Developing a Replicable Methodology for Automated Identification of Emerging Technologies in Healthcare

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Objectives

The Emerging Technologies Team, part of the MLA systematic review projects, was seeking a replicable and authoritative methodology to mine PubMed for emerging technologies relevant to health and medical librarians, and to create a methodology to empower librarians to perform this task more easily in the future. Ideally, the findings should reflect the range and diversity of health and medical librarians, their workplaces, resources, and supported communities.

Organizations working in this space, such as the Gartner Group and the New Media Consortium (Horizon Report), either have no formal methodology or do not publicly share their strategy. Thus, it was necessary to create and document a methodology for this purpose that can be used by MLA now and in the future.

Methods

The creation of a search strategy involved identifying appropriate free text and MeSH terms for three concept groups (emerging technologies, emerging, and technology), and then testing these individually and in combination for specificity and sensitivity.

Specific journal titles with high specificity for the topic were hand selected for each concept group. Inclusion/exclusion criteria were identified for the level of specificity required for terms and titles. Concept groups were combined as: [“Emerging Technologies” OR (Emerging AND Technologies)]. The search is limited to the most recent 1-3 years and English language. The language limit is to avoid the challenges of trying to apply text mining across multiple languages whose terms may not be equivalent.

Special Circumstances

Emerging technologies

Unlike most of the other MLASR teams, we are not actually doing a systematic review, and a systematic review methodology would be inappropriate for our topic. The systematic review methodology is designed to look backwards in time, compiling the best of the research on that topic. For emerging technologies, we need to look to the future, rather than the past. This temporal context created challenges which influenced every part of the project. It was made more difficult by the fact that, while there are many think tanks which provide lists of significant emerging technologies, none of them have or share a replicable methodology for how they arrive at their conclusions, forcing us to attempt to create and document one ourselves.

Text-mining

The search strategy has been developed not for the purpose of creating a data set of citations to evaluate as relevant or not, but rather for the purpose of creating a data set of title and abstract terms, a kind of concordance, to be analysed with text-mining in an attempt to identify “hot spots” or emerging concepts of significance. This means inclusion/exclusion criteria relate not to the characteristics of the resulting citation set, but rather to the purpose of developing a text file which is clearly on emerging technologies and not muddied by other concepts, however interesting those concepts might be.

Journal Selection Process (Flow Chart)

Emerging technologies are constantly evolving. Identifying relevant journals focused on healthcare technologies will assist in the discovery of novel or previously undiscovered technology terms through the text-mining process.

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Next Steps & Recommendations

- The master search strategy has been designed in three versions (broad, narrow, and standard), which will be tested with filters on specific topics such as the human body, public health, education / communication, and libraries / publication. The search results will be reduced to a text dataset comprised of titles and abstracts, to which text mining will be applied to identify conceptual “hot spots.”

Sources / Resources


More information:


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- MLASR https://plus.google.com/u/0/lc/communities/11589255144390929773

The Medical Library Association initiated a large systematic review project to assess the level of evidence available to support the profession and practice of medical librarianship in several very important teams. Team 6 has been assigned to explore this topic:

- The explosion of information, expanding of technology (especially mobile technology), and complexity of healthcare environment present medical librarians and medical libraries opportunities and challenges. To live up with the opportunities and challenges, what kinds of skill sets or information structure do medical librarians or medical libraries are required to have or acquire so as to be strong partners or contributors of continuing effectiveness to the changing environment?