The Effectiveness of Online Educational Interventions for Diagnosing Mental Health Disorders in Primary Care and Community Settings: Contribution to a Systematic Review

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Abstract

Mental health disorders are frequently encountered within primary care and community settings, where healthcare professionals play a key role in early identification and diagnosis. As online educational interventions become increasingly common within healthcare education, understanding their effectiveness in improving diagnostic abilities has become an important area of research. This project contributed to an ongoing systematic review investigating the effectiveness of online educational interventions for diagnosing mental health disorders in primary care and community settings. Over a six-week placement, I developed practical skills in systematic review methodology, literature searching, search strategy refinement and study screening. My contribution focused on understanding the systematic review process, refining database search strategies, evaluating the performance of different search approaches and undertaking initial title and abstract screening using Rayyan. This report outlines the activities completed during the placement, the skills developed, and the reflections gained from contributing to an ongoing research project.

Introduction

Mental health disorders are among the most common conditions encountered within primary care and community healthcare settings. General practitioners and other healthcare professionals are often responsible for recognising symptoms, making initial diagnoses and referring patients for appropriate treatment. However, diagnosing mental

health disorders can be challenging because symptoms frequently overlap with other conditions and presentations vary considerably between individuals. Improving diagnostic skills among healthcare professionals therefore remains an important priority.

Digital education has become increasingly integrated into healthcare training. Online educational interventions, including e-learning modules, virtual patients and interactive case-based learning, offer flexible and accessible methods of developing clinical knowledge and diagnostic reasoning. Although these approaches are becoming more widely used, there remains uncertainty regarding how effective they are at improving diagnostic performance within primary care settings.

This project formed part of an ongoing systematic review examining the effectiveness of online educational interventions for improving the diagnosis of mental health disorders in primary care and community settings. The findings of the review will contribute to the development of future educational resources, including a new mental health case for the UCL eCREST platform designed to support pharmacy and medical students in developing diagnostic skills.

My role focused on the early methodological stages of the review. Throughout the six-week placement I developed an understanding of systematic review methodology, contributed to refining literature search strategies, evaluated database searches and gained practical experience in study screening using Rayyan.

Project Aims and Objectives

The overall aim of the systematic review was to evaluate the evidence for the effectiveness of online educational interventions in improving diagnostic abilities for mental health disorders among healthcare professionals working in primary care and community settings.

My objectives during the placement were to:

- Develop an understanding of systematic review methodology.
- Gain experience conducting structured literature searches across multiple academic databases.
- Refine and evaluate database search strategies to improve the identification of relevant literature.
- Apply predefined inclusion and exclusion criteria during study screening.
- Develop skills in critical appraisal, academic research and collaborative working.

Methodology

Understanding the Systematic Review Process

The first stage of the placement focused on developing an understanding of how systematic reviews are conducted. Prior to beginning the project, I had limited experience with evidence synthesis, so the initial weeks were dedicated to familiarising myself with the overall review process and understanding how each stage contributes to producing reliable research evidence.

I began by reading the systematic review protocol and reviewing resources provided through the UCL Library on systematic review methodology. This helped me understand the purpose of each stage of the review, from developing the research question through to literature searching, screening, data extraction and synthesis.

An important part of this process was learning how the research question had been developed using the PICOS framework. Understanding the Population, Intervention, Comparator, Outcomes and Setting enabled me to appreciate how research questions are translated into structured database searches. This framework also provided the foundation for understanding the inclusion and exclusion criteria that would later be used during study screening.

Population	Patient or population undergoing the phenomena of interest. Age, ethnicity, condition /health status, disease, presentation, setting.
Intervention	What intervention is the focus of the search - the specific treatment, test, or action you want to test.
Comparator	The alternative choice or standard care you measure the intervention against, if any.
Outcomes	The specific result or effect you hope to measure or find (e.g., lower blood sugar levels).
Setting	The physical environment, geographic

	location, or clinical care level.

PICOS table

To better understand the project, I also reviewed work completed during the previous year's placement. This provided useful context regarding the development of the original search strategies and demonstrated how systematic reviews require continuous refinement throughout the research process.

During this period I also became familiar with the academic databases that would be used throughout the project. This involved learning the different interfaces and search functions within Ovid MEDLINE, PsycINFO and Web of Science, and while the principles of database searching were similar across each platform, each database required different techniques and syntax to perform effective searches. Although PubMed was included within the original protocol, the practical database searching and refinement stages of my contribution focused primarily on Ovid MEDLINE, PsycINFO and Web of Science.

Developing and Refining the Search Strategy

Following familiarisation with the databases, I contributed to refining the existing literature search strategy. The original searches had been designed to maximise sensitivity and identify as many potentially relevant studies as possible. However, broad search strategies can retrieve large numbers of irrelevant articles, increasing the workload during study screening. My aim was therefore to improve the specificity of the search while maintaining sufficient sensitivity to identify relevant literature.

Using the PICOS framework, I developed a revised search strategy focusing on three main concepts: mental health disorders and diagnosis, online educational interventions, and primary care or community settings. Rather than searching specifically for outcome measures, these were intentionally assessed during study selection to avoid excluding potentially relevant studies where outcomes were not explicitly described within titles, abstracts or indexing terms.

The revised strategy expanded the range of terminology used to describe mental health disorders, online educational interventions and healthcare professionals working within primary care. Additional keywords and controlled vocabulary terms (MeSH and Emtree

headings) were incorporated to improve retrieval of relevant studies across the databases. The complete revised search strategy developed during the project is provided in Appendix A.

Developing the revised strategy demonstrated that database searching is an iterative process rather than a single fixed method. Small changes to search terms or database syntax often resulted in substantial differences in the number and relevance of studies retrieved. This highlighted the importance of carefully balancing search sensitivity and specificity throughout the development of a systematic review.

During this stage, my project partner repeated the original search strategy to allow direct comparison with my revised approach. Comparing the two strategies demonstrated how modifications to keywords and indexing terms influenced both the quantity and quality of retrieved studies.

An additional challenge arose when using Web of Science. Despite attempting to perform equivalent searches, my project partner and I obtained substantially different numbers of retrieved studies. This inconsistency raised concerns regarding our ability to reproduce searches consistently within the platform and highlighted the importance of ensuring database searches are transparent and repeatable.

Evaluating and Validating the Search Strategy

During the fourth week of the placement, we met with both project supervisors to review our progress and discuss the strengths and limitations of the different search strategies.

The meeting focused on comparing the revised searches with the original protocol and evaluating whether each strategy successfully identified a set of known indicative studies. These studies were used as benchmarks to determine whether the search strategy was capable of retrieving literature already known to be relevant to the review question.

Although the revised searches reduced the number of irrelevant records retrieved, an important issue emerged during validation. Some indicative studies were not identified by either the original or revised search strategies. This demonstrated the difficulty of balancing specificity with sensitivity and reinforced that search strategies require repeated testing and refinement before they can be confidently implemented.

Following discussion with the supervisors, it was agreed that Web of Science would not be included in the project moving forward. Given the time constraints of the placement and the inconsistencies experienced when searching the database, it was considered more beneficial to focus on developing practical experience in study screening rather than continuing to troubleshoot database-specific issues.

Study Screening Using Rayyan

The final stage of the placement involved learning how to screen studies using Rayyan, a systematic review management platform.

Initially, I completed a training exercise involving ten sample studies to become familiar with the software and practise applying the predefined inclusion and exclusion criteria. This required reviewing study titles and abstracts and determining whether each article should be included for full-text review.

At first, identifying the relevant information within abstracts proved challenging. Many studies contained limited methodological detail, requiring careful interpretation of the available information to determine whether they addressed the review question. However, with practice I became increasingly confident in identifying the study population, intervention, setting and outcomes relevant to the review.

Following the training exercise, I completed screening of a further group of studies using the same approach. This experience improved my confidence in applying eligibility criteria consistently and demonstrated the importance of careful judgement during the early stages of systematic review screening.

Outcomes and Future Directions

Although the systematic review was still ongoing at the conclusion of my placement, several important outcomes were achieved. I helped to develop a revised literature search strategy, gained experience using Ovid MEDLINE and PsycINFO, and became familiar with evaluating search performance through comparison with known indicative studies. I also gained practical experience using Rayyan to undertake title and abstract screening.

The work completed during this placement contributes to the subsequent stages of the systematic review, including full-text screening, data extraction, risk of bias assessment and narrative synthesis. Ultimately, the completed review will provide evidence regarding the effectiveness of online educational interventions for improving mental health

diagnosis and will inform the development of future educational resources, including new learning materials for the UCL eCREST platform.

Reflections and Learnings

This placement significantly improved my understanding of how systematic reviews are conducted. Prior to beginning the project, I viewed systematic reviews primarily as published summaries of existing evidence. Through participating in the early stages of the review, I developed an appreciation for the extensive planning, organisation and methodological rigour required before data synthesis can even begin.

One of the most valuable learning experiences was developing literature searching skills. Initially, I assumed database searching would involve simply selecting appropriate keywords. However, I quickly realised that constructing an effective search strategy requires careful consideration of terminology, controlled vocabulary, database functionality and the balance between sensitivity and specificity. Small changes to search terms often produced substantial differences in search results, demonstrating how important these early methodological decisions are to the overall quality of a systematic review.

Working with multiple databases also highlighted the importance of reproducibility within research. The challenges encountered when using Web of Science demonstrated that practical issues with database interfaces and search functionality can influence methodological decisions and require collaborative discussion with supervisors.

Learning to use Rayyan provided my first experience of applying eligibility criteria during title and abstract screening. Initially, making inclusion decisions based on limited information felt challenging, but repeated practice improved both my confidence and consistency. This experience reinforced the importance of applying predefined criteria objectively while recognising that some decisions require careful interpretation.

Overall, the placement strengthened my research skills, improved my confidence in conducting systematic reviews and provided valuable insight into collaborative academic research. It also highlighted the importance of robust methodology in producing evidence capable of informing healthcare education and future clinical practice.

Conclusion

This six-week placement provided valuable experience contributing to the early stages of an ongoing systematic review investigating online educational interventions for diagnosing mental health disorders in primary care and community settings. Through learning systematic review methodology, refining literature searches, evaluating search strategies and undertaking initial study screening, I developed practical research skills that I had not previously encountered.

Beyond the technical skills acquired, the project provided a greater appreciation of the complexity involved in producing high-quality evidence. The experience demonstrated that systematic reviews rely upon careful planning, continual refinement and collaborative decision-making. The skills developed throughout this placement will be valuable for future academic research and have strengthened my understanding of evidence-based healthcare.

Acknowledgements

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Appendix A: Revised Search Strategy

A.1 Ovid MEDLINE Search Strategy

Concept	Text words (Txt)	MeSH / Emtree
Population	mental disorder*.mp. mental illness*.mp. psychiatric disorder*.mp. behavio?r disorder*.mp. diagnos*.mp.	exp Mental Disorders/ exp Differential Diagnosis/
Intervention	educational intervention* online education online learning e-learning web-based education distance learning computer-assisted instruction virtual patient* ((online or web or internet or digital) adj3 (education or learning or training))	Health Knowledge, Attitudes, Practice/ Attitude of Health Personnel/ Computer-Assisted Instruction/ Education, Distance/ Health Education/ Internet/
Comparator	None specified	None specified
Outcome	None specified (effectiveness will be assessed during study selection rather than searched as a concept)	None specified
Setting	primary care primary health care general practi* general practitioner* family physician* community health community service* primary care physician*	Primary Health Care/ Community Health Services/ Community Services/ Health Personnel/ Physicians, Primary Care/ General Practitioners/ Nurses/

	health professional* healthcare professional* clinician*	

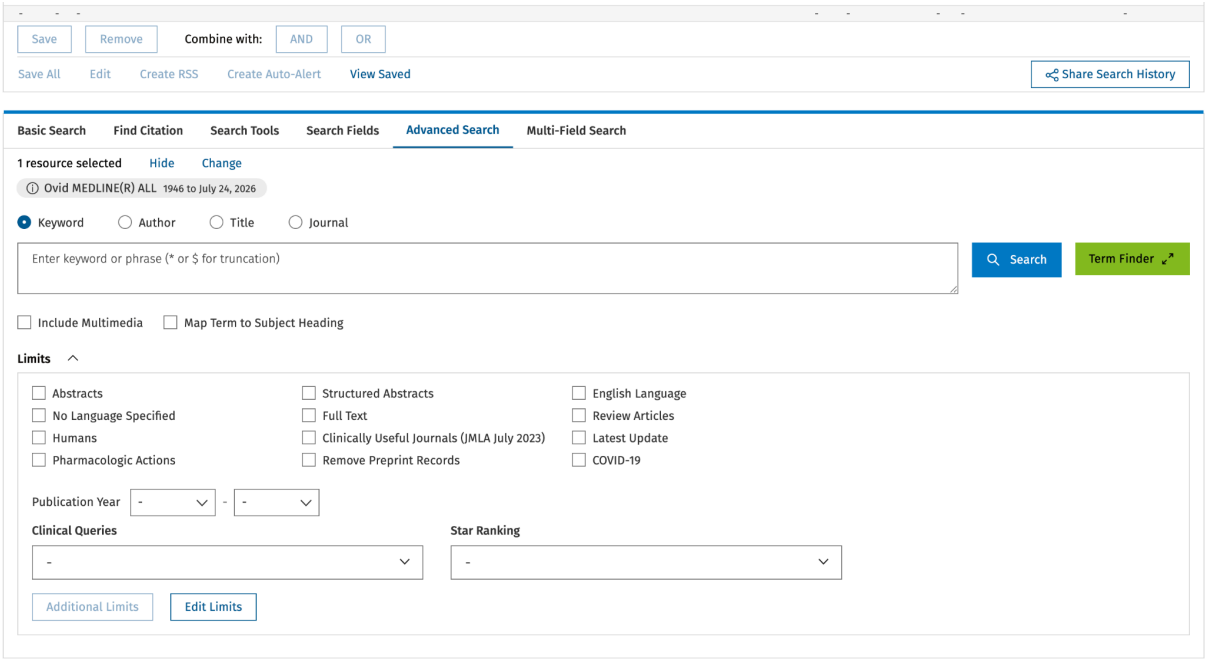

Figure A1. Ovid MEDLINE search interface

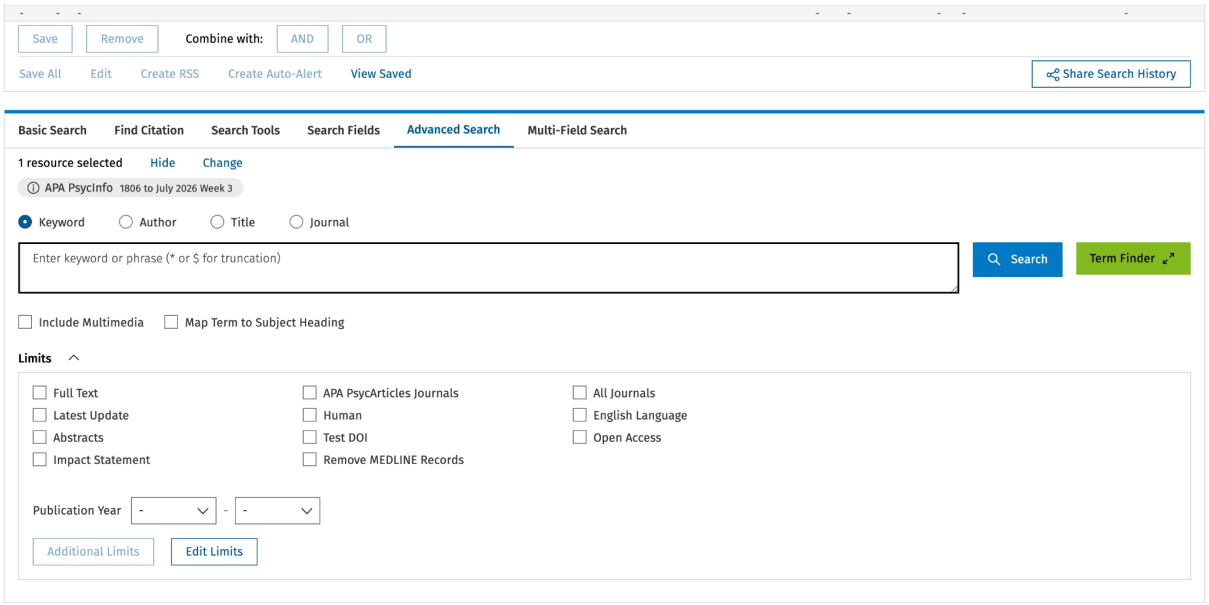

Figure A2. PsycINFO search interface

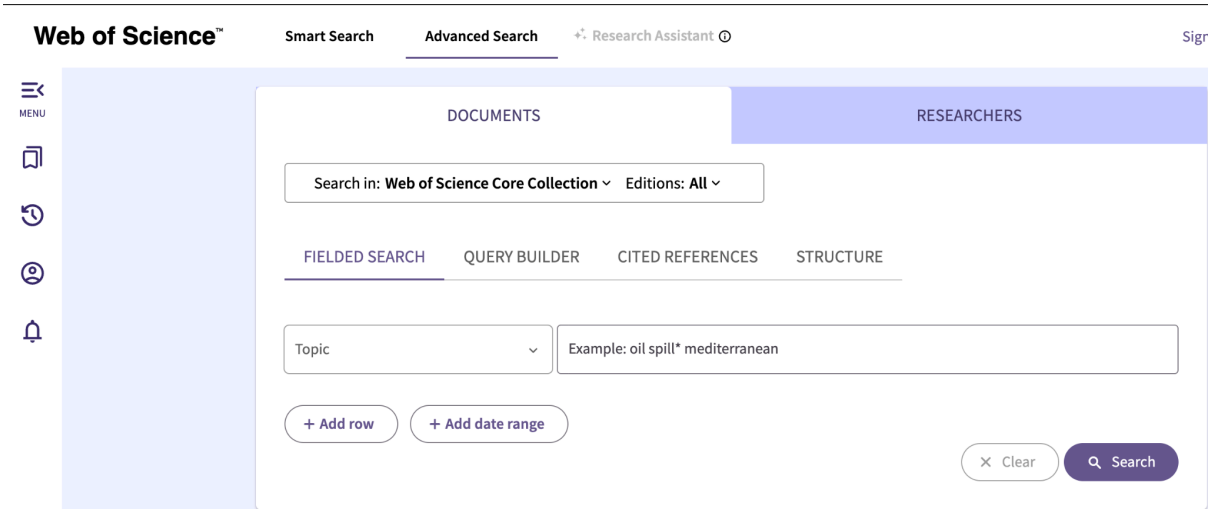

Figure A3. Web of Science search interface