Using Visual Feedback to Improve Article Searches

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Abstract—The efficient searching of journal articles to answer research questions may benefit from research into intelligent question routing system (IQRS) that links individuals asking questions with those who can answer them, especially where incorporating visual feedback could improve the automation of accurate and unambiguous questions. This article presents a method to test the visual feedback of words to locate journal articles for a school scenario. The results show that visual feedback improved the search for articles for the tested sample, but further testing is required to verify the accuracy and validity of the results.

Keywords—visual feedback, journal article retrieval, experiment, software testing, information and communication technology, management, schools.

I. INTRODUCTION

The efficient searching of journal articles to answer research questions may benefit from research into intelligent question routing systems (IQRS) that link individuals asking questions with those who can answer them. In this paper an IQRS approach is used to match an ICT management question with research articles using visual feedback to facilitate accurate and unambiguous questions.

A. Intelligent Question Routing Systems (IQRS)

Reference [1] examined 11 ways to link a person asking a question online to others who can answer their question. Designing a template for the survey, they tabulate the features and discuss the pros and cons of each approach. Their analysis identifies three issues for future research, namely, to provide visual feedback to automate accurate and unambiguous questions, assist knowledge profiles to match questions in spite of semantics due to typos and different words that have the same meaning, and thirdly building knowledge profiles from multiple internal and external sources to assist matching questions with those who can answer them. This paper contributes research for the issue of using visual feedback.

B. Application in schools

Technology that transforms information and supports communication to assist administration, teaching and learning in modern schools has evolved with the introduction of computers in the 1980s [2]. Research on ICT in education, such as [3], [4], and [5] covered many aspects of managing ICT. However, research carried out in 2012 to understand the perspective of principals and their executive who manage Information and Communication Technology (ICT) in schools identified training, staffing and funding was lacking in the schools studied to support the management of ICT beyond normal teaching and management duties of their executive [6]. To address this, school executive could leverage their ability to search for answers by using an IQRS to give them key resources to answer questions about managing ICT.

The rest of this short research paper covers the method to test the IQRS approach for a school scenario followed by the results, discussion and conclusion.

II. METHODS

Using a quantitative and positivist research design this experiment aims to support the null hypothesis that there is no relationship between the use of visual feedback and answering questions.

A. The Test Scenario

Consider a school principal in meeting with parents or reviewing the school budget being interrupted by a member of staff who indicates that the school has a Facebook issue, which needs the principal’s advice. To prepare for the meeting the principal enters the keywords “facebook issues school” onto an online journal article database to determine what common issues have already been identified and possibly how to address them. The question then is, can visual feedback assist this principal accurately and clearly find a useful journal article to answer the enquiry?

B. Design

To carry out this experiment, the principal’s search criteria is entered into the PrimoSearch search engine, available on the Charles Sturt University website [7]. Settings are changed from the defaults: Any field - contains “facebook issues school”, Material type – Journal articles, Start date – 2013 and sorted by popularity. The actions of an IQRS are then carried out manually:

- The names and subjects of retrieved articles are cut and pasted into a Microsoft Excel spreadsheet as a record and for further processing. To compare results, worksheets of the first 20, 50 and 100 retrieved articles are created.
The subject values are then cleaned by removing unnecessary spaces, blank lines and double dashes “--” that indicate sub-subjects, as well as separating multiple words in subjects, placing each word into a single column, sorting them in alphabetic order for convenience and changing spaces to tildes “~”, which represent spaces in the Wordle.net application.

The subject list is then copied and pasted into the wordle.net screen to create a word cloud [8].

The word cloud formatting settings changed from the defaults are: Font – Scheherazade, Layout – 20 Maximum words (to reduce clutter), Prefer Alphabetical Order, Rounder Edges (for the cloud shape) and Horizontal (words), and Color (sic.) - BW (Black and white)

A screen shot of each generated word cloud is then captured using screen capture feature of Microsoft OneNote.

Each screen shot is combined into a single image using the Paint.net application and shown as Fig. 1 below.

Finally, a new search criteria is entered into the PrimoSearch search engine using the meaningful subjects highlighted from the word cloud.

Note: wordle.net and Paint.net are both open source applications and ownership of the images created are owned by the image creator. Microsoft, Excel, Wordle.net, Paint.net and all relevant copyright are owned by their respective owners.

III. RESULTS

Initially, using the keywords “facebook issues school” returned 12,835 journal articles. Filtering searches reduced the quantity as shown in Table 1.

Grouping retrieved journal articles in groups containing the first 20, 50 and 100 records resulted in 118, 291, and 503 subject records respectively. The searches also retrieved 2 (10%), 5 (10%) and 19 (19%) journals respectively without subjects That were sourced from Cengage Learning, Inc. (9), the Routledge, Taylor & Francis Group (7) and the SciVerse ScienceDirect Journals (3). The word cloud for each group is shown in Fig. 1.

IV. DISCUSSION

The results above raise a number of points for discussion. On the one hand, the procedure carried out created an effective word cloud identifying changing the key words from “issues” to “social issues” and “bullying”; and “school” to the larger word in the word cloud “schools”. This change resulted in reducing the number of articles that were retrieved to answer the principal’s question from around 1,400 to under 100 articles. Also, it can be seen that words come and go within these groupings, such as Women, Australia and Technology and may reflect a link between accuracy and the number of words displayed.

On the other hand, an analysis to understand which articles gave better answers to the original question was outside the scope of this study and not tested. As was a second search, based on new keywords from the last journal search. In addition, as the number of retrieved records increased, so too did the number of records that did not have a subject. In this test, from 10% to 20% of the total. Since, the availability of subject words may depend on specific publishers, this trend may or may not change with more records, say for a thousand records where the percentage of articles retrieved from these publishers varies.

Finally, because the procedure is manual, the process restricts the number of records processed for visual feedback using subject words. An automated process would facilitate testing for larger samples of subject words and carrying out further iterations of searches.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Search 1</th>
<th>Search 2</th>
<th>Search 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013 Journal articles + Any field contains facebook issues school</td>
<td>facebook issues school</td>
<td>facebook issues school</td>
<td>facebook bullying school</td>
</tr>
<tr>
<td>Totals</td>
<td>1,395</td>
<td>44</td>
<td>80</td>
</tr>
</tbody>
</table>
V. Conclusion

In this research paper a process for intelligently routing questions to relevant journals articles was developed in light of a perceived need managing ICT in schools with limited training, staffing and funding. The results and discussion do not support the null hypothesis that visual feedback of subjects retrieved from an initial article search will not assist identifying useful journal articles to answer questions about managing information and communication technology. Instead the test supports the idea that using visual feedback may be useful.

Accuracy, was considered inversely proportional to the number of journals retrieved, but this assumption needs further testing. The reliability of the research is considered medium as the process worked for records with subject words, but the number of journals that were retrieved without subjects increased with the number of journals found and only one search with a relatively small sample of 100 journals was carried out. Subsequently, future studies could automate the process, increase the sample and use visual feedback to refine more than one iteration of searches. Possibly contact with search engine providers could also assist the automating and testing of the process and sourcing keywords outside the subject words (say from the article abstract) when they are missing.

References


