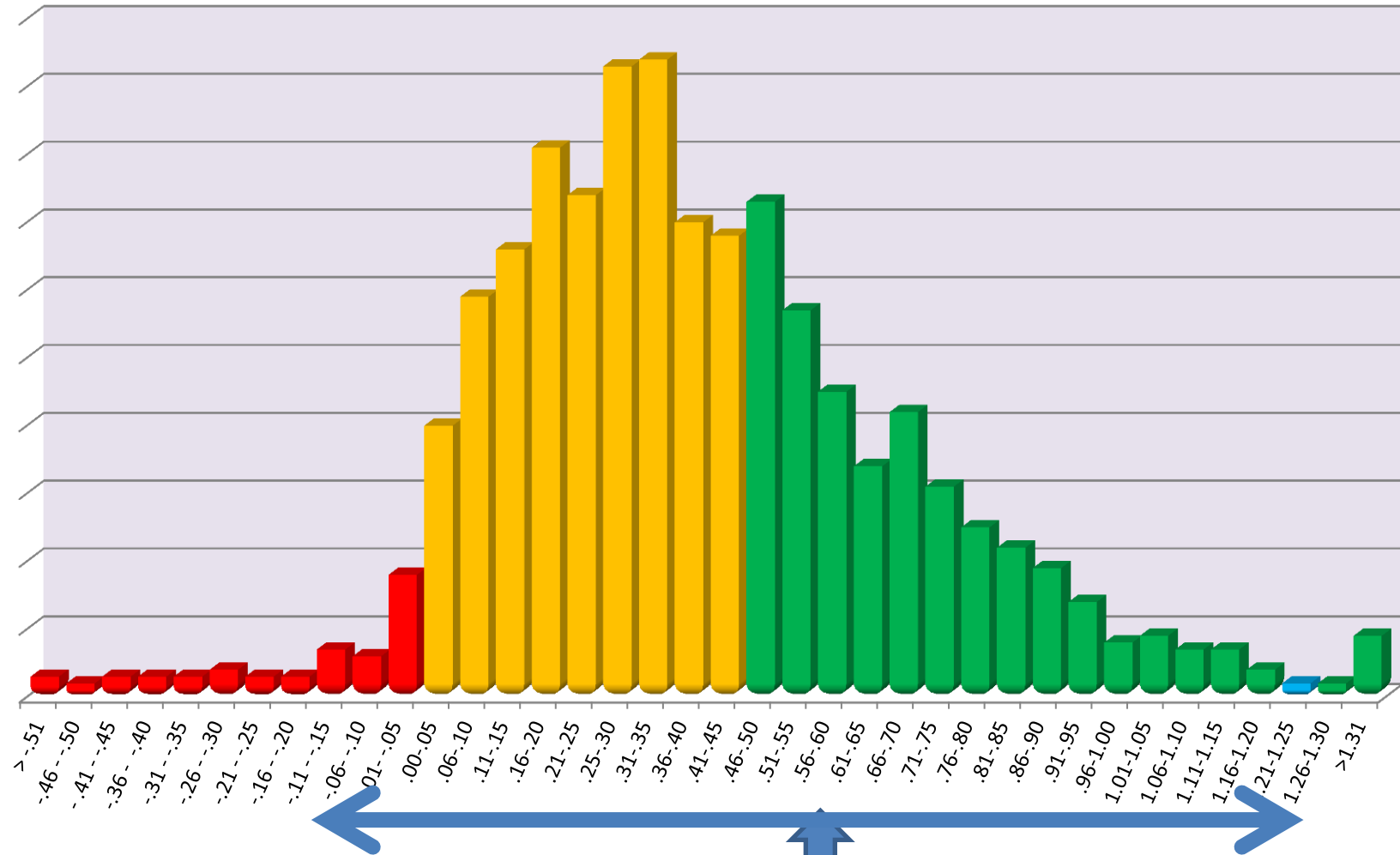
10,000+ studies, 43,157 effects from about 12-16m students

No. of effects



Learning strategies $d=.60$

No. of effects



Learning strategies $d=.60$

A Model of Learning

Inputs



	No. metas	No. effects	ES
Prior Achievement	9	8014	.77

A Model of Learning

Inputs



The WILL

Self-efficacy

	No. metas	No. effects	ES
Self-efficacy	11	2678	.63
Task Value	1		.46
Reducing anxiety	8	1305	.45
Attitude to content	4	782	.35
Learning styles	5	943	.23
Growth vs. Fixed thinking	1	113	.19



The Thrill: a. Motivation

Inputs



Motivational strategies	No. metas	No. effects	ES
Deep motivation	1	72	0.75
Achieving approach	1	95	0.70
Goal intentions	2	190	0.68
Deep approach	1	38	0.63
Goal difficulty	7	526	0.60
Goals (Mastery, performance, social)	11	3531	0.48
Commitment to Goals	2	104	0.41
Mastery goals (general)	3	163	0.19
Achieving motivation	1	18	0.18
Surface approach	2	344	0.11
Surface motivation	2	58	-0.38
TOTAL	33	5139	0.39

Inputs → Surface → Deep → Transfer

	No. metas	ES
--	--------------	----

Similarities and differences	1	1.32
------------------------------	---	------

Problem solving teaching	2	0.84
--------------------------	---	------

TOTAL	4	0.99
-------	---	------

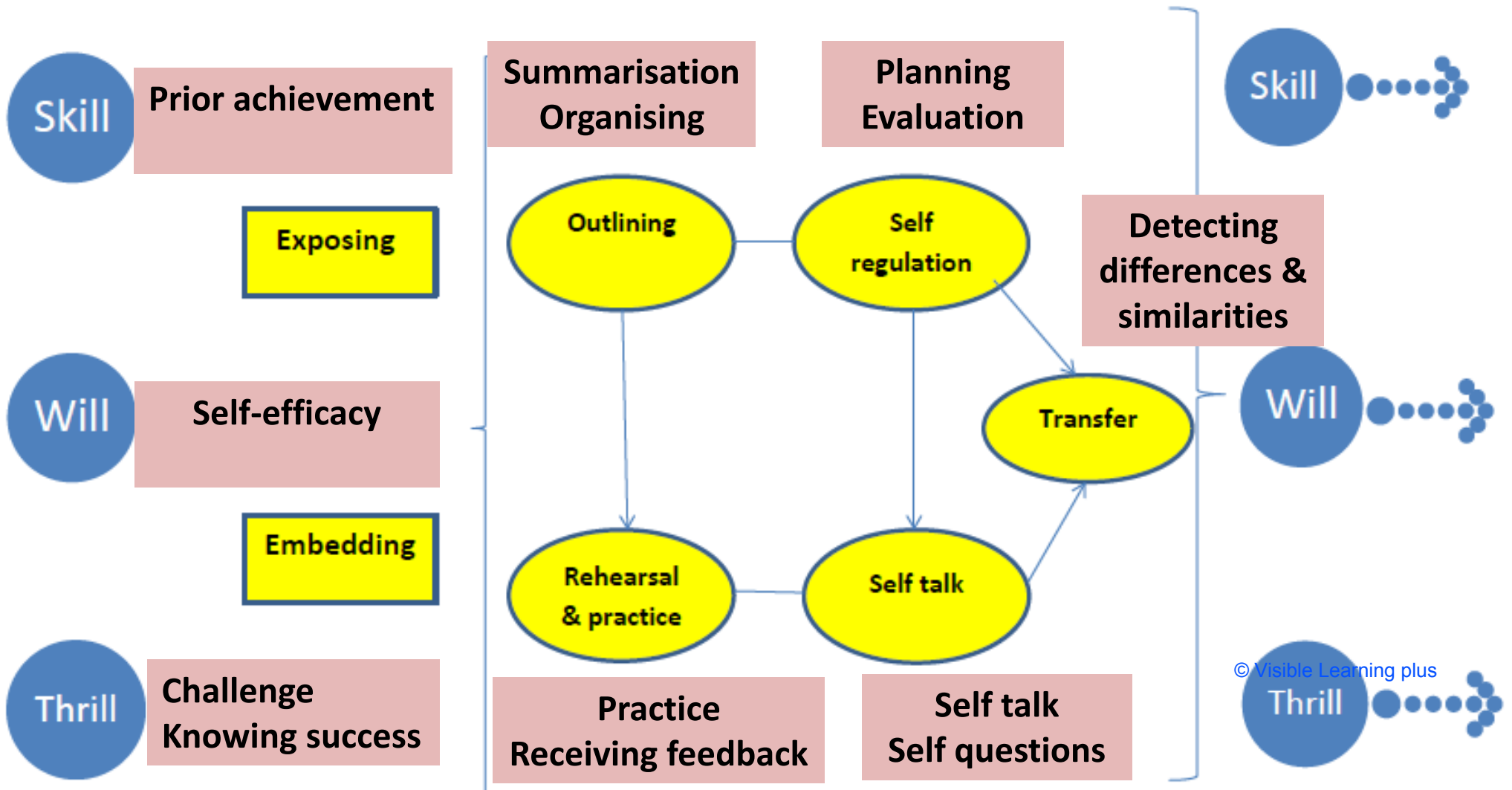


Environmental structuring

	No. metas	No. effects	ES
Time Management	1	8	0.44
Environmental structuring	2	10	0.41
Working memory	1	30	0.35
Exercise	7	2325	0.22
Social support	1	33	0.12
Sleep	2	78	0.07
Student control over learning	3	132	0.01
TOTAL	23	2865	0.28

A Model of Learning

Inputs → Surface → Deep → Transfer → Outputs



The Major Messages from this Meta-Synthesis of Learning Strategies

A. The right time for interventions

Rank	Influence	Effect-size
	Inquiry based methods	
	Individualized instruction	
	Visual/Audio-visual methods	
	Problem based learning	
	Whole language	

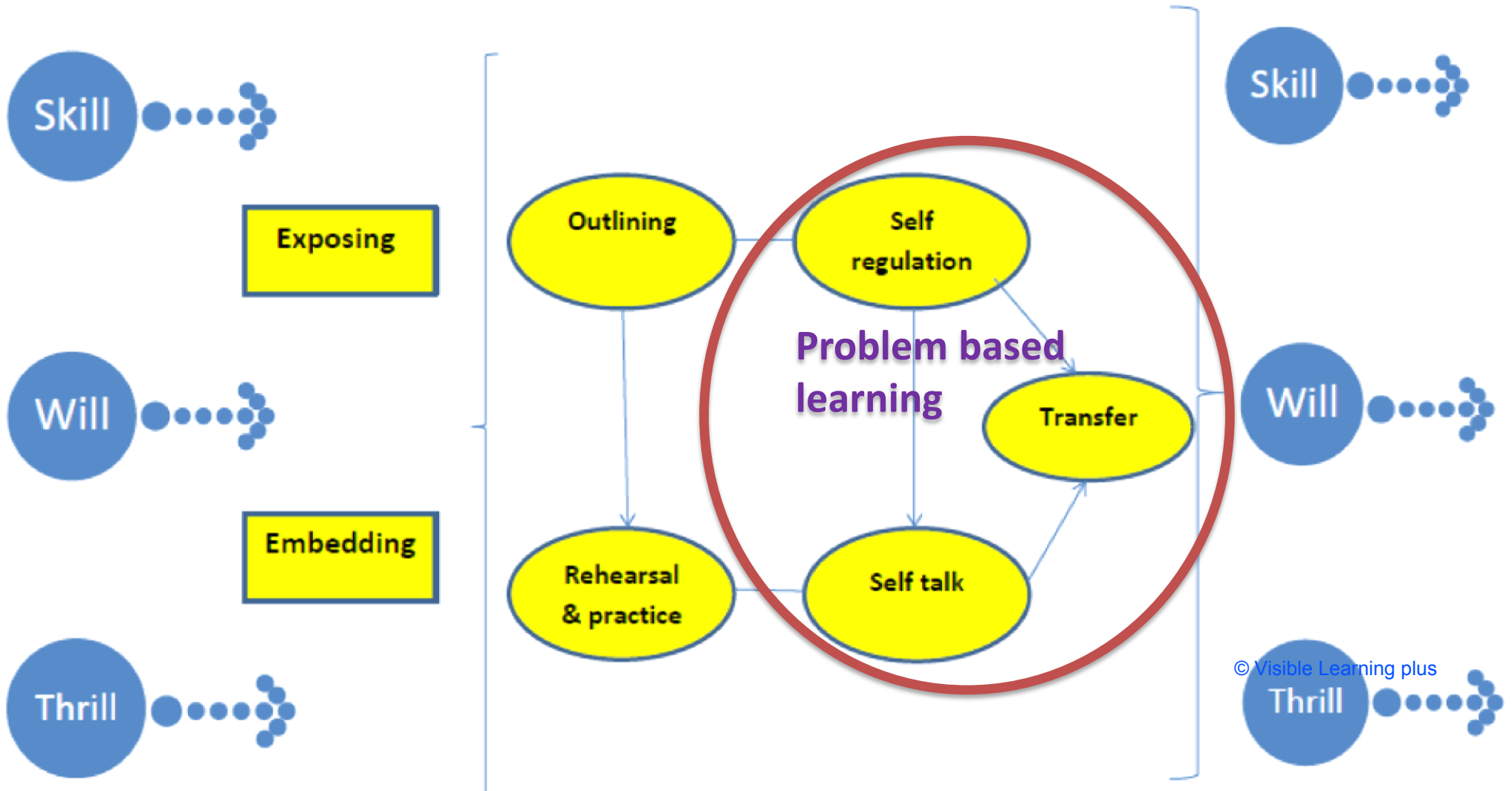
The Major Messages from this Meta-Synthesis of Learning Strategies

A. The right time for interventions

Rank	Influence	Effect-size
91	Inquiry based methods	0.31
143	Individualized instruction	0.22
144	Visual/Audio-visual methods	0.22
168	Problem based learning	0.15
184	Whole language	0.06

A Model of Learning

Inputs → Surface → Deep → Transfer → Outputs



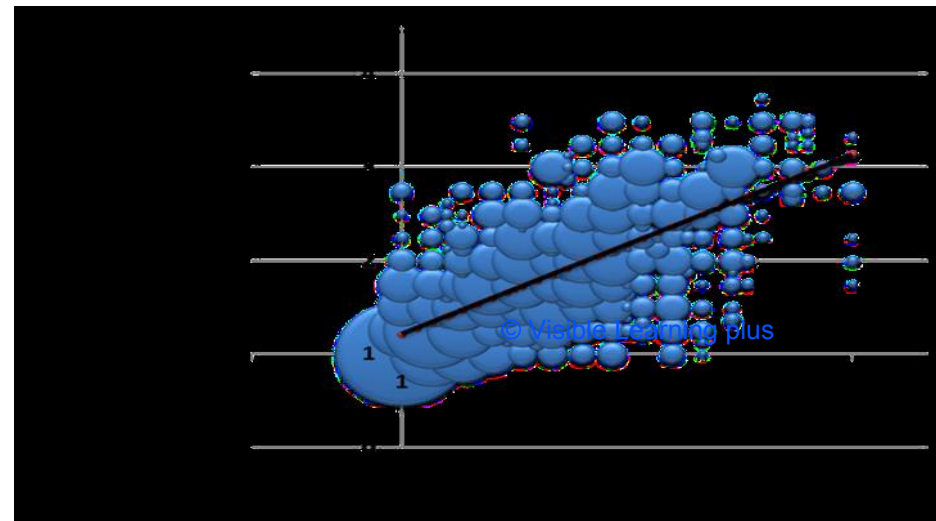
The Major Messages from this Meta-Synthesis of Learning Strategies

A. The right time for interventions

B. An over emphasis on surface knowing

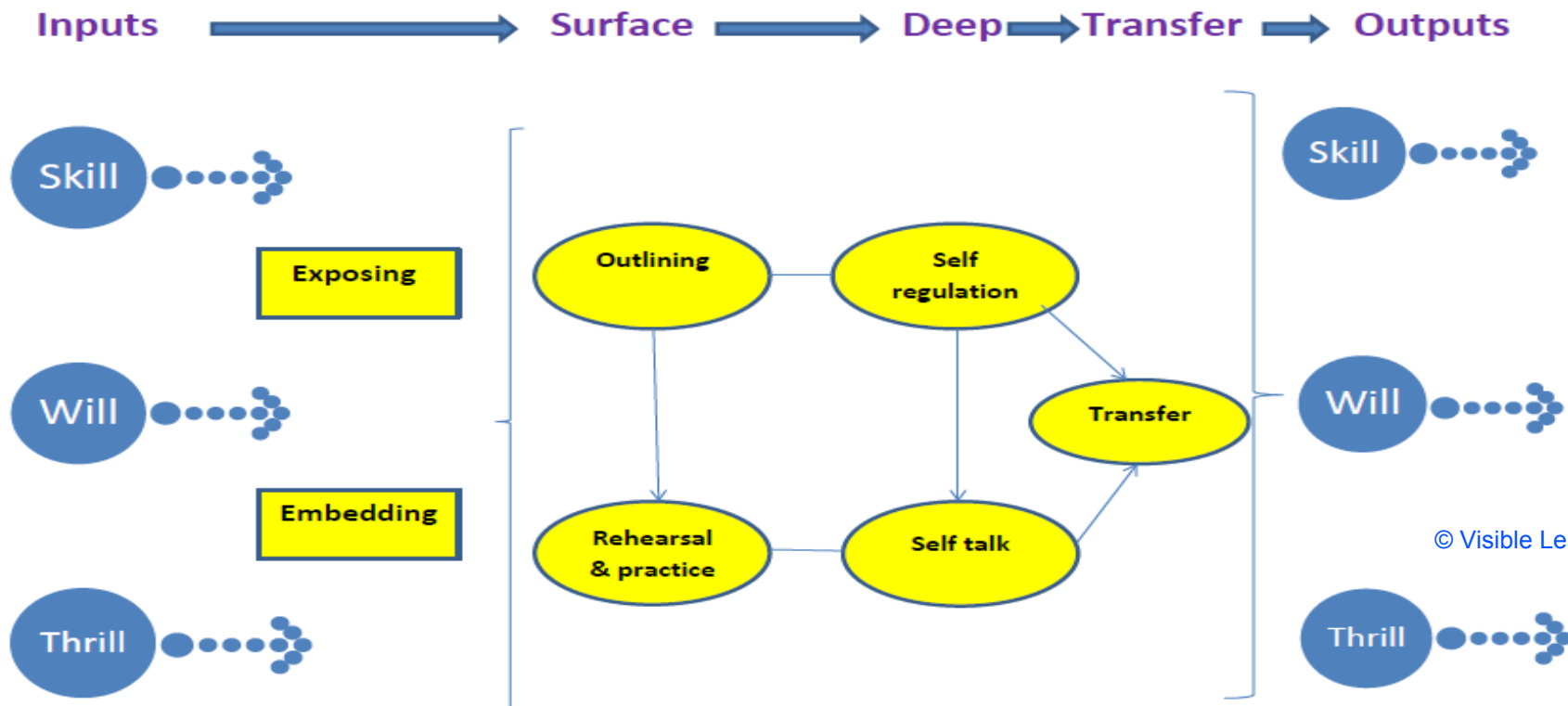
Learning strategies	90+% are surface
Teacher questions	90+% are surface
Lesson observations	90+% are surface
Test analyses	90+% are surface
Visible Learning	90+% are surface

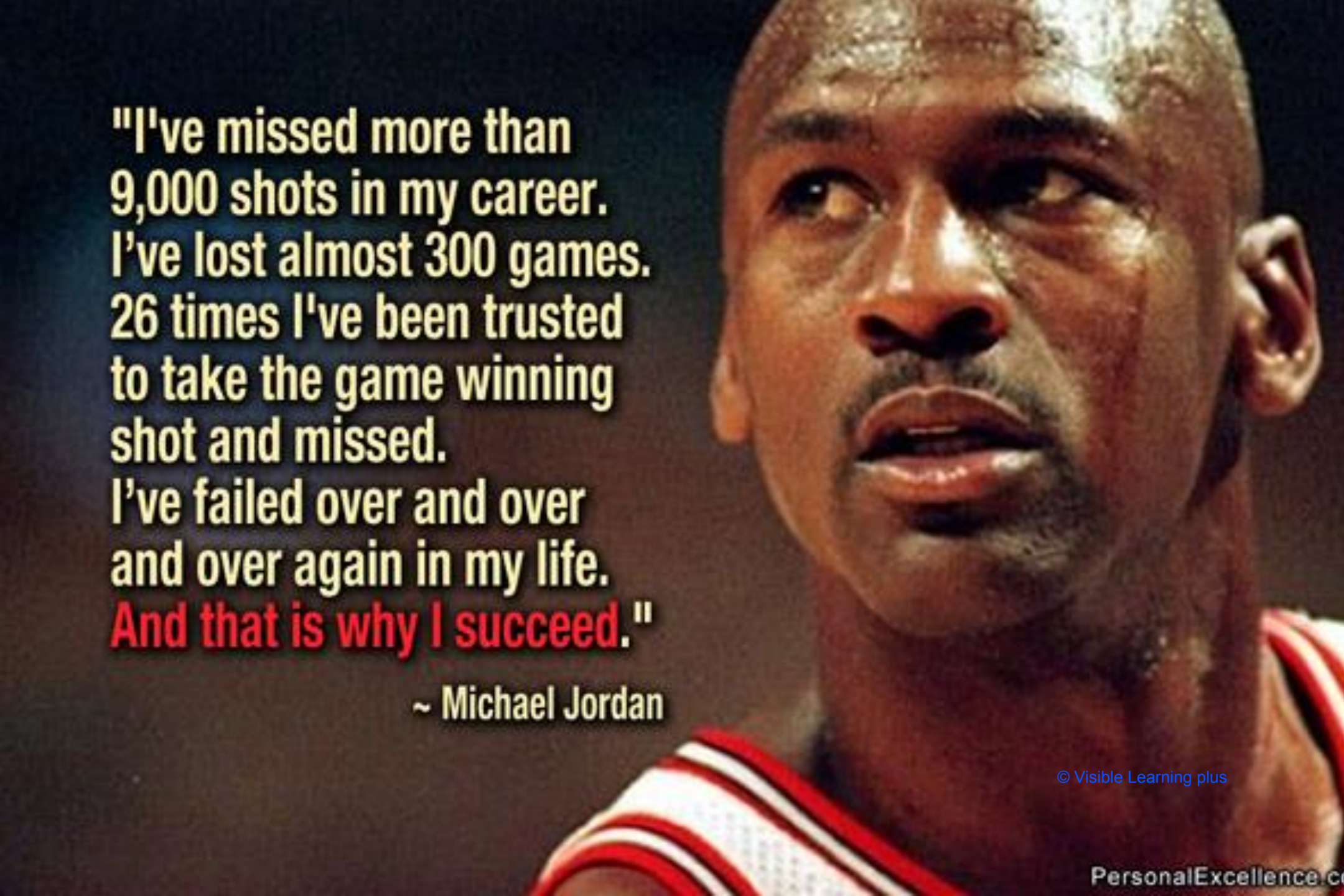
*We privilege a
grammar of surface learning*



The Major Messages

- A. The right time for interventions
- B. An over *emphasis* on surface knowing
- C. The mantra should be “surface to deep to transfer”
- D. **The importance of the skill, the will & the thrill (as both input and outputs)**



A close-up photograph of Michael Jordan, looking upwards and to the right with a focused expression. He is wearing a white Chicago Bulls jersey with red and black stripes on the shoulder. The background is dark and out of focus.

**"I've missed more than
9,000 shots in my career.
I've lost almost 300 games.
26 times I've been trusted
to take the game winning
shot and missed.
I've failed over and over
and over again in my life.
And that is why I succeed."**

~ Michael Jordan

© Visible Learning plus

PersonalExcellence.co

Ātātou
pūrākau

Our
stories



visible
learning^{plus}

Thank you

jhattie@unimelb.edu.au

