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AfL and RtII: how they can work together

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Dylan Wiliam

www.dylanwiliam.net



www.ioe.ac.uk

Effective learning environments

A prevalent, mistaken, view

- ⌘ Teachers create learning
- ⌘ The teacher's job is to do the learning for the learner

A not so prevalent, not quite so mistaken, but equally dangerous view

- ⌘ Only learners can create learning
- ⌘ The teacher's job is to "facilitate" learning

A difficult to negotiate, middle path

- ⌘ Teaching as the engineering of effective learning environments
- ⌘ Key features:
 - ⊞ Create student engagement (pedagogies of engagement)
 - ⊞ Well-regulated (pedagogies of contingency)

Why pedagogies of engagement?

Intelligence is partly inherited

⌘ So what?

Intelligence is partly environmental

⌘ Environment creates intelligence

⌘ Intelligence creates environment

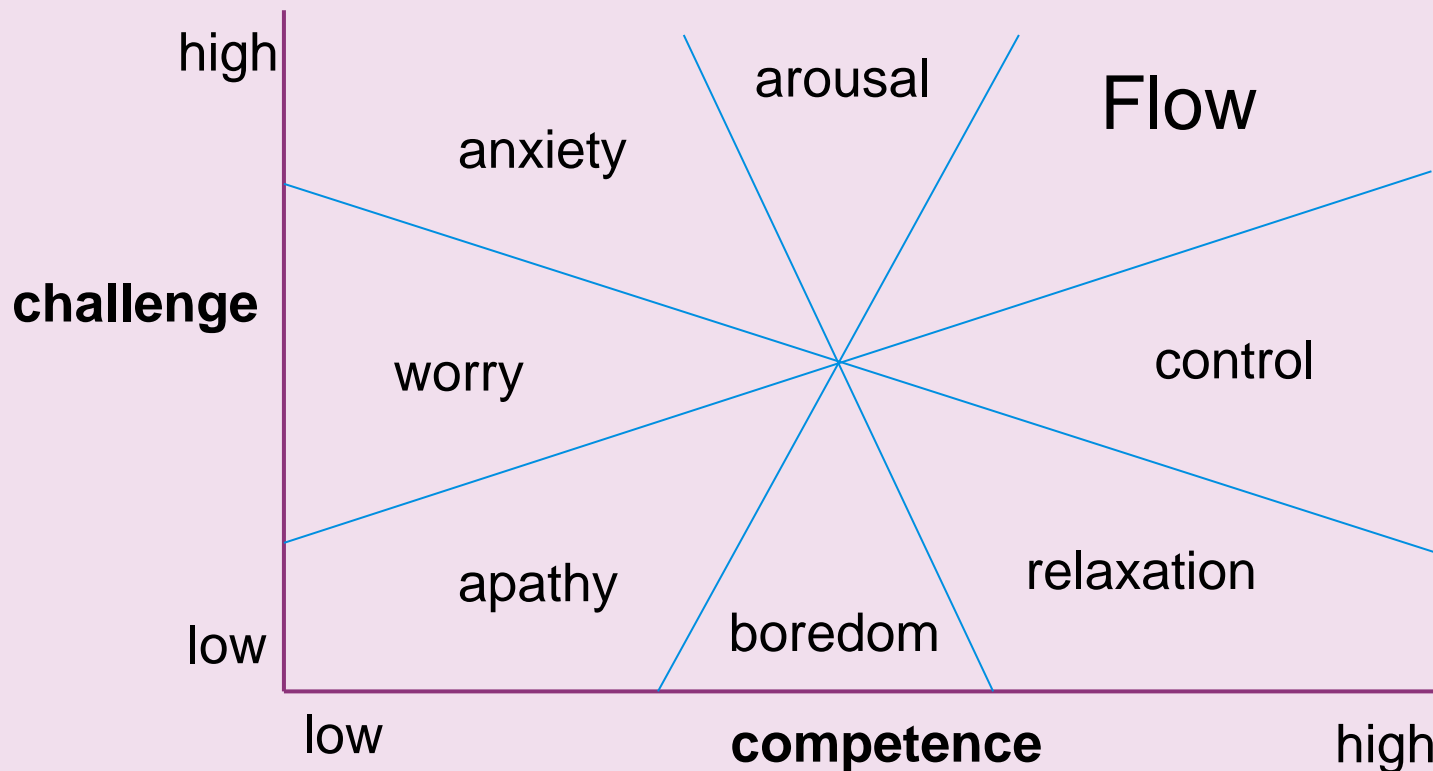
Learning environments

⌘ High cognitive demand

⌘ Inclusive

⌘ Obligatory

Motivation: cause or effect?



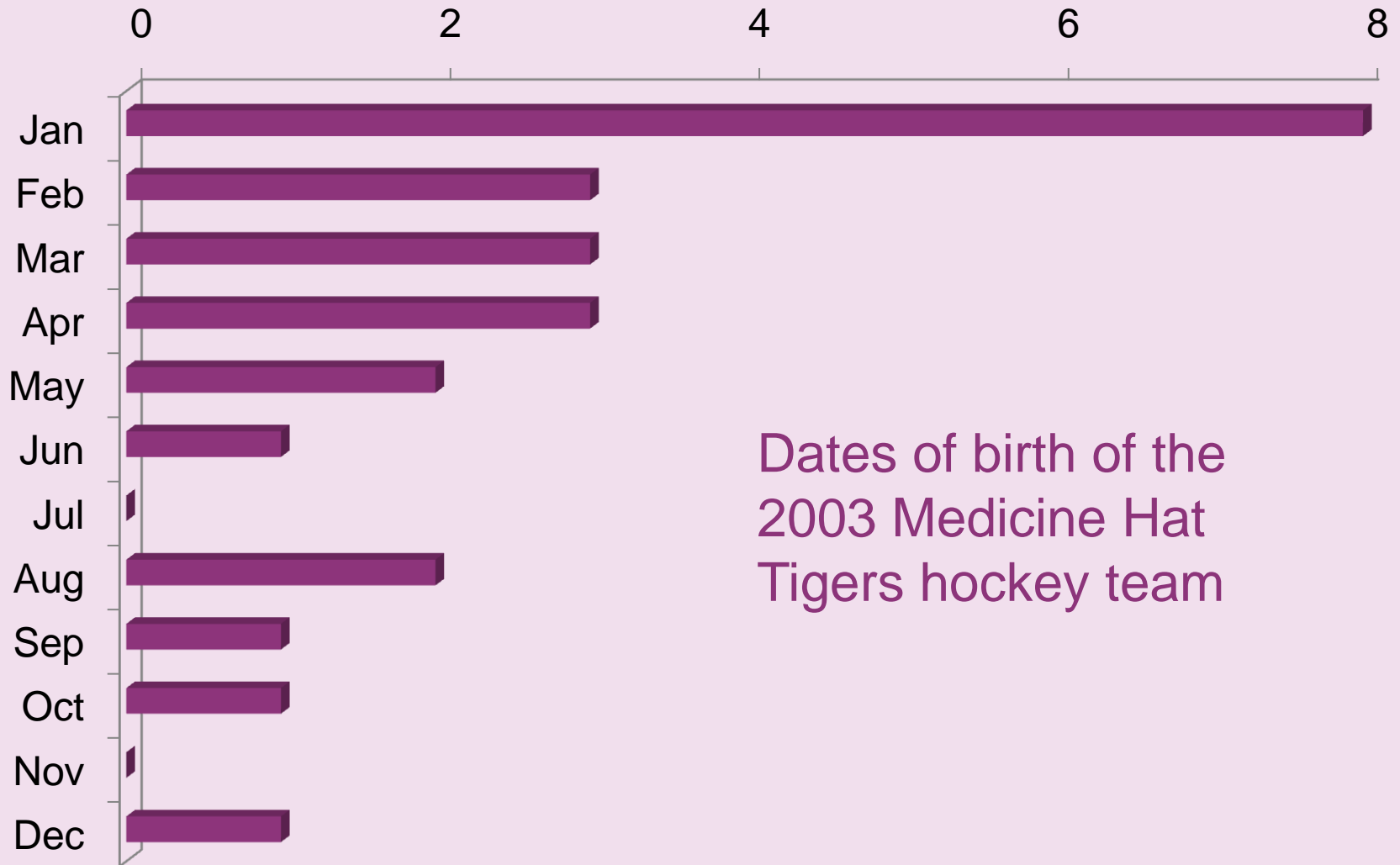
(Csikszentmihalyi, 1990)

Medicine Hat Tigers

A major junior (ice) hockey team playing in the Central Division of the Eastern Conference of the Western Hockey League in Canada

Players are aged from 15 to 20

- ⌘ 15 year olds are only allowed to play five games until their own season has ended
- ⌘ Each team is allowed only three 20 year olds
- ⌘ Total roster 25 players



Dates of birth of the
2003 Medicine Hat
Tigers hockey team

Why pedagogies of contingency?

For evaluating institutions

For describing individuals

For supporting learning

⌘ Monitoring learning

☒ Whether learning is taking place

⌘ Diagnosing (informing) learning

☒ What is not being learnt

⌘ Forming learning

☒ What to do about it

Key insights from C20th psychology

1. **What gets learned as a result of a particular sequence of instructional activities is impossible to predict, but**
2. **Student errors are not random**

Conclusion: teaching is interesting because learners are so different, but only possible because they are so similar

Formative assessment: a new definition

An assessment functions formatively to the extent that evidence about student achievement elicited by the assessment is interpreted and used to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions that would have been taken in the absence of that evidence. (William, 2009)

Questioning in math: discussion

Look at the following sequence:

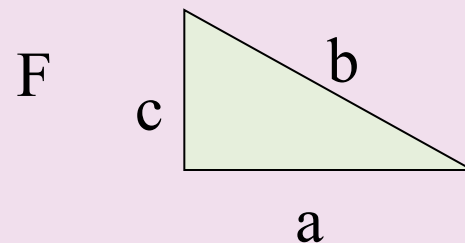
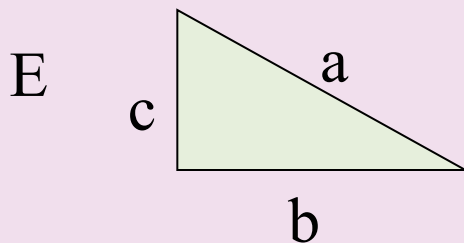
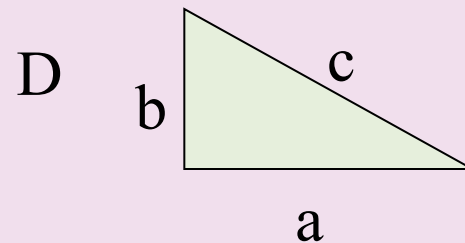
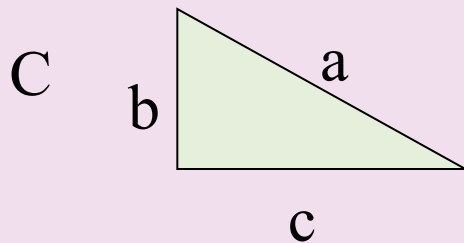
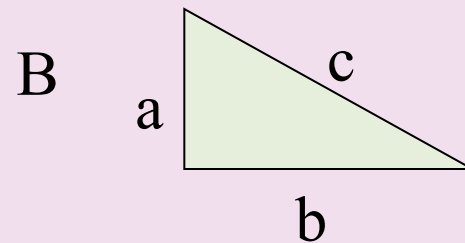
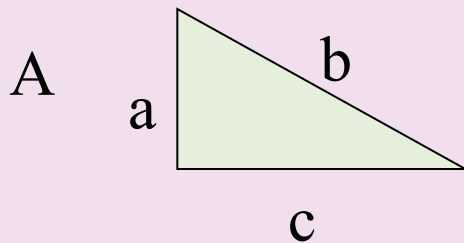
3, 7, 11, 15, 19,

Which is the best rule to describe the sequence?

- A. $n + 4$
- B. $3 + n$
- C. $4n - 1$
- D. $4n + 3$

Questioning in maths: diagnosis

In which of these right-angled triangles is $a^2 + b^2 = c^2$?

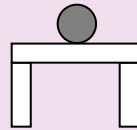


Questioning in science: discussion

Ice-cubes are added to a glass of water. What happens to the level of the water as the ice-cubes melt?

- A. The level of the water drops
- B. The level of the water stays the same
- C. The level of the water increases
- D. You need more information to be sure

Questioning in science: diagnosis



The ball sitting on the table is not moving. It is not moving because:

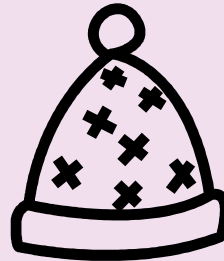
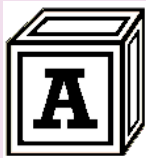
- A. no forces are pushing or pulling on the ball.
- B. gravity is pulling down, but the table is in the way.
- C. the table pushes up with the same force that gravity pulls down
- D. gravity is holding it onto the table.
- E. there is a force inside the ball keeping it from rolling off the table

Save the ozone layer

What can we do to preserve the ozone layer?

- A. Reduce the amount of carbon dioxide produced by cars and factories
- B. Reduce the greenhouse effect
- C. Stop cutting down the rainforests
- D. Limit the numbers of cars that can be used when the level of ozone is high
- E. Properly dispose of air-conditioners and fridges

Questioning in science: diagnosis



Sheena leaves a wooden block, a glass flask, a woolly hat, and a metal stapler on a table overnight. What can she say about their temperatures the next morning?

- A. The stapler will be colder than the other objects
- B. The woolly hat will be warmer than the other objects
- C. The temperatures of all four objects will be different
- D. The temperatures of all four objects will be the same



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Questioning in English: discussion

Macbeth: mad or bad?

Questioning in English: diagnosis

Where is the verb in this sentence?

The dog ran across the road



A



B



C



D

Questioning in English: diagnosis

Which of these is correct?

- A. Its important that the cat eats its food
- B. It's important that the cat eats its food
- C. Its important that the cat eats it's food
- D. It's important that the cat eats it's food

Questioning in English: diagnosis

Which of these is the best thesis statement?

- A. The typical TV show has 9 violent incidents
- B. The essay I am going to write is about violence on TV
- C. There is a lot of violence on TV
- D. The amount of violence on TV should be reduced
- E. Some programs are more violent than others
- F. Violence is included in programs to boost ratings
- G. Violence on TV is interesting
- H. I don't like the violence on TV

Questioning in history: discussion

In which year did World War II begin?

- A. 1919
- B. 1938
- C. 1939
- D. 1940
- E. 1941

Questioning in history: diagnosis

Why are historians concerned with bias when analyzing sources?

- A. People can never be trusted to tell the truth
- B. People deliberately leave out important details
- C. People are only able to provide meaningful information if they experienced an event firsthand
- D. People interpret the same event in different ways, according to their experience
- E. People are unaware of the motivations for their actions
- F. People get confused about sequences of events



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Questioning in MFL: discussion

Is the verb “être” regular in French?

Questioning in MFL: diagnosis

Which of the following is the correct translation for "I give the book to him"?

- A. Yo lo doy el libro.
- B. Yo doy le el libro.
- C. Yo le doy el libro.
- D. Yo doy lo el libro.
- E. Yo doy el libro le.
- F. Yo doy el libro lo.

Discriminate between incorrect and correct cognitive rules

Version 1

There are two flights per day from Newtown to Oldtown. The first flight leaves Newtown each day at 9:20 and arrives in Oldtown at 10:55. The second flight from Newtown leaves at 2:15. At what time does the second flight arrive in Oldtown? Show your work.

Version 2

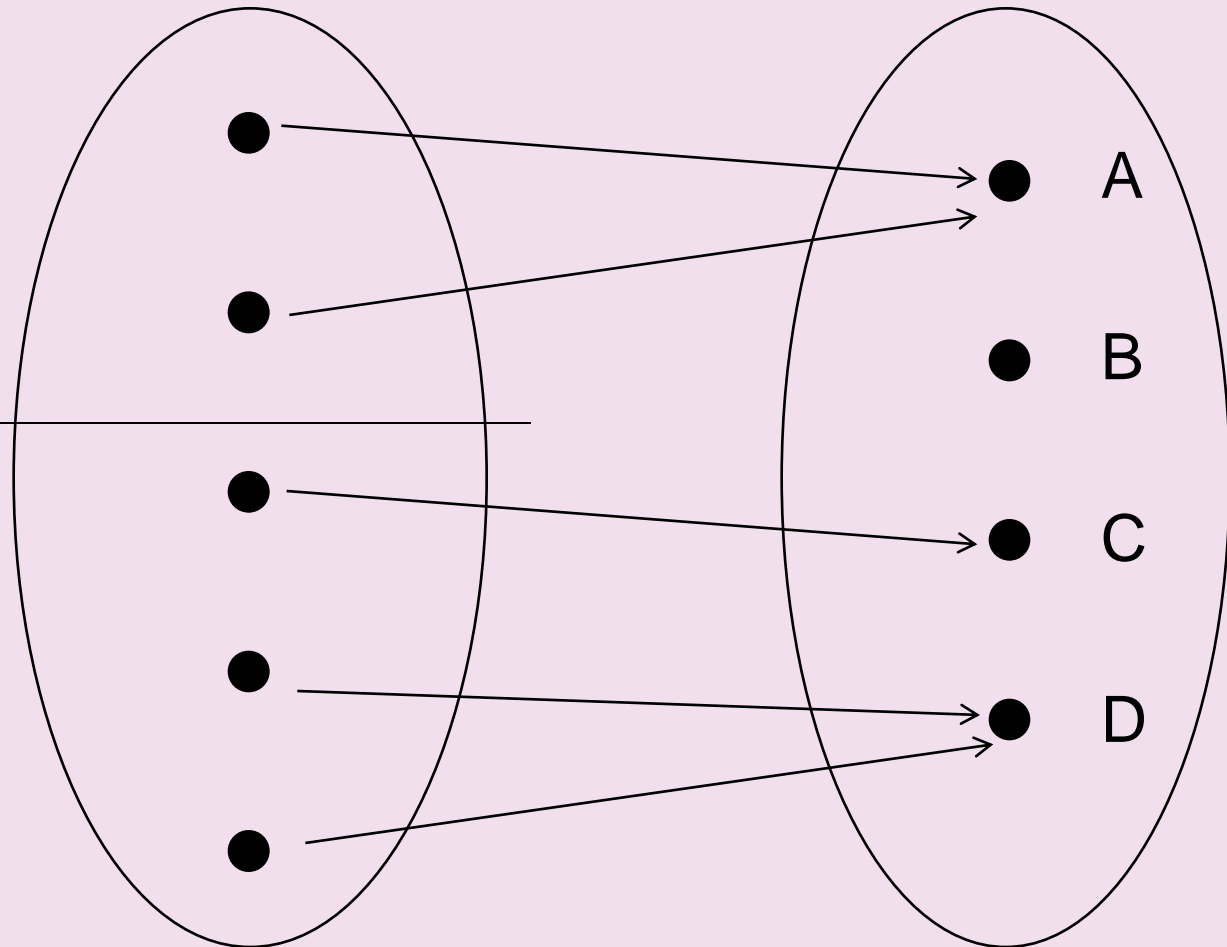
There are two flights per day from Newtown to Oldtown. The first flight leaves Newtown each day at 9:05 and arrives in Oldtown at 10:55. The second flight from Newtown leaves at 2:15. At what time does the second flight arrive in Oldtown? Show your work.

Cognitive rules

Responses

Correct

Incorrect



Hinge-point questions

A hinge-point question focuses on a key learning outcome that is essential for students to achieve before moving on

Design requirements

- ⌘ Every student must respond to the question within two minutes.
- ⌘ You must be able to collect and interpret the responses from all students in 30 seconds

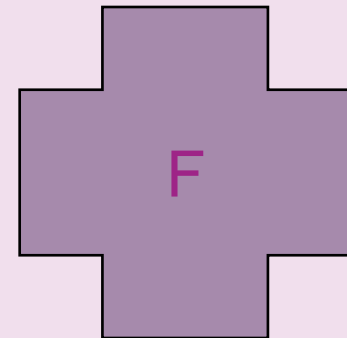
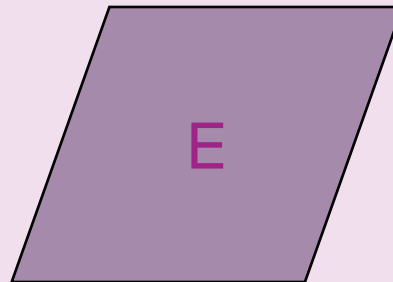
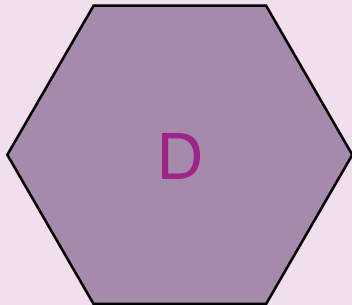
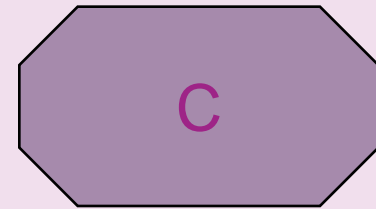
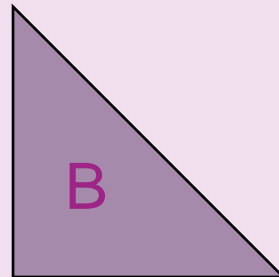
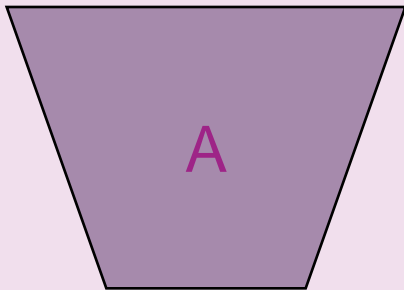
Priorities (in order)

- ⌘ In no case should correct and incorrect cognitive rules map onto the correct option
- ⌘ Each incorrect option response (distractor) should interpret a single cognitive rule
- ⌘ Correct option responses (keys) should interpret a single cognitive rule

Class quiz: Figurative language

- | | | | |
|-----------|--------------------------|-----------|---|
| A. | Alliteration | 1. | He was like a bull in a china shop. |
| B. | Hyperbole | 2. | This backpack weighs a ton. |
| C. | Irony | 3. | The sweetly smiling sunshine... |
| D. | Metaphor | 4. | He honked his horn at the cyclist. |
| E. | Onomatopoeia | 5. | “They in the sea being burnt, they in the burnt ship drown’d.” |
| F. | Personification | 6. | He was as tall as a house. |
| G. | Simile | | |
| H. | None of the above | | |

Class quiz: Lines of symmetry





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Taking the work forward in your own school/district



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Creating a climate for improvement

Teacher learning is just like any other learning in a highly complex area

- ⌘ In the same way that teachers cannot do the learning for their learners, leaders cannot do the learning for their teachers

What is needed from teachers

- ⌘ A commitment to the continuous improvement of practice; and
- ⌘ A focus on those things that make a difference to students

What is needed from leaders

- ⌘ A commitment to engineer effective learning environments for teachers:
 - ⌘ creating expectations for the continuous improvement of practice
 - ⌘ keeping the focus on the things that make a difference to students
 - ⌘ providing the time, space, dispensation and support for innovation
 - ⌘ supporting risk-taking

Pareto analysis

Vilfredo Pareto (1848-1923)

- ⌘ Economist and philosopher associated with the 80:20 rule

Pareto improvement

- ⌘ A change that can make at least one person better off without making anyone else worse off.

Pareto efficiency/Pareto optimality

- ⌘ An allocation of resource is Pareto efficient or Pareto optimal when there are no more Pareto improvements

Obstacles to Pareto improvements

- ⌘ The political economy of reform
- ⌘ It is very hard to stop people doing valuable things in order to give them time to do even more valuable things



A case study in risk

Transposition of the great arteries (TGA)

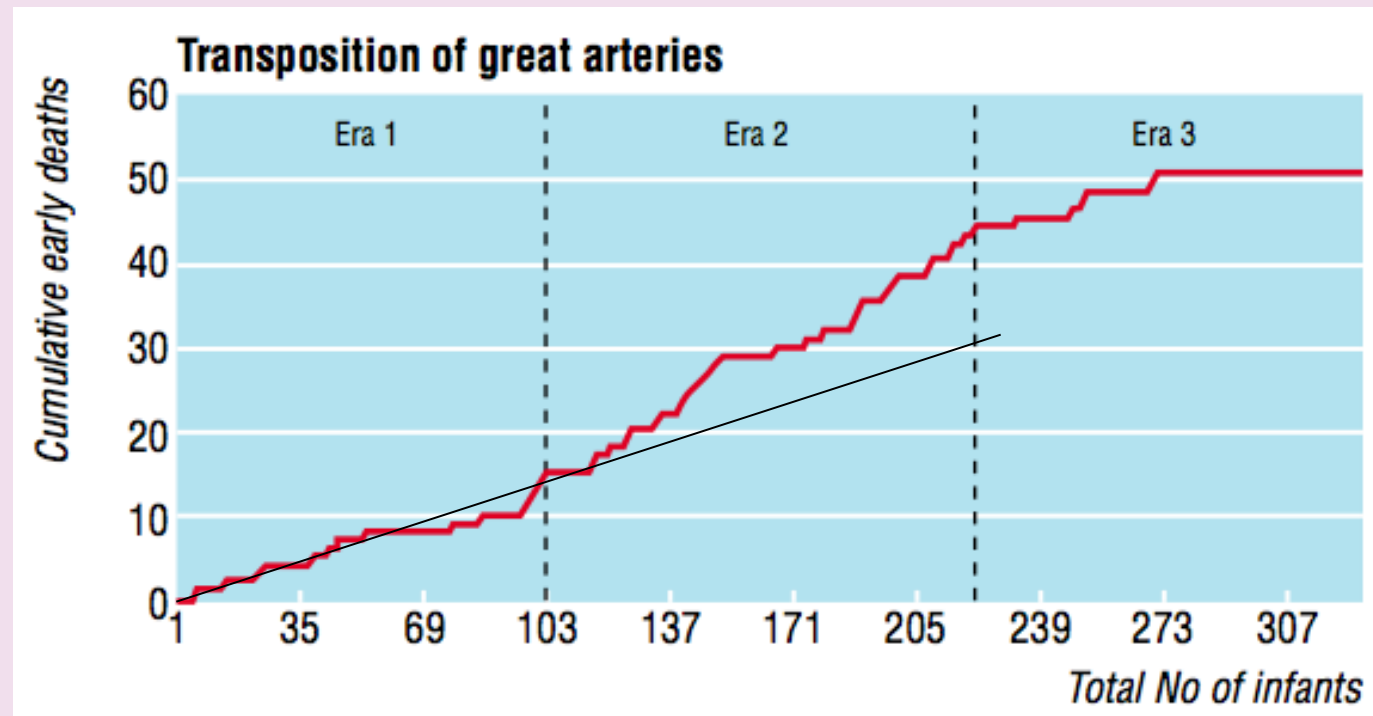
- ⌘ A rare (1 in 4000 live births) but serious condition in newborns in which
 - ⊞ the aorta emerges from the right ventricle and so receives oxygen-poor blood, which is carried back to the body without receiving more oxygen
 - ⊞ the pulmonary artery emerges from the left ventricle and so receives the oxygen-rich blood, which is carried back to the lungs
- ⌘ Traditional treatment: the 'Senning' procedure which involves:
 - ⊞ the creation of a 'tunnel' between the ventricles, and
 - ⊞ the insertion of a 'baffle' to divert oxygen-rich blood from the left ventricle (where it shouldn't be) to the right ventricle (where it should)
- ⌘ Prognosis
 - ⊞ Early death rate (first 30 days): 12%
 - ⊞ Life expectancy: 46.6 years

The introduction of the 'switch' procedure

Senning

Transitional

Switch

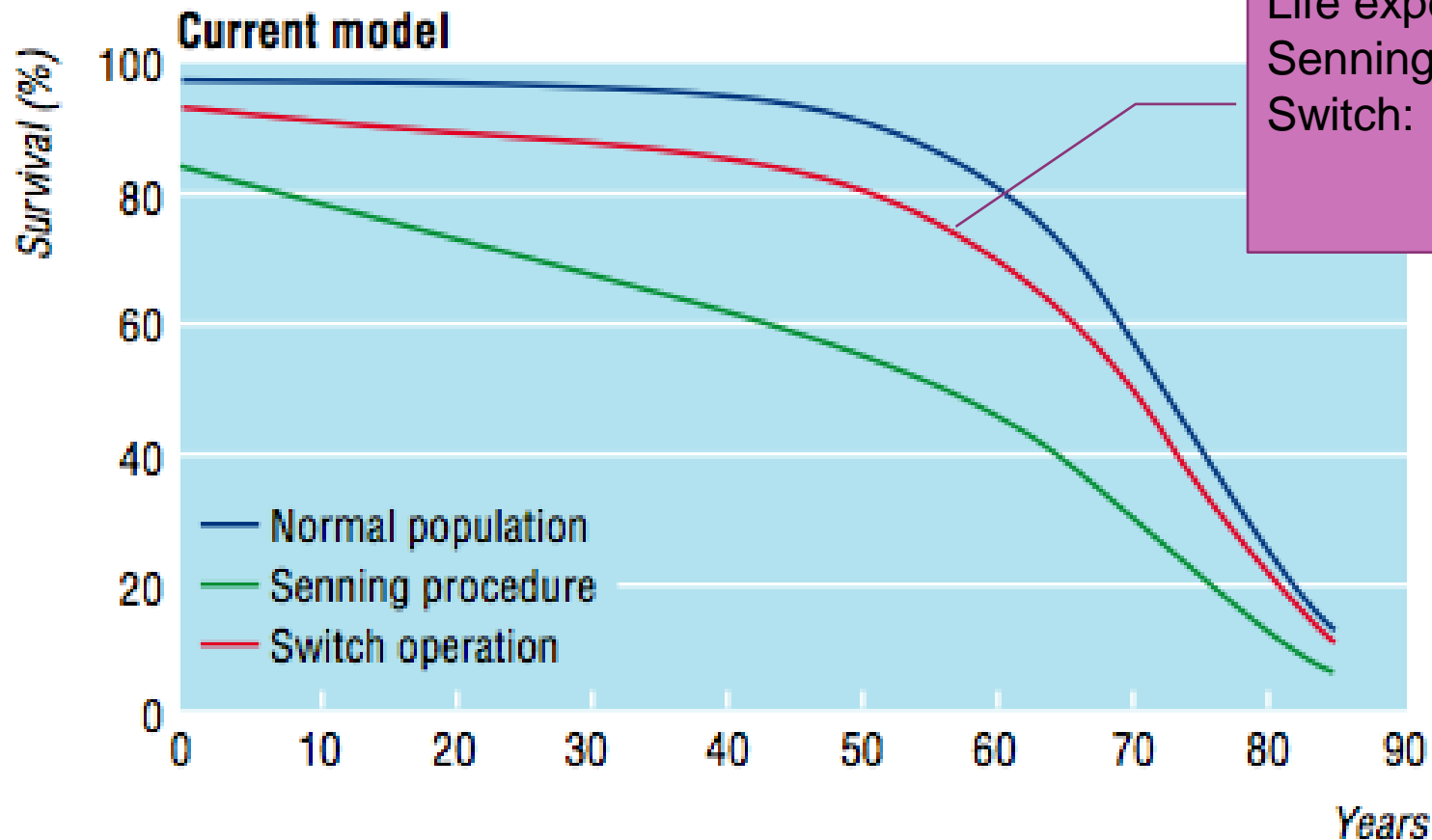


Early death rate

Senning 12%

Transitional 25%

Impact on life expectancy



Life expectancy:
Senning: 46.6 years
Switch: 62.6 years

Teacher learning communities

Plan that the TLC will run for two years

Identify 10 to 12 interested colleagues

⌘ Composition

Similar assignments (e.g. early years, math/sci)

Mixed-subject/mixed-phase

Hybrid

Secure institutional support for:

⌘ Monthly meetings (75 - 120 minutes each, inside or outside school time)

⌘ Time between meetings (2 hrs per month in school time)

Collaborative planning

Peer observation

⌘ Any necessary waivers from school policies

A 'signature pedagogy' for teacher learning

Every monthly TLC meeting should follow the same structure and sequence of activities

Activity 1: Introduction (5 minutes)

Activity 2: Starter activity (5 minutes)

Activity 3: Feedback (25-50 minutes)

Activity 4: New learning about formative assessment (20-40 minutes)

Activity 5: Personal action planning (15 minutes)

Activity 6: Review of learning (5 minutes)

Every TLC needs a leader

The job of the TLC leader(s)

- ⌘ To ensure that all necessary resources (including refreshments!) are available at meetings
- ⌘ To ensure that the agenda is followed
- ⌘ To maintain a collegial and supportive environment

But most important of all...

- ⌘ not to be the formative assessment “expert”

Peer observation

Run to the agenda of the observed, not the observer

- ⌘ Observed teacher specifies focus of observation
 - ☒ e.g., teacher wants to increase wait-time
- ⌘ Observed teacher specifies what counts as evidence
 - ☒ provides observer with a stop-watch to log wait-times
- ⌘ Observed teacher owns any notes made during the observation



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Comments?

Questions?



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Force-field analysis (Lewin, 1954)

What are the forces that will support or drive the adoption of formative assessment practices in your school/district?

+

What are the forces that will constrain or prevent the adoption of formative assessment practices in your school/district?

—