The futures of systematic searching

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Systematic Reviewing

- Question
  - Scoping Search
    - No Thanks!
    - Go Ahead!
      - Write Protocol
        - Register/Publish
          - Searching
            - Screening
              - Data Extraction
                - Summarizing
                  - Meta-Analysis
                    - Meta-Synthesis
                      - Report
                        - Update
Screening Steps

De-Duplicated Search Results

Title/Abstract Screening

Relevant Records

Irrelevant Records

Full Text Screening

Included Studies

Excluded Studies

Ongoing Studies

Awaiting Assessment Studies
Resources needed for evidence review

• 14 review types (Grant and Booth 2009)

• 48 review types (Sutton et al. 2019)

• Cost of doing a systematic review
Clinical decision making

• Pattern recognition (also known as doorway diagnosis or the skill-based process)
• The rule-based process
• **The hypotheticodeductive or knowledge-based process**
• The naturalistic or event-driven process
• #AMillionDecisions per day in NHS
COVID-19 & fast-forward historical processes

• Need for rapid review of evidence on a disease/virus with no name
• Rise of misinformation and disinformation
• Living evidence synthesis
  • Reviews in 2 weeks using tools and communication
  • Systematic Review Toolbox (http://systematicreviewtools.com/)
Missing futures studies (futurology)

- Multiple possibilities (futures) even in parallel
- Participatory futures
- Complexity and multiple contexts
Futures depend on current problems

- **MacFarlane, Russell-Rose, Shokraneh 2022**
  - 17 issues
    - Cost
    - One-stop-shop for search strategies
    - Interface limitations
    - Errors

- Community engagement is horrible; tools/solutions die
- One-stop-shop for information/data
- Copyright and access issues
Futures depends on reverse progress of general search systems

• Hieroglyphs ---> alphabets and math ---> coding ---> icons (Hieroglyphs)
• Simplicity with complexity behind
• Question-to-answer shortcut with a black box in the middle
  • An unexplainable solution that works
• We have marketed medications that work without knowing their mechanism of action
Characteristics of future search tools

• Mobile app-based
• Openness
• Liveness
• Collaboration (among humans and across machines)
• Reproducibility and replicability
• Trust
• Simplicity at the user end and complexity at back end
• Black box-based and not necessarily explainable!
• Single source of truth; a one-stop-shop
Dependency on other fields (Drivers of change)

• Evidence synthesis
• Open Science
• Commercial Publishing, Indexing, and Abstracting Industries
• Evidence-Based Research Methods
• ML/classifiers (NLP) and AI
• UX/UI
• Humanities (law and ethics)
• Challenges to Evidence-Based Practice
  • Uncertainties
  • Context
  • Personalised/Precision Medicine
Futures

• Future 1: Today’s Continuity
• Future 2: Semi-automation on all stages and full automation on others
  • Automation of question-to-concept conversion
  • Automation of term collection
  • Automation of search strategies development (see ChatGPT and Embase PV Wizard)
  • Automation of translation of search strategies (See PolyGlot and 2Dsearch)
  • Automation of screening the search results (See EPPI-Reviewer and Rayyan)
  • Automation of obtaining full reports/data (See Zotero and EndNote)
  • Automation of analysis/synthesis (See RevMan, Stata, R)
• Future 3: Full automation
• Future 4: Goodbye Search, Hello Answer
Search Pyramid

System (Answer)

ML Models

Living Filters

Living Search and Search Filters

Systematic Search

Advanced or Boolean Search

Simple Search

More complex and less explainable

Simpler and more explainable
What can I do to help

• Drive the change
• Be proactive with networking and funding applications
• Saying goodbye to Embase if it does not move to openness
• Closed science, copyright and hackers from east (Sci-Hub)
• Publishing industry
• Funding Systematic Reviews is wasting public money
  • Unsustainable to fund me to keep updating the systematic reviews
• Funding Automation of Systematic Reviews is an investment
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