COMP120: Creative Computing: Tinkering

2: Computing Professionals

Learning Outcomes

- **Analyse** the role of computing professionals in the games industry
- **Recall** important theories about learning computer programming
- **Apply** pair programming practices to solve simple problems

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Professional Roles

TwitterFall Activities

- Self-organise into small groups of 3-4
- Load a Twitter app, or login to Twitter on a PC
- Conduct research on the given topic
- Post a tweet when you find something interesting

- Please use the hashtag for the module (i.e., `#comp120`)
- Also please ensure you use the @ symbol to open and continue discussions

TwitterFall Activity #1

Answer the follow question:

"What do computing professionals do, *generally*?"

You have:

- 10 minutes to conduct research and tweet to `#comp120`
- 5 minutes to debrief

TwitterFall Activity #2

Answer the follow question:

"What do computing professionals do, *in games*?"

You have:

- 10 minutes to conduct research and tweet to `#comp120`
- 5 minutes to debrief

TwitterFall Activity #3

Answer the follow question:

"What career options are available to graduates with B.Sc. degrees in computing?"

You have:

- 10 minutes to conduct research and tweet to `#comp120`
- 5 minutes to debrief

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Professional Development

Continuing Professional Development

- Games industry is fast-moving
- Learning does not end at school and university
- A goal of this course is to facilitate your development as self-regulated learners
- Gradually, more independence across each year of study
- This is a science degree, which means you will become a producer of knowledge, not just a consumer of knowledge!

Continuing Professional Development

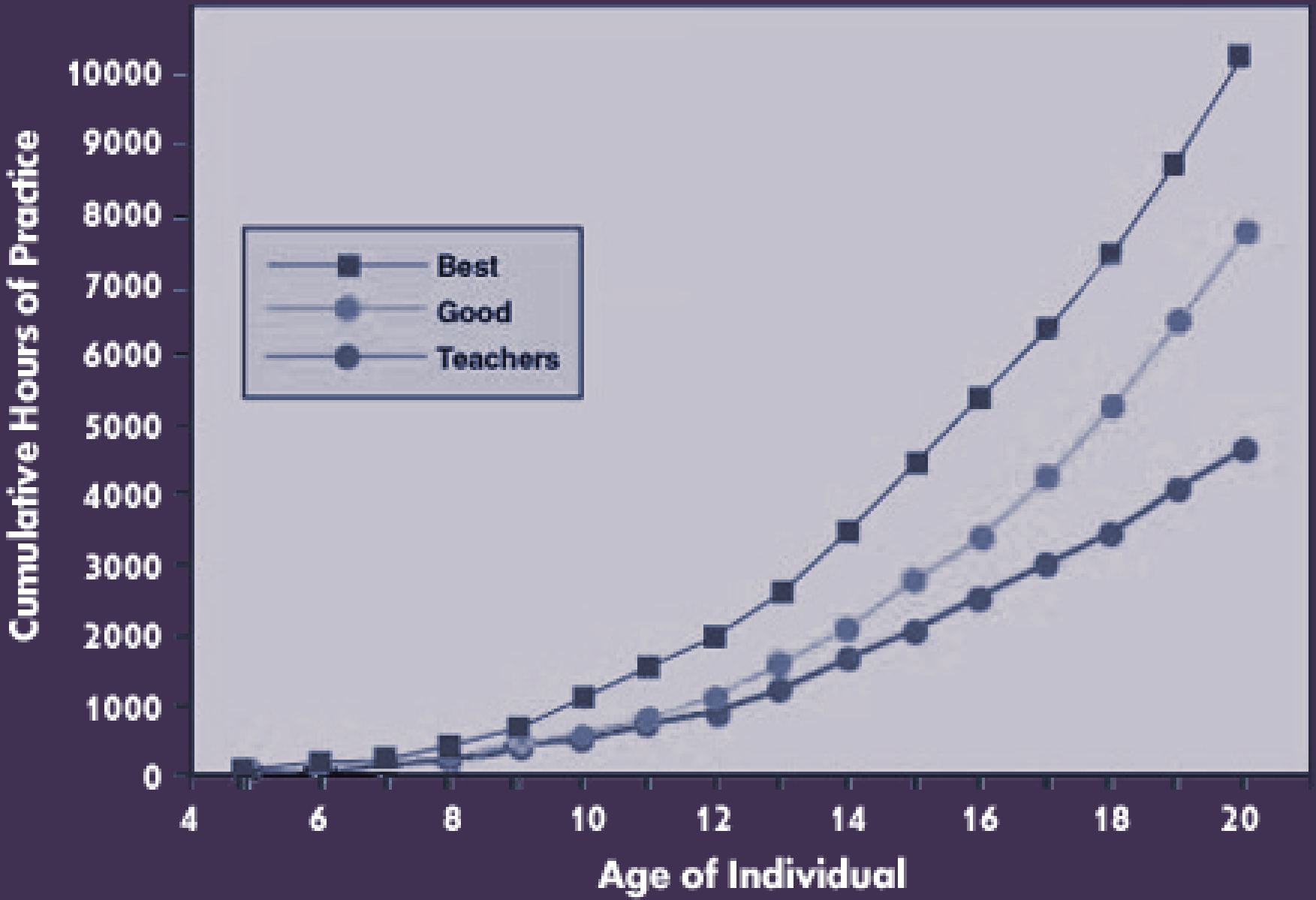
- It isn't easy!
- Many of you will encounter programming anxiety
- Some will experience a sense of fear or a sense of hopelessness — it is more common than you think
- Some will need more support than others — this isn't a bad thing
- Everyone who puts in the time and effort will eventually achieve mastery

Key Learning Theories

- Deliberate Practice
- Scaffolding and the Zone of Proximal Development
- Schema Development
- Cognitive Load
- Learning Edge Momentum
- Mindset
- Neuroplasticity
- Self-Determination

10,000 Hours of Practice

Those identified as most gifted were also most practiced

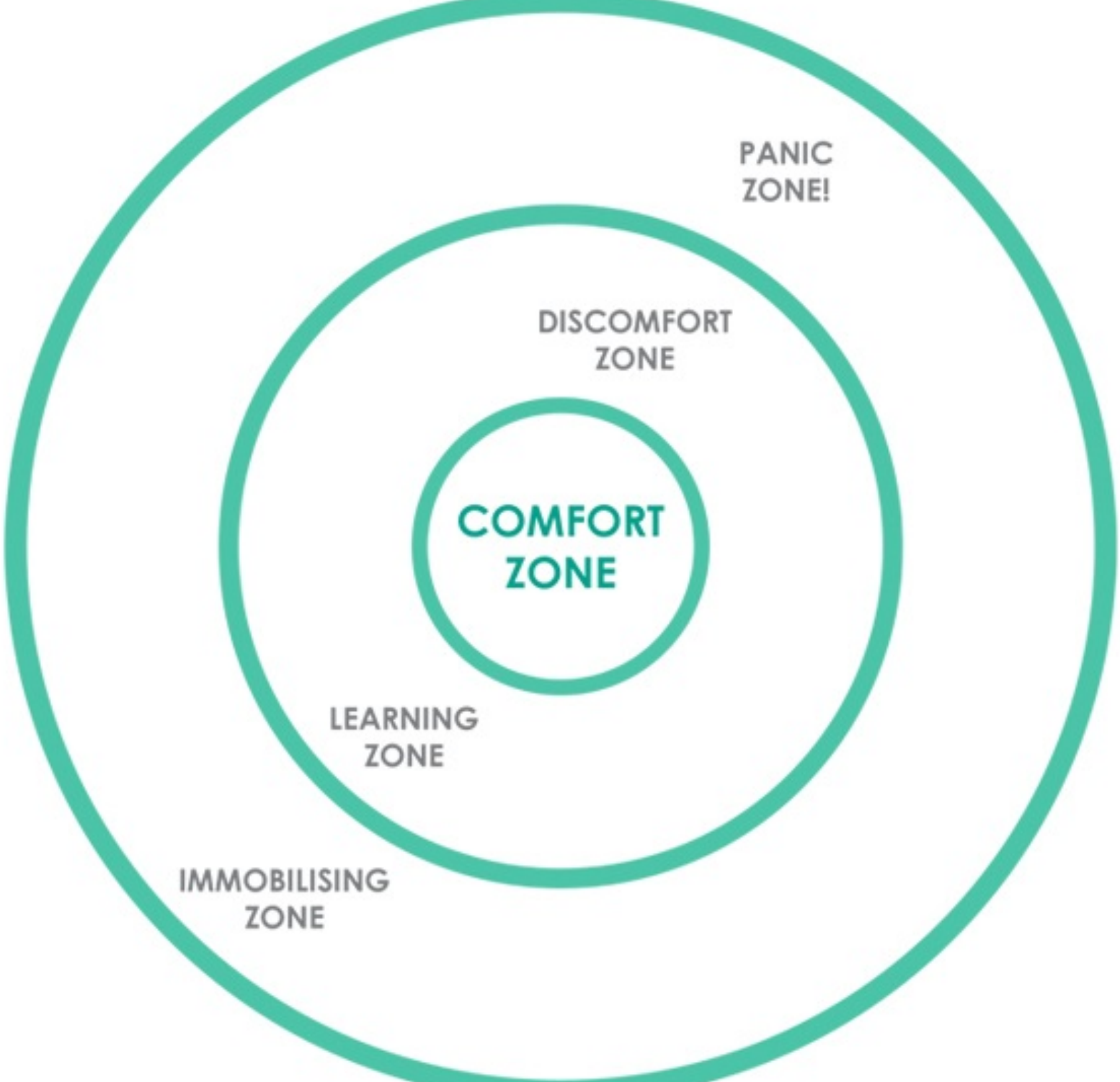


Deliberate Practice

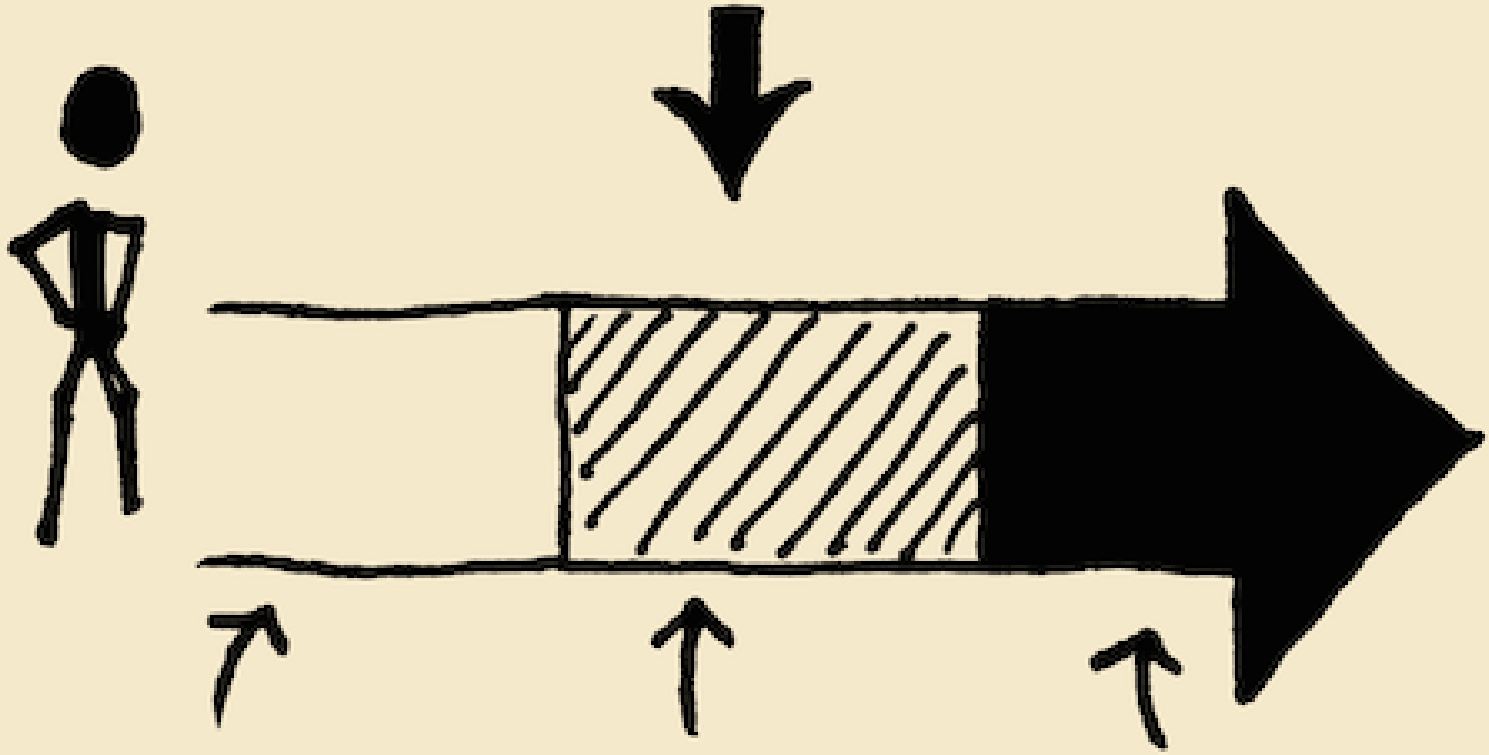
"**Attention to the task:** It is essential to pay fixed attention. The more a student's mind wanders, the less the rate of change. Even videogames require the subject to stay 'locked in' to the content and the process."
(Jensen, 2006, p. 82)

Deliberate Practice

"**Low to moderate stress:** This variable is quite slippery because what is stressful for one may not be stressful for another. The bottom line is that the subject must perceive some choice or control over the task and the surrounding conditions. Otherwise, the stress from that loss of control may neutralize the positive effects from the learning." (Jensen, 2006, p. 82)


PANIC
ZONE!
DISCOMFORT
ZONE
COMFORT
ZONE
LEARNING
ZONE
IMMOBILISING
ZONE

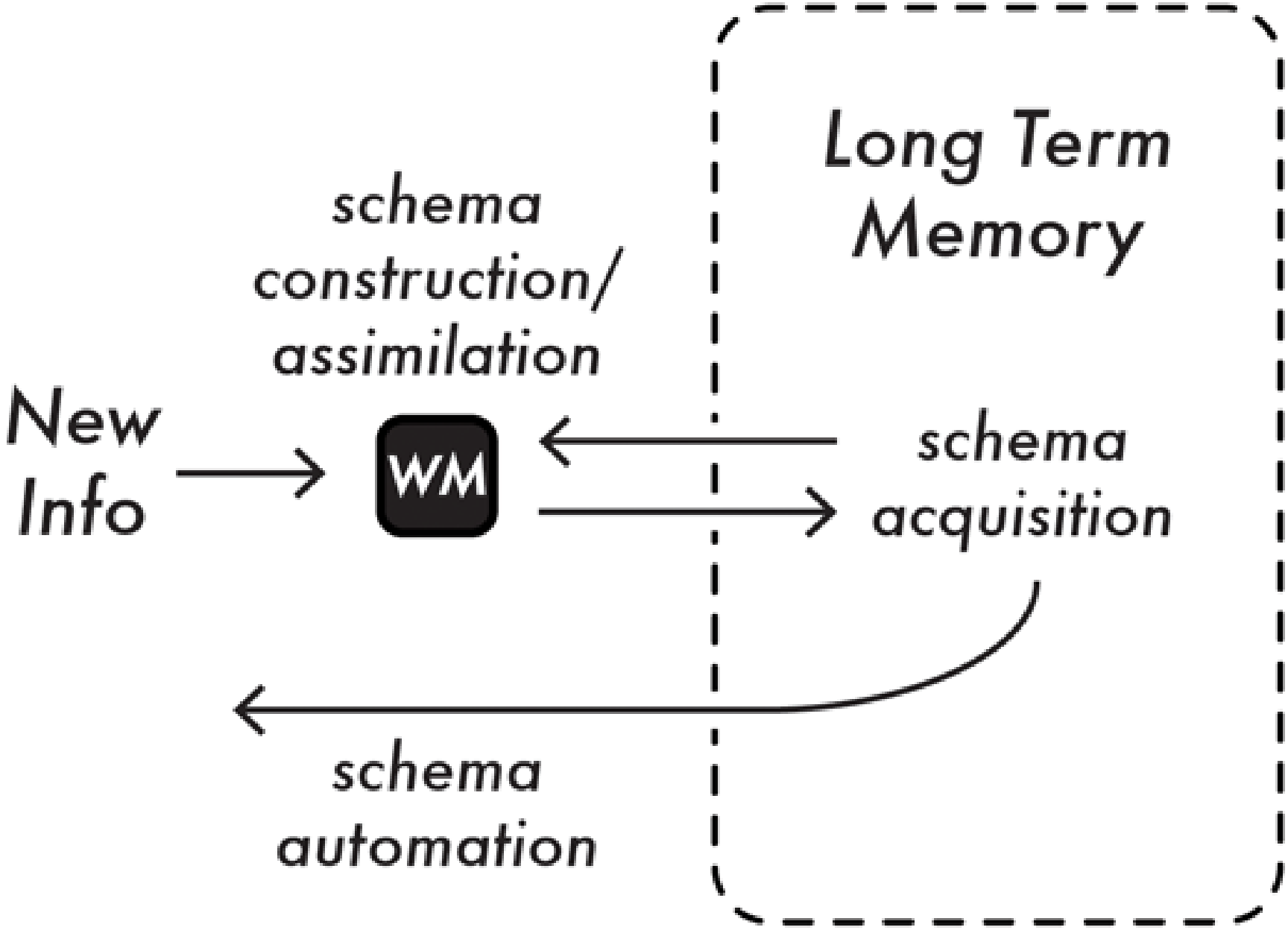
PROXIMAL DEVELOPMENT

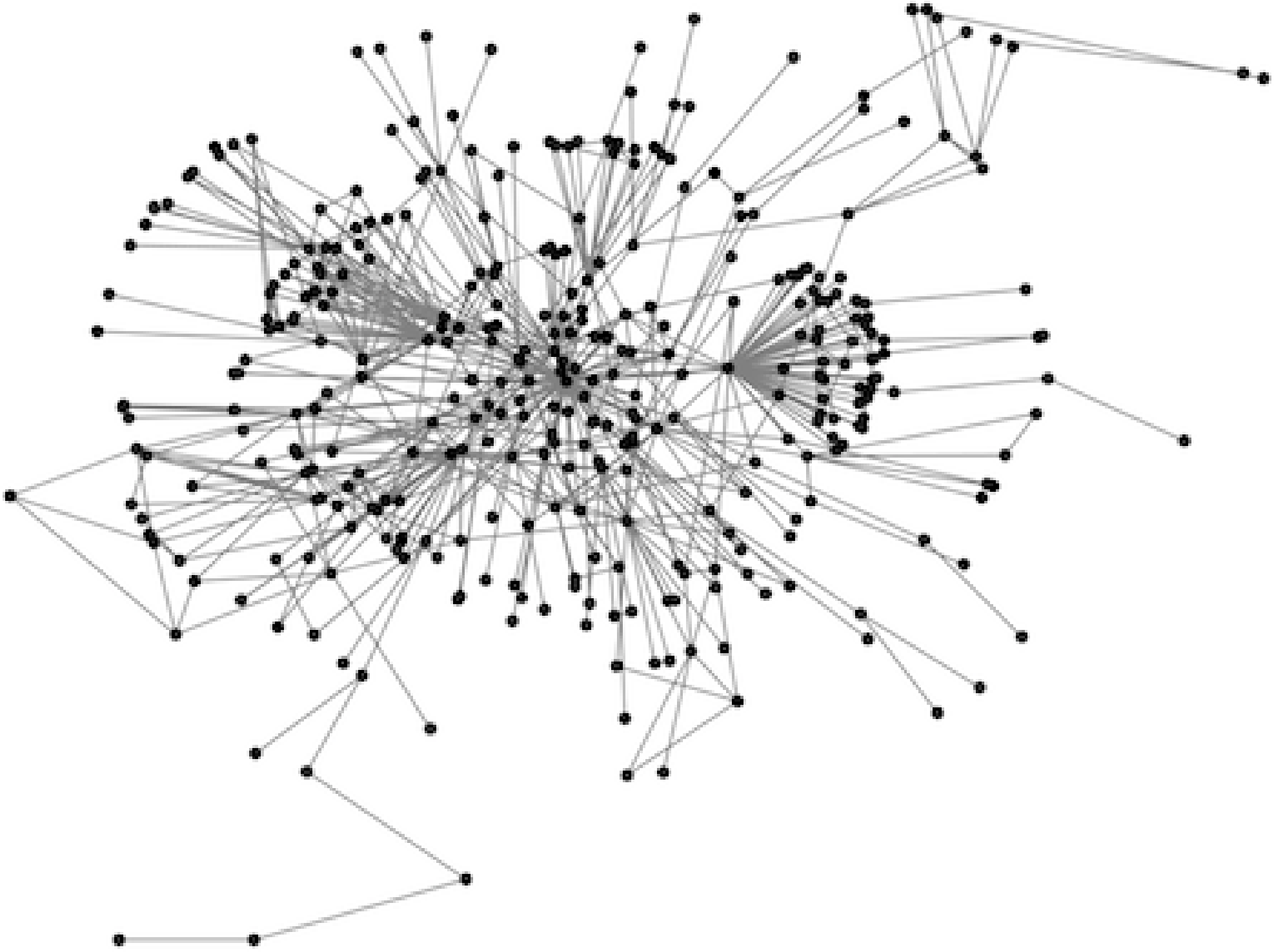


THINGS YOU CAN DO ALL ON YOUR OWN

THINGS YOU CAN DO WITH A BIT OF HELP

THINGS YOU CAN'T YET DO, NO MATTER HOW MUCH SUPPORT YOU GET


Long Term Memory
schema construction/ assimilation
New Info
WM
schema acquisition
schema automation



Mindsets

Watch the video at:

https://www.dropbox.com/s/8wy1mbkud7n5ns3/Growth%20vs%20Fixed%20Mindset.mp4?dl=0

(5 minutes)

I'VE MISSED MORE THAN

9000 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

Neuroplasticity

Medina (2008) demonstrates:

- **Neuroplasticity**: the ability of the brain to reorganise itself and create new circuits in response to our environment and, perhaps most remarkably, in response to our thoughts
- **Life-long plasticity**: scientists discovered decades ago that the human brain remains plastic throughout our lives
- **New Nuron Growth**: more recent research shows that stem cells in the brain can grow new neurons at any age (i.e., Gage, 2002).
- **Epigenetics**: no such thing as a `geek gene', considerable variance in *gene expression*

Neuroplasticity

Medina's (2008) also notes the following `brain rules':

- Exercise: Physical health matters.
- Survival: Human brain evolves, too.
- Wiring: Every brain is wired differently.
- Attention: The brain won't pay attention to boring things.
- Short-term Memory: Repeat to remember.
- Long-term Memory: Remember to repeat.

Neuroplasticity

Medina's (2008) also notes the following `brain rules':

- Sleep: sleep well, think well.
- Stress: anxiety impairs learning.
- Sensory Integration: Try to stimulate all of your senses.
- Vision: vision trumps the other senses.
- Exploration: humans are natural explorers, nurture this.

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Professional Practice

Pair Programming

Pair programming is an agile software development technique in which two programmers work together at one workstation.

One, the driver, writes code while the other, the observer or navigator, reviews each line of code as it is typed in.

The two programmers switch roles frequently.

Pair Programming

Watch the video at:

`https://www.youtube.com/watch?v=ET3Q6zNK3Io`

(5 minutes)

Pair Programming

Review the guidelines at:

`http://www.pairprogramming.co.uk/`

(10 minutes)

Pair Programming

Watch the video at:

`https://www.youtube.com/watch?v=ONnYCT_LJio`

(5 minutes)

Pair Programming Challenge

- In pairs
- **Implement** the code excerpt
- **Fix** the errors in the code excerpt
- **Modify** the code excerpt to incorporate functions and arguments
- **Post** your solution to the `#comp120` slack channel

You can learn more about functions and arguments at:

`https://docs.python.org/3/tutorial/controlflow.html#defining-functions`

(20 minutes)

Pair Programming Challenge

The function:

```
def madlib()
```

Should become:

```
def madlib(name, pet, verb, snack)
```

Pair Programming Challenge

```
def madlib():
    name = 'Mike'
    pet = 'Spyro'
    verb = 'ate'
    snack = 'doughnuts'
    line1 = 'once upon a time,' + name + ' walked'
    line2 = ' with ' + pet + ', a trained dragon.'
    line3 = 'Suddenly, ' + pet + ' announced,'
    line4 = 'I really want some ' + snack + '!'
    line5 = name + ' complained. Where am I going to
        get that?'
    line6 = 'Then ' + name + 'found a wizard's wand.'
    line 7 = 'With a wave of the wand, '
    line8 = pet + ' got ' + snack + '. '
    line9 = 'Perhaps surprisingly, ' + pet + ' ' +
        verb + '  ' + snack
    print line1 + line2 + line3 + line4
    print line5 + line6 + line7 + line8 + line9
```