Critical Thinking and Appraisal

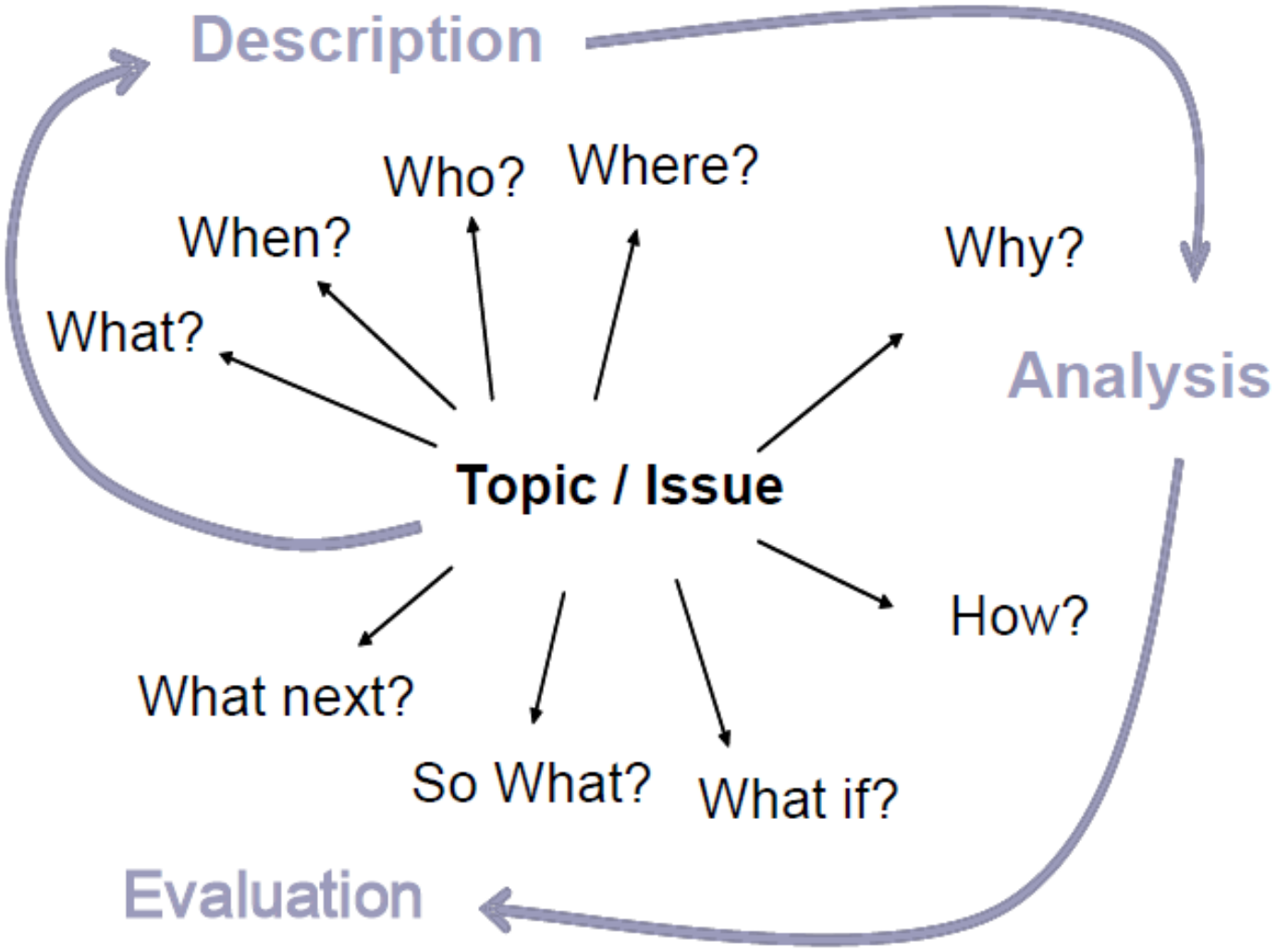
What is critical thinking?

Not just a single skill… It covers a range of processes such as:

- **Everyday questioning** – e.g. scepticism about adverts; looking out for scams / fake news
- **Is the argument supported?** – e.g. judging how strong people's arguments are
- **Making your own judgements** – e.g. not just looking at the pros & cons of a position, but using the information to reach your own conclusions
- **Accepting uncertainty** – e.g. not leaping to conclusions or rushing to find an absolute "right" answer

Based on Oxford Brookes University (2023)

Critical thinking model



Plymouth University (2003)

What is critical appraisal?

"The process of **assessing and interpreting evidence**, by **systematically considering** its **validity**, **results** and **relevance** to your own context."

Critical Appraisal Skills Programme (2023)

Is it authoritative and trustworthy?

Is it current?

Is it relevant?

Is it accurate?

What is its purpose?

Why critically appraise?

- To identify papers that are clinically relevant in an imperfect information environment (e.g. information overload, variable quality of research articles)

➡ On average, the results of 62 RCTs and 57 systematic reviews are published every day*

- To decide whether studies have been undertaken in a way which makes their findings reliable (putting unreliable evidence into practice could lead to harm being caused or limited resources being wasted)

- To make sense of the results

** Based on 2017 data; see Niforatos. J.D., Weaver. M., & Johansen, M.E. (2019)*

Where does critical appraisal fit into evidence-based practice?

1. Formulate an answerable question – e.g. use PICO to split your question up into searchable chunks

2. Find evidence from research – to answer your question

3. **Appraise for validity and usefulness (critical appraisal)**

4. Implement change – apply the evidence into clinical practice

5. Evaluate performance

PICO:
Population (who are the patients)
Intervention (what is the treatment)
Comparison (with what do we compare the intervention)
Outcomes (what happens?)

Appraising a journal article

What to look for...

- Abstract
  - Does it ask a question?
  - Study design / data collection method?
- Introduction
  - Who is the study aimed at?
  - Hypothesis?
- Methods
  - Clarity?
  - Suitable?
  - Repeatable?
- Results
  - Clear outcomes?
  - Appropriate use of statistics?
- Discussion/Conclusion
  - Critical findings
  - Does it add to the literature?
  - Limitations?
  - What can I take from this?

Checklists

There are critical appraisal checklists available for most types of study. Sources include...

- **CASP (Critical Appraisal Skills Programme)** https://casp-uk.net/casp-tools-checklists/

- **Centre for Evidence-Based Medicine** https://www.cebm.ox.ac.uk/resources/ebm-tools/critical-appraisal-tools

- **Healthcare Improvement Scotland** checklists https://www.sign.ac.uk/what-we-do/methodology/checklists/

- **University of Glasgow** (General Practice/Primary Care) https://www.gla.ac.uk/researchinstitutes/healthwellbeing/research/generalpractice/ebp/checklists/

Example questions from the CASP RCT checklist

CASP
Critical Appraisal Skills Programme

Section A: Is the basic study design valid for a randomised controlled trial?			
1. Did the study address a clearly focused research question? *CONSIDER:* *Was the study designed to assess the outcomes of an intervention?* *Is the research question 'focused' in terms of:* • *Population studied* • *Intervention given* • *Comparator chosen* • *Outcomes measured?*	Yes ☐	No ☐	Can't tell ☐
2. Was the assignment of participants to interventions randomised? *CONSIDER:* • *How was randomisation carried out? Was the method appropriate?* • *Was randomisation sufficient to eliminate systematic bias?* • *Was the allocation sequence concealed from investigators and participants?*	Yes ☐	No ☐	Can't tell ☐
3. Were all participants who entered the study accounted for at its conclusion? *CONSIDER:* • *Were losses to follow-up and exclusions after randomisation accounted for?* • *Were participants analysed in the study groups to which they were randomised (intention-to-treat analysis)?* • *Was the study stopped early? If so, what was the reason?*	Yes ☐	No ☐	Can't tell ☐

Identifying errors in the evidence

- Fundamental biases
- Lack of clarity
- Groups that don’t compare
- Confused outcomes
- Figures that don’t add up
- Confounding variables

Don’t assume that the peer review process will prevent these errors from happening…

Examples of Bias

Type of bias	Description
Selection bias	Occurs when there is a problem with the way subjects are recruited and allocated to groups
Observation/ Information bias	Occurs when there is a problem with the way data are collected and/or measured in the study (e.g. influenced by expectations of researchers or subjects)
Exclusion bias	Occurs when data are missing, e.g. subjects dropping out of the study or missing measurements
Reporting bias	Occurs when significant or positive studies are over-represented in systematic reviews e.g. publication bias, language bias, citation bias

Based on Gosall & Gosall (2020) and Bankhead, Spencer & Nunan (2019)

Further reading

- **How to read a paper**
  Trisha Greenhalgh
  6th ed (2019)
  [Available from the library]

- **BMJ** – "How to read a paper" articles
  https://www.bmj.com/about-bmj/resources-readers/publications/how-read-paper

thebmj

eLearning

- **Critically Appraising the evidence base**
  - 9 introductory modules on critical appraisal
  - https://portal.e-lfh.org.uk/Catalogue/Index?HierarchyId=0_58511&programmeId=58511

Any Questions?