Institute of Education

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Best Practice in Medical Education: The role of theory and evidence

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What is the purpose of Medical education ?

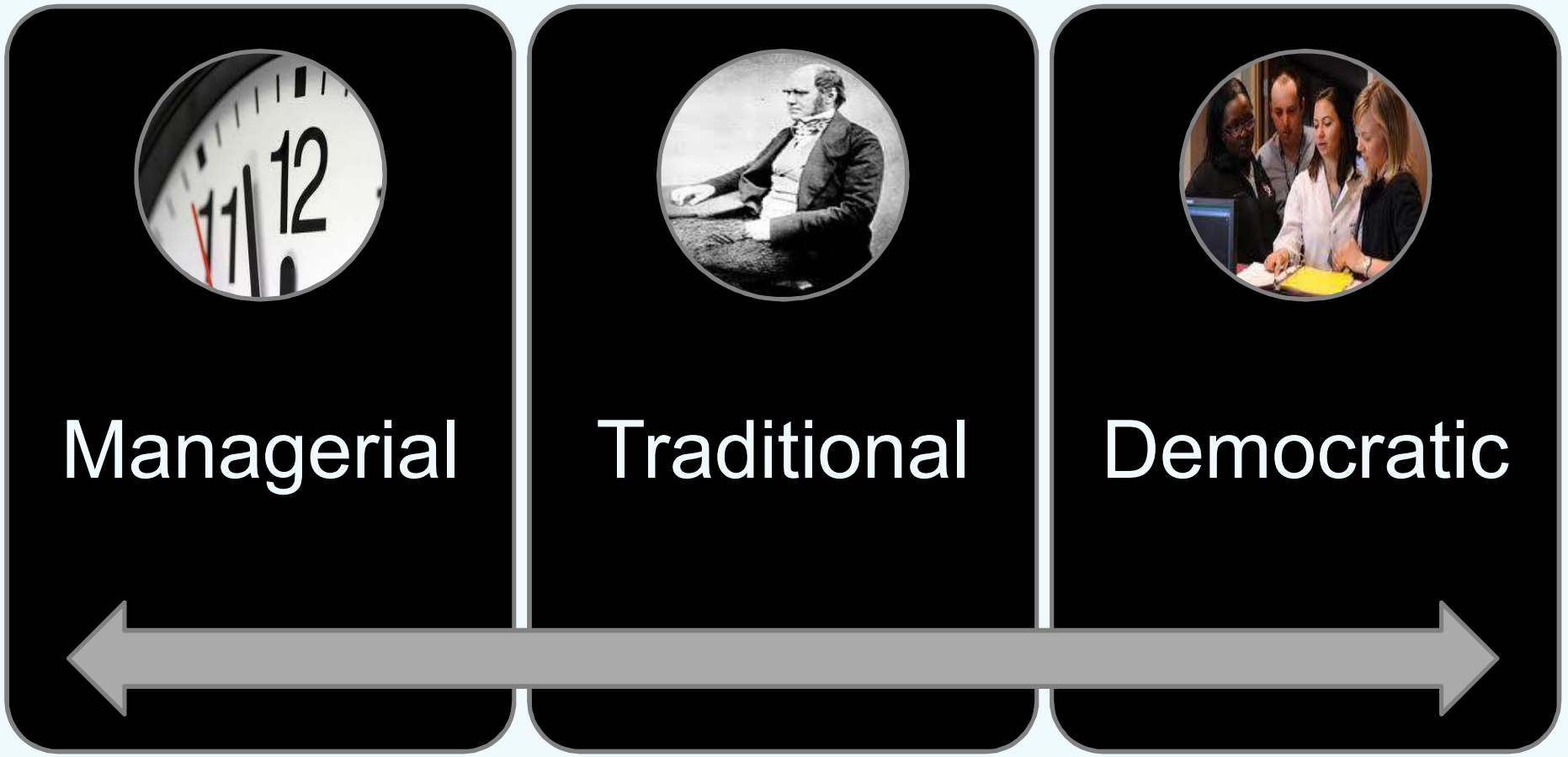
- To develop and grow a person to their full intellectual, practical and emotional potential?
- To inculcate specific societal values?
- To produce a worker who can competently perform specific roles and tasks?
- To develop a persons ability to explore new ideas and to think independently?

Dominant discourses of competence

- Knowledge Discourse
- Performance Discourse
- Psychometric Discourse
- Reflection Discourse
- Production Discourse

Hodges 2012

Discourses of ‘Professionalism’

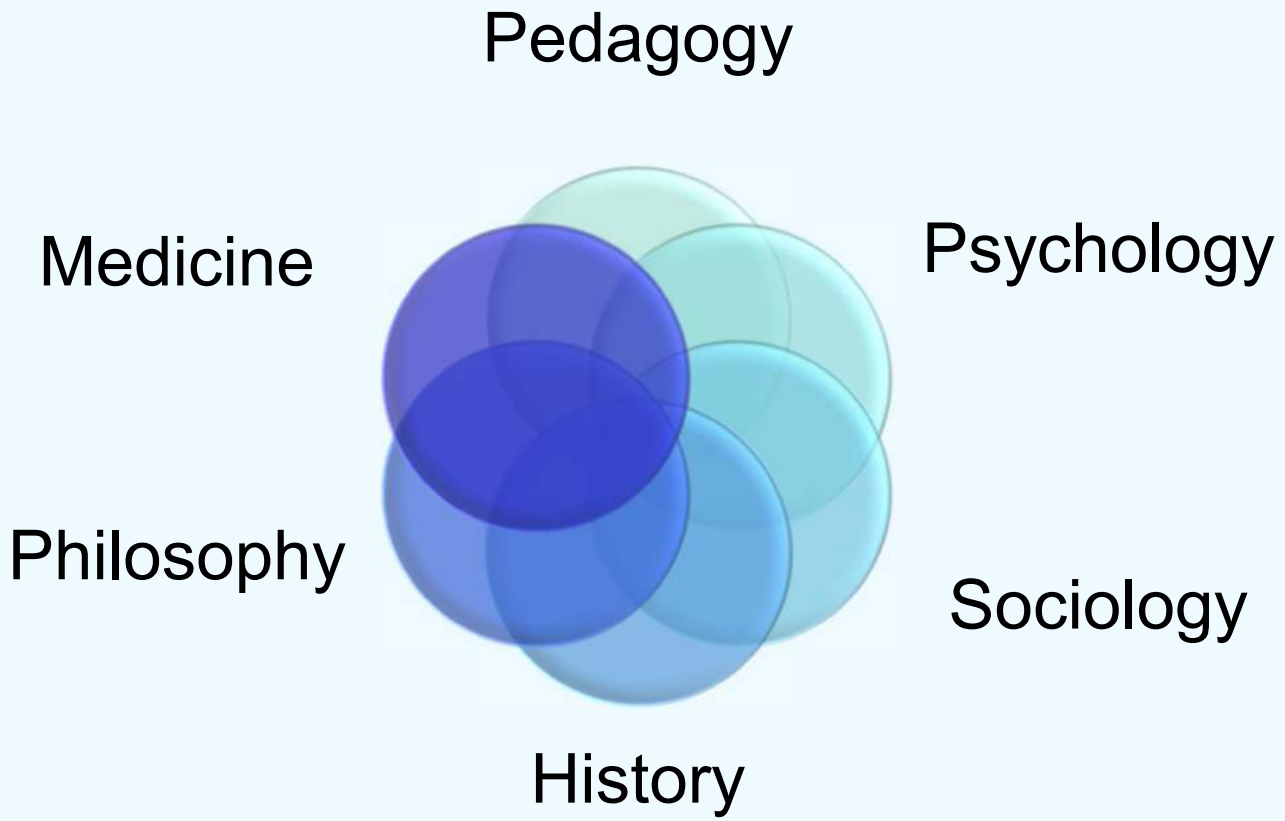


Gill D & Griffin A (2101) Good Medical Practice: what are we trying to say? Textual analysis using tag clouds Medical Education 2010: 44: 316–322

Discourses affect decisions about pedagogical practice

- How you conceptualise purpose/professionalism/competence will affect:
  - What you do
  - What you expect others to do
  - What you consider is ‘core’ as an educator in the professions
  - How you go about helping people to develop it
  - How you assess its presence or absence

The contributing disciplines of medical education



Have we got pedagogical best practice in health professional education now ?

‘*Educational practice and educational research are not aligned with each other’.*

C. P. M. van der Vleuten • E. W. Driessen (2014) What would happen to education if we take education evidence seriously? Perspect Med Educ (2014) 3:222–232.

‘*Medical education practice is more often the result of tradition, ritual, culture, and history than of any easily expressed theoretical or conceptual framework’*

B.D.Hodges, & A. Kuper (2012)Theory and Practice in the Design and Conduct of Graduate Medical Education Academic Medicine, Vol. 87, (1) pp25-33

How do we go about choosing better programmes ?

This not an ontological issue !

But rather a key problem in social science

- “A key problem in social science is how to determine which conditional statements (or conclusions) are scientifically interesting and which are pure speculation based on little more than the private intuitions of the person making the assertions. Unfortunately there are no universally agreed firm criteria for making this judgement. The concern here is to identify the degree of usefulness of a particular conclusion or theory as an instrument for investigation and understanding of the phenomena in question rather than its relative degree of absolute truth. From this perspective the various findings from a study are neither absolutely true nor absolutely false but rather have differing levels of warrant (Gordon, 1993)”.

By paying attention to theories……

Table 1

Examples of Different Types of Theories and Their Applications to Graduate Medical Education (GME)*

Type of theory	Theory	Example of a relevant issue in GME	Hypothetical example of a specific intervention in GME
Bioscience theories	Personality/genetic theory	Characteristics for admissions to residency training	Predicting conduct/misconduct in future practice using personality traits
	Motor learning/control theory	Learning complex motor tasks and technical skills	Using distributed rather than massed feedback to support motor learning
	Neurophysiological theory	Effects of stress on learning and performance	Addressing levels of stress to optimize learning in simulations
	Cognitive theory of multimedia learning	Design of learning formats and resources	Structuring learning tools and formats for optimum learning and retention with multiple media
	Cognitive load theory	Design of simulation and multimedia learning modules	Reducing cognitive load to allow for better performance in practice
Learning theories	Adult learning theory (including critiques)	Role of self-assessment and self-directed learning	Avoiding unstructured self-direction by using directed, guided self-learning
	Situated learning theory	Awareness of learning context	Incorporating workplace features into educational design
	Social cognitive theory	Role of social networks in learning	Paying attention to the development of social relationships in learning
Sociocultural theories	Critical theories	Attention to the hidden curriculum arising from the effects of power inequities, hierarchies, and socialization	Addressing the hidden curriculum by making visible and mitigating hierarchies and power differentials and by improving the socialization processes
	Political–economic theories	Attention to economic and political factors that drive behavior	Making visible/altering economic and political drivers of professional behavior

* This table presents a selection of bioscience theories, learning theories, and sociocultural theories that are relevant to GME. For each theory, the table provides an example of an issue within GME to which that theory is potentially relevant and a hypothetical example of a specific intervention which would be supported by that theory.

B.D.Hodges, & A. Kuper (2012)Theory and Practice in the Design and Conduct of Graduate Medical Education Academic Medicine, (Vol. 87, (1) pp25-33

Many theories, Which are good? Or how can we decide what is a good argument

Adult learning theory, first described by Malcolm Knowles in the early 1970s, is based on a number of apparently self-evident axioms about how adults learn. The fundamental assumptions remain largely untested, and a critical analysis suggests that they may be largely a product of the environment in which adults find themselves rather than of any innate differences between adults and children.... Uncritical reliance on the principles of adult learning may have detrimental consequences, particularly in the domain of maintenance of competence.

Norman GR. The adult learner: A mythical species. Acad Med. 1999;74:886–889.

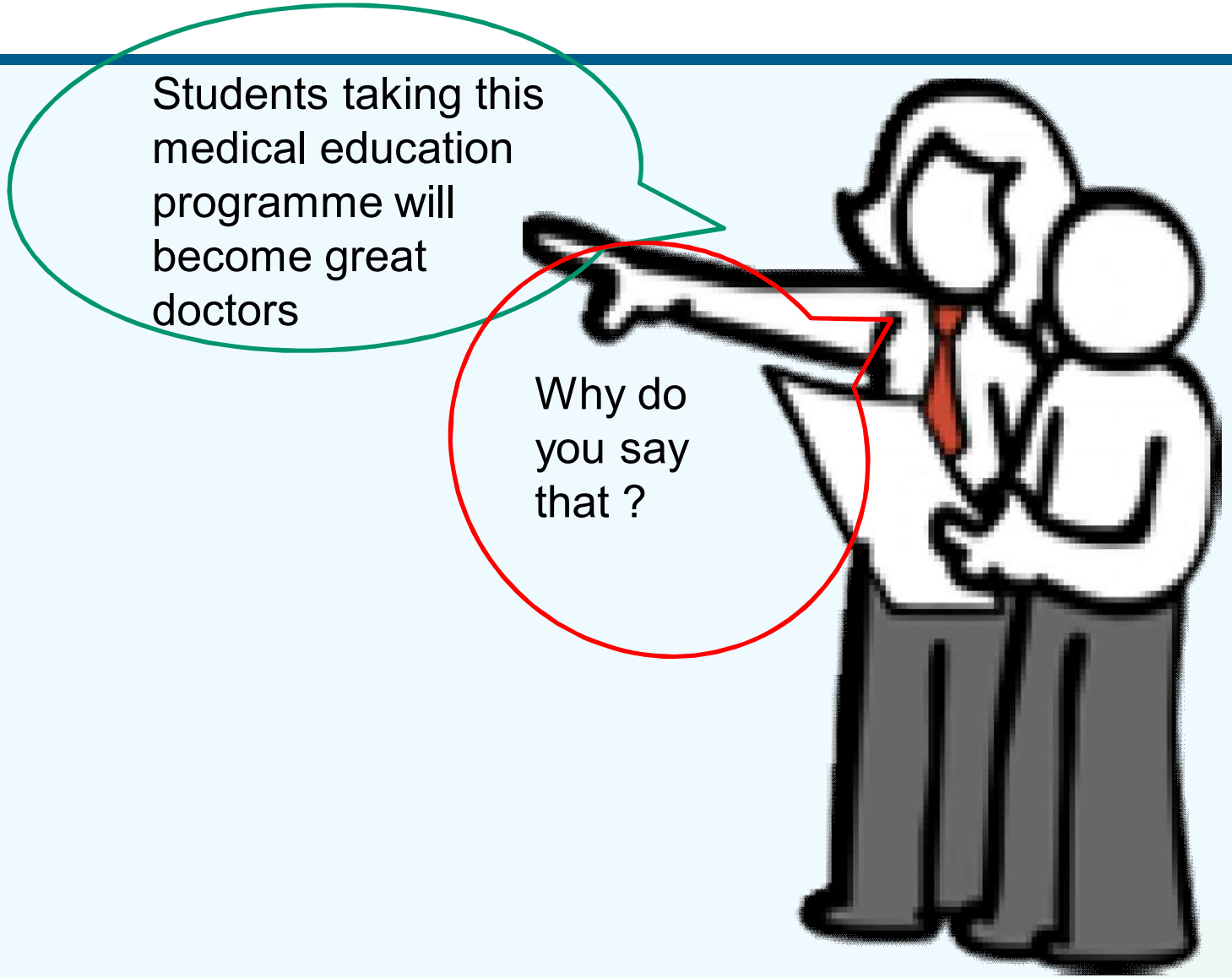
But what is a theory?

"A logically interrelated set of propositions about empirical reality"

Schutt RK (2015) Investigating the Social World: The Process and Practice of Research. Sage., Boston

i.e an argument based on a set of premises

A couple of education system managers are choosing which medical education programmes to recommend

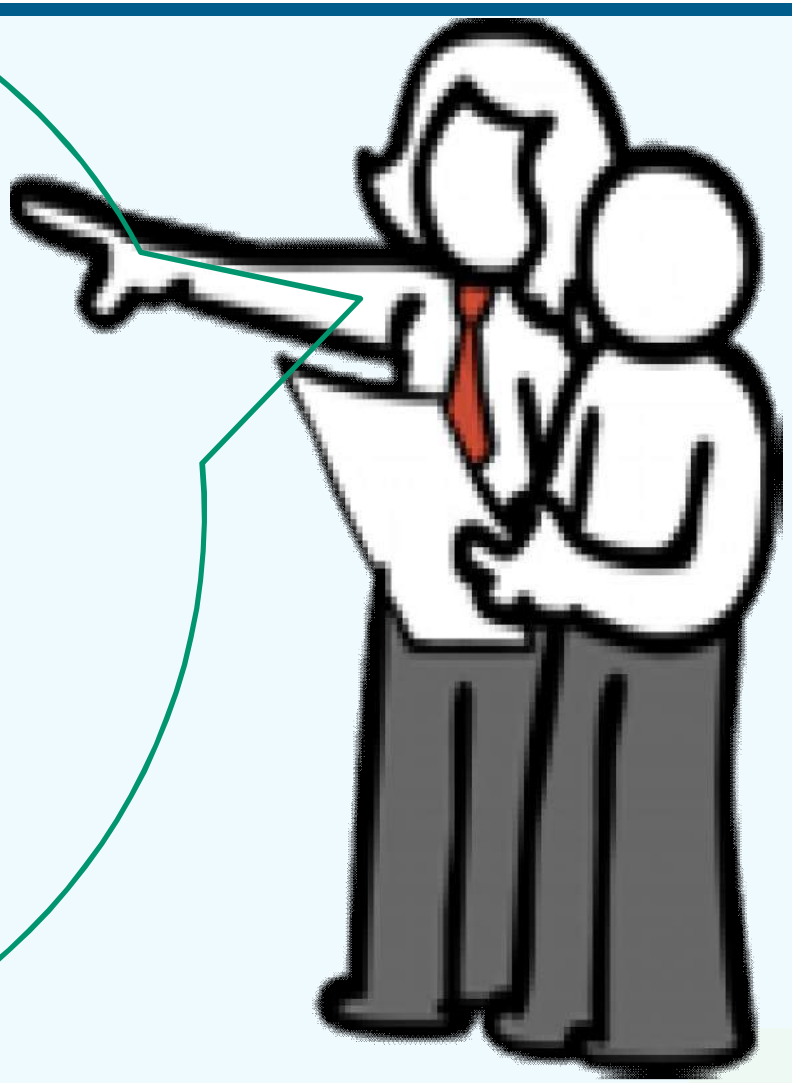


A couple of education system managers are choosing which medical education programmes to recommend

1. Dr Newman designed the programme and he is a great guy

2. Students from this programme get jobs at good hospitals with great salaries

3. The programme uses a clinically based elaborative learning design with active mentorship and constant feedback so students are really engaged



Arguments supported by premises

1. Dr Newman designed the programme and he is a great guy

2. Students from this programme get jobs at good hospitals with great salaries

3. The programme is a clinically based elaborative learning design with active mentorship and constant feedback so students are really engaged

=

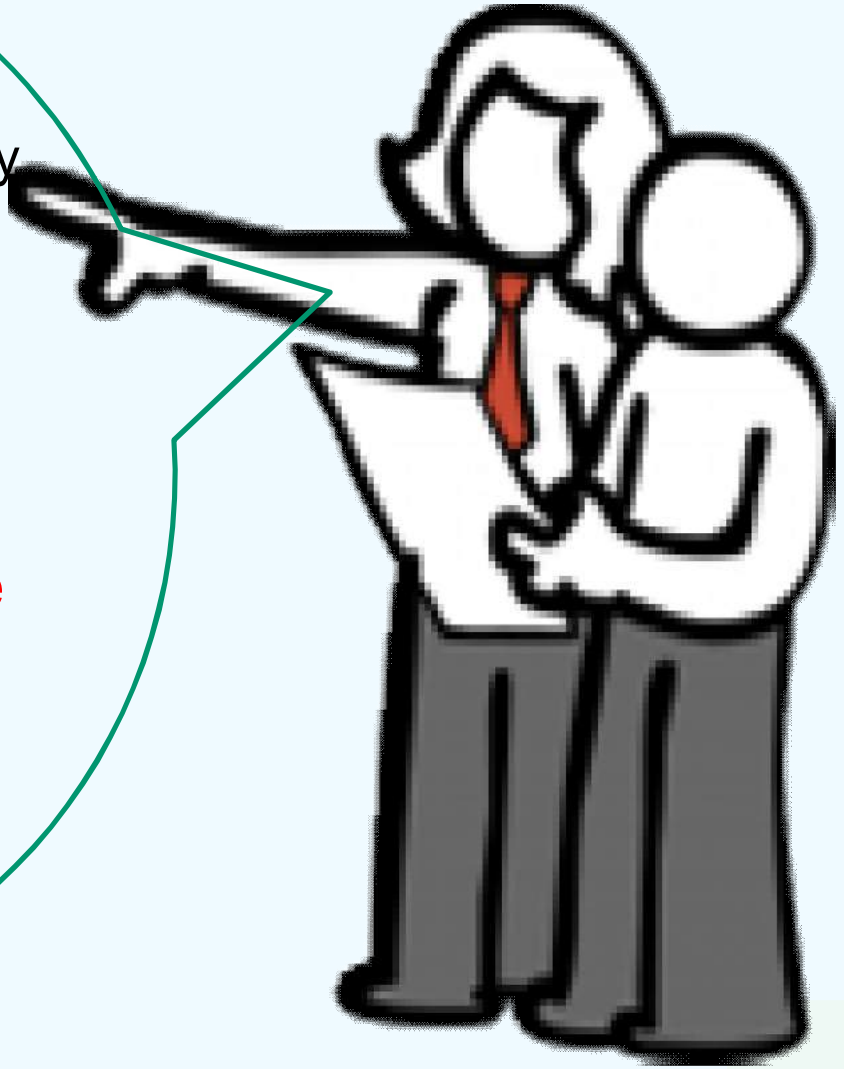
Premises for argument that programme will produce good doctors

Assessing the quality of an argument

1. Dr Ne[illegible] designed [illegible]
programme[illegible] great guy

BAD argument =

Even if the premise were true would not increase the % that the argument was correct



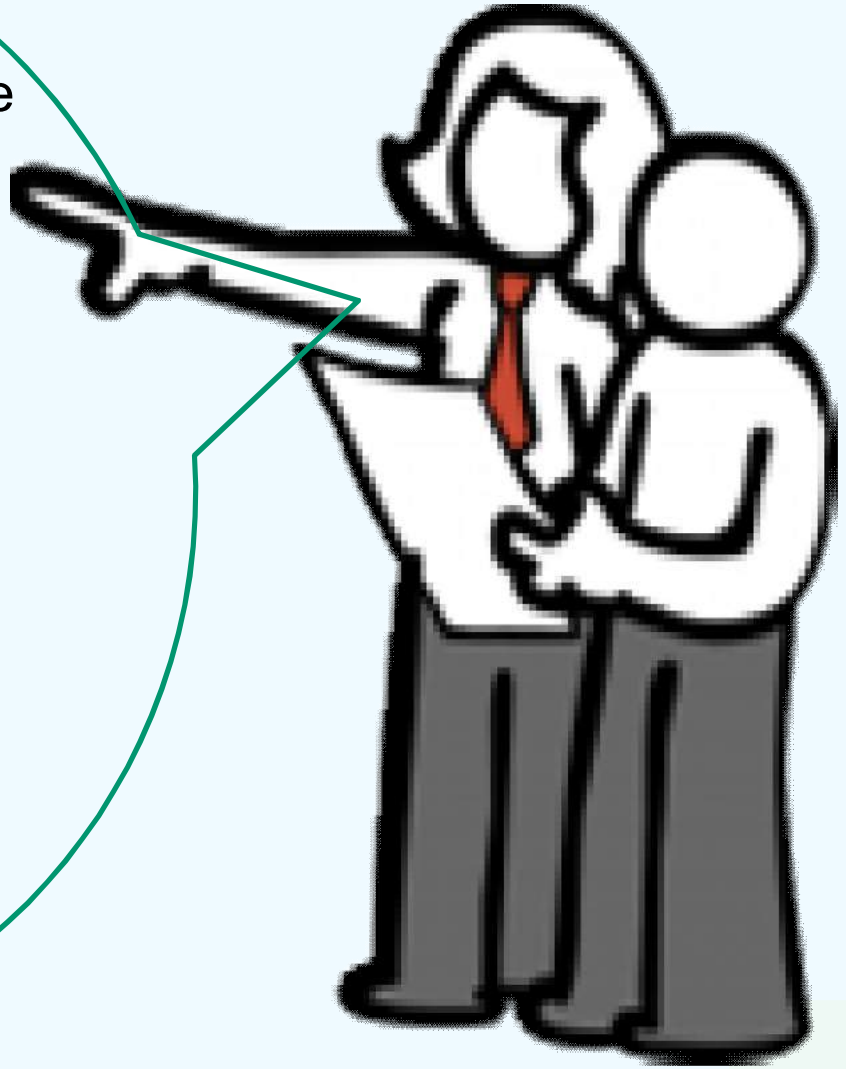
Assessing the quality of an argument

2. Students from this programme get jobs at good hospitals with great salaries

3. The programme is a clinically based elaborative learning design with active mentorship and constant feedback so students are really engaged

= Good arguments

If true they increase the % that the argument is correct



A couple of education system managers are choosing which medical education programmes to recommend

- Students from this programme get jobs at good hospitals with great salaries
- The programme is a clinically based elaborative learning design with active mentorship and constant feedback so students are really engaged

What kind of argument?

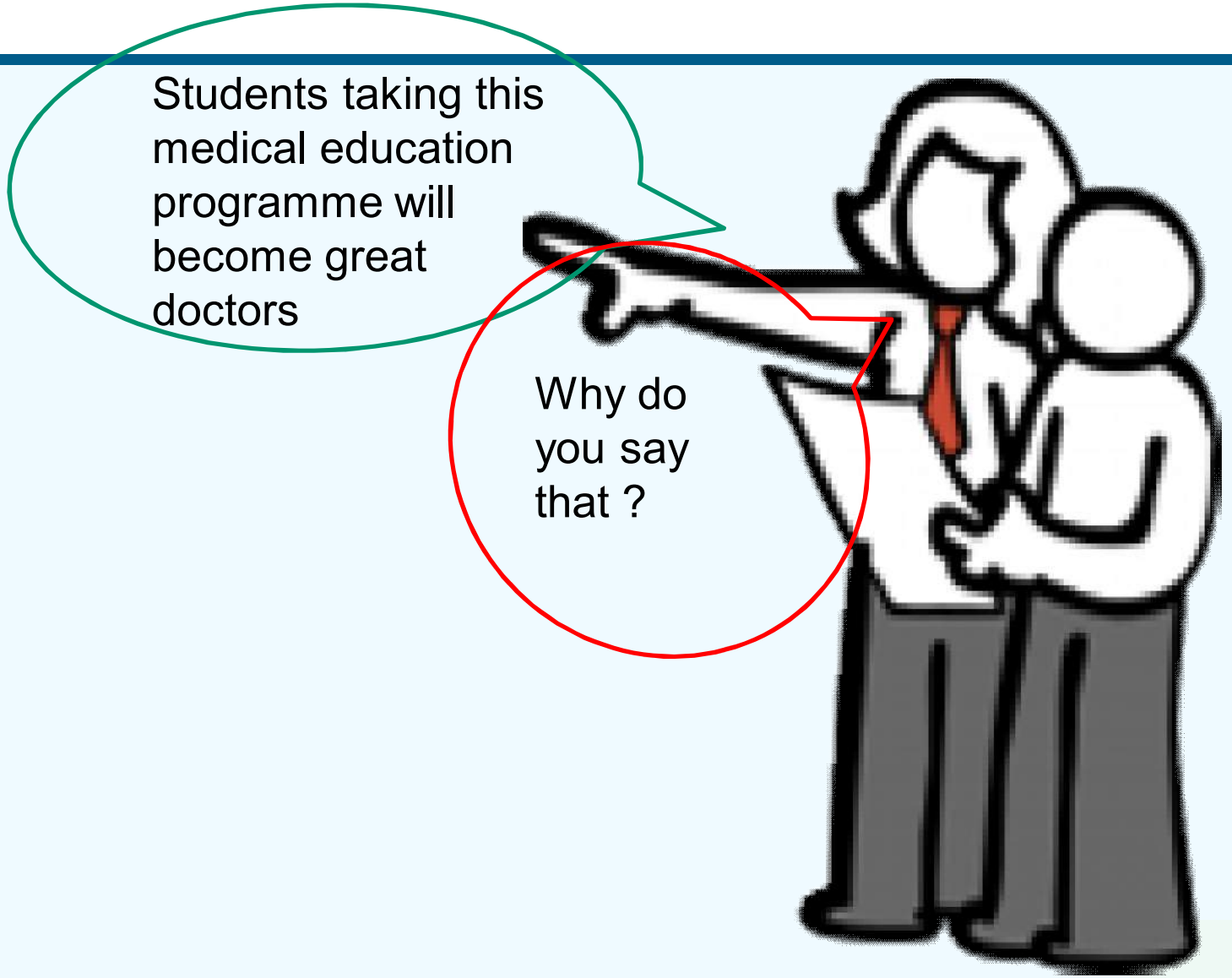
- Students from this programme get jobs at good hospitals with great salaries
- The programme is a clinically based elaborative learning design with active mentorship and constant feedback so students are really engaged

These premises make it more probable that the argument is true but do not guarantee it = ampliative or inductive

Theories *are* ampliative or inductive arguments

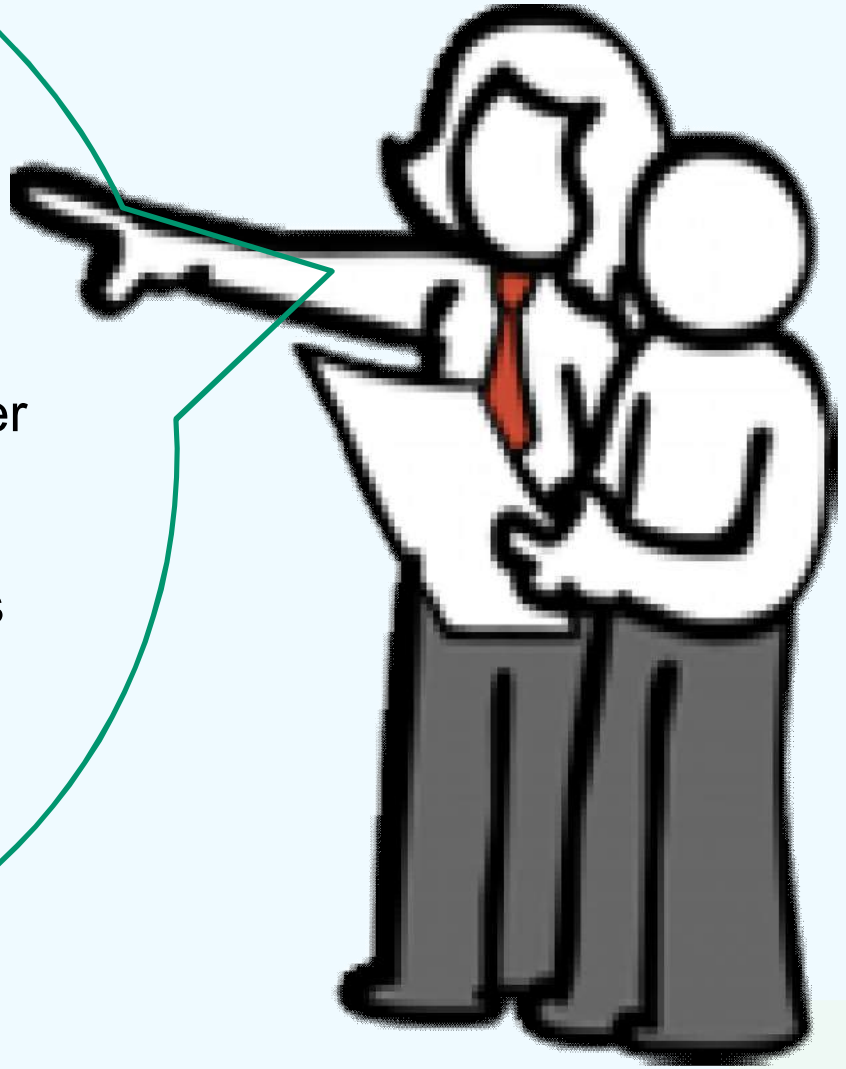
Theories are ‘Good’ arguments that make it more likely that claims about the impact of a pedagogical practice will be true but do not guarantee it

A couple of education system managers are choosing which medical education programmes to recommend



A couple of education system managers are choosing which medical education programmes to recommend

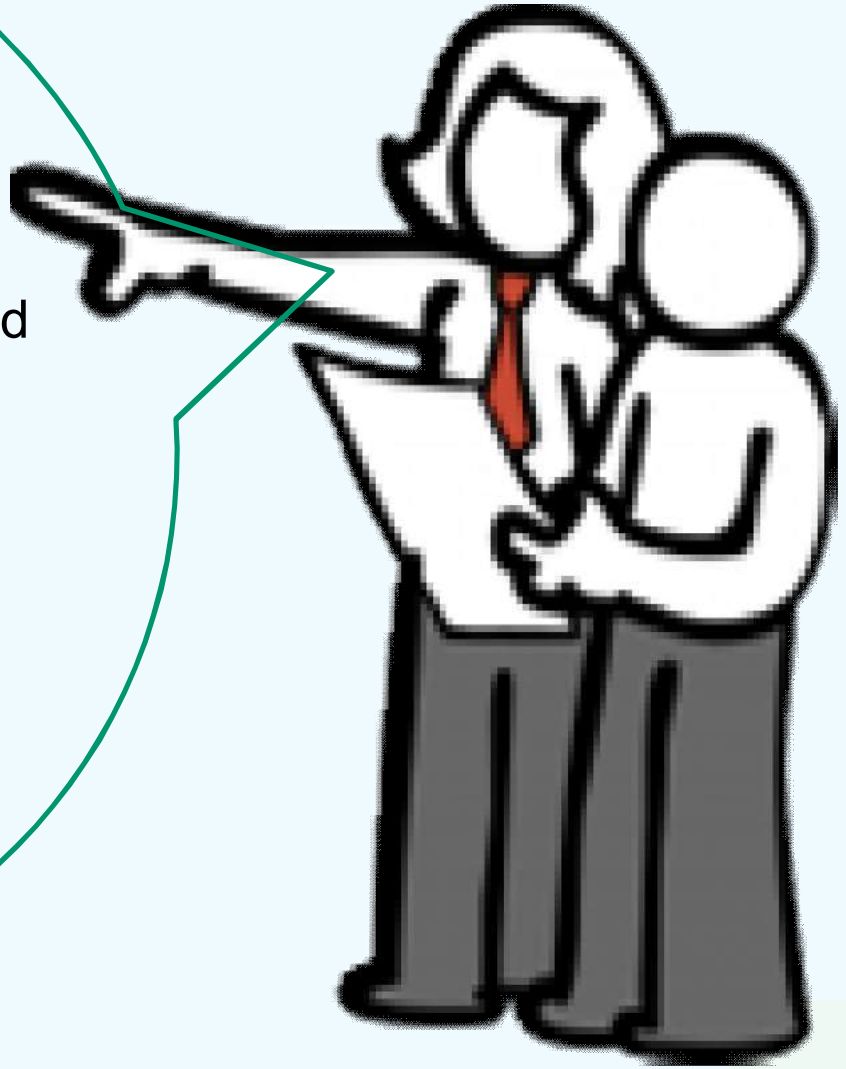
1. Research has shown that patients from around the world who are cared for by Doctors who trained in this programme have better clinical outcomes and greater satisfaction with their care when compared to Doctors trained in other programmes



A couple of education system managers are choosing which medical education programmes to recommend

"Research has shown that patients from around the world who are cared for by Doctors who trained in this programme have better clinical outcomes and greater satisfaction with their carewhen compared to Doctors trained in other programmes"

= Deductive
If the premise is true then the argument must be correct



'where we have solid evidence on how learning is facilitated'

- "Supporting theory & empirical evidence"
  - Elaboration
  - Engagement
  - Feedback
  - Mentoring
  - Learning in a social context

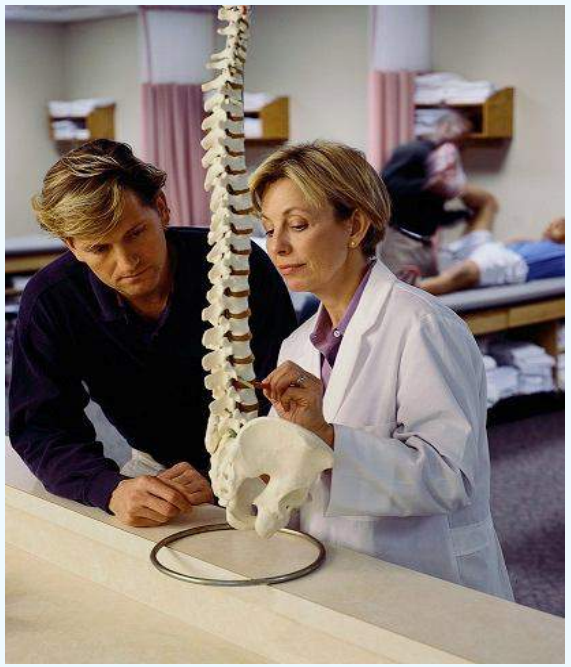
C. P. M. van der Vleuten • E. W. Driessen (2014) What would happen to education if we take education evidence seriously? Perspect Med Educ (2014) 3:222–232

Major area of disagreement in education policy, research and practice

- Are ampliative arguments sufficient justifications for pedagogical practice? Or do we need deductive arguments
- Is it possible to have deductive arguments about the impact of pedagogical practices?
- What kind of empirical evidence is needed for a deductive argument about the impacts of pedagogical practices

Pedagogical practice has impacts on students learning and patient outcome

- The more confident we can be about the argument made for the impact of any particular pedagogical practice the better
- using ampliative and deductive arguments
- Paying attention to descriptive causality



Descriptive Causality

- That there is a variation in pattern of outcomes
    - AND

That the most probable explanation for this variation was a difference in the 'pedagogical practice'

i.e.

That variation x was 'caused by' Y

So how do I demonstrate descriptive causality ?

Principles for demonstrating a causal relationship

- There is a temporal order in which cause must precede effect
- There is association that requires that the two events occur together
- There is elimination of alternatives in order to be able to claim that the effect was due to the specified intervention and not something else.
- Causal relationships are made sense of in terms of broader theoretical ideas or assumptions.

(Blaikie 2000)

Threats to validity (bias)

- In practice we claim descriptive causality by eliminating various alternative explanation or ‘threats to validity’
  - Threats to statistical conclusion validity
  - Threats to construct validity
  - Threats to external validity
  - Threats to internal validity

(Cook & Campbell 1979)

Threats present different type of problem for researcher

Threats to statistical conclusion validity

Threats to construct validity

Threats to external validity

Specific from study to study not amenable to 'research design' solutions – have to be established through replication/ argument / theory

Threats to internal validity

Technical – amenable to design solutions within a single study – replication will not solve

Research design

Threats to internal validity

Well executed Experimental research design with random allocation to groups is an efficient method of controlling for threats to internal validity

Implications for choosing 'best' pedagogical practices

- Consider the argument /claim we wish to make when choosing pedagogical practices
- What kind of argument is a necessary or sufficient basis for that choice
- If a deductive argument is also thought to be necessary or will help inform choice consider
  - 'Best' for what & who in what context
  - how the claim for descriptive causality is supported by the empirical research evidence

Thankyou

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