Can abstract screening workload be reduced using text mining?

User experiences of the tool Rayyan

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Background

The rapidly growing body of scientific literature and the fact that a truly comprehensive literature search generates large search results, often means that an increasing number of abstracts needs to be screened.

This has become a time-consuming and costly process. Lack of time and other resources might introduce short-cuts which in turn might jeopardize the result of the systematic review.

A crucial question is: Is there a more efficient way to conduct systematic reviews?

Text mining in the process of conducting a systematic review

Text mining can be used in several stages of the process of conducting a systematic review:

- Developing search strategies
- Developing search filters
- Automating data extraction
- Screening abstracts

Screening abstracts with the text mining based tool Rayyan

Developed by Qatar Computer Research Institute (QCRI), http://qcri.org.qa/

Rayyan uses text mining to assist the reviewer when screening abstracts.

The text mining function in Rayyan is dependent on the reviewers inclusion and exclusion decisions. The system searches for similarities and resorts the record order continuously according to these decisions. References likely to be relevant are to be found at the top of the resultlist.

An evaluation of Rayyan: user experiences made by SBU

Objective

The objective was to evaluate the performance of the web based tool Rayyan when screening abstracts in six actual ongoing reviews (three were systematic reviews).

How many of the potentially relevant records were identified after screening the first quarter, first half, and the first three quarters of the abstracts?

Results

When using Rayyan we identified (median) 60% of the potentially relevant records when 25% of the abstracts were screened, 95% of the potentially relevant records when 50% of the abstracts were screened, 98% of the potentially relevant records when 75% of the abstracts were screened.

Percentage of abstracts (search result) screened	Median percentage of abstracts identified as potentially relevant
25%	60%
50%	95%
75%	98%

Conclusions and discussion

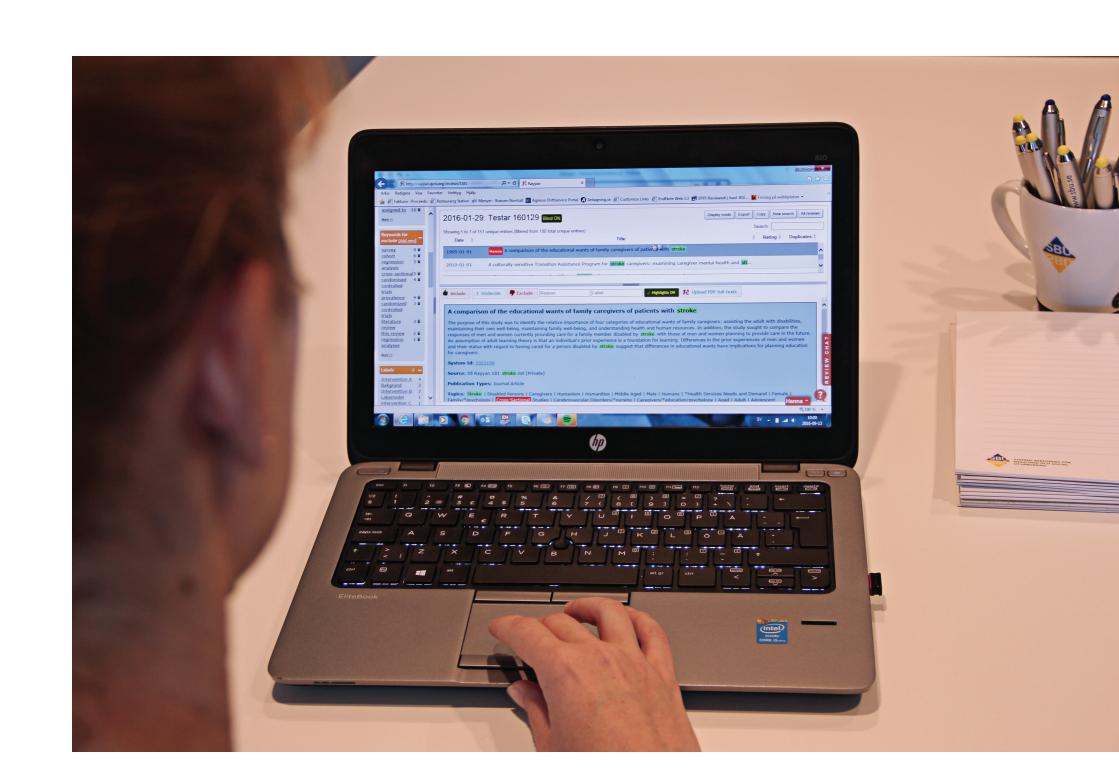**Text mining – a technique with the potential to save time and money**

- The text mining based ranking function of Rayyan effectively assisted reviewers to identify relevant records early in the review process for all six reviews evaluated.
- Our conclusions are that text mining is a technique with potential to save time and money.

To use a cut off or not?

One important question still to be answered is if a cut off can be used? Is it safe to stop screening after for an example 50% or 75% of the search result is screened?

The Director General and management team of SBU decided:

- Rayyan should be used as a well functioning, easy to learn, free screening tool based on text mining.
- It´s too early to use a cut off in the systematic review process – more evaluation are needed especially in disciplines within the social sciences such as social work.

Ongoing new evaluations of Rayyan at SBU (Swedish Agency for Health Technology Assessment and Assessment of Social Services)

We are now evaluating Rayyan in a new ongoing systematic review in the field of social work: *Parenting interventions for the prevention of physical or psychological child abuse or neglect.*

The purpose of the present systematic review is to evaluate the effectiveness of indicated interventions for parents who allegedly have exposed their children to physical or psychological abuse or neglect. The interventions asessed within this review are interventions provided by the child protective services including: individual or group-based parenting programs/training, home visiting programs, counselling, psychological and psychosocial interventions.

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Rayyan screening tool: features

- Free software, http://rayyan.qcri.org/
- Allows independent screening – two or more screeners
- Offers labelling possibilities to group specific exclusion criteria, background etc
- Easy to import from EndNote, easy to export back with reviewers groups/labels intact
- Searching features and MeSH clouds to quickly identify relevant and irrelevant abstracts
- Highlighting keywords facilitates easier work process