Search Technology through the Lens of a Vocational Teacher

MICHEL WOUTERS, Consortium Beroepsonderwijs, The Netherlands
HANNA JOCHMANN-MANNAK, Wizenoze, The Netherlands
THIJS WESTERVELD, Wizenoze, The Netherlands
THEO HUIBERS, University of Twente | Wizenoze, The Netherlands

At the end of 2020, Stichting Consortium Beroepsonderwijs and Wizenoze conducted a focus group study on Wizenoze's search system and its collection by teachers and students in Dutch vocational education (ages 12+). This practice paper introduces the context of Dutch vocational education, the role played by Stichting Consortium Beroepsonderwijs as a provider of didactic and pedagogic information in this field, and how they use the search solution and the collection of Wizenoze. After setting the context of what and how this research was conducted, we show that there is much fertile ground for deploying a novel platform for teachers and students in the vocational education sector. However, this practice paper also sheds light on the challenges and future research questions.

Additional Key Words and Phrases: focus group study, search systems, vocational education, teachers

ACM Reference Format:
Michel Wouters, Hanna Jochmann-Mannak, Thijs Westerveld, and Theo Huibers. 2021. Search Technology through the Lens of a Vocational Teacher. In *KidRec '21: 5th International and Interdisciplinary Perspectives on Children & Recommender and Information Retrieval Systems (KidRec) Search and Recommendation Technology through the Lens of a Teacher- Co-located with ACM IDC 2021, June 26, 2021, Online Event*. ACM, New York, NY, USA, 5 pages. https://doi.org/10.1145/1122445.1122456

1 INTRODUCTION

To begin with, we will explain the educational landscape in which we operate. We will address the role the Stichting Consortium Beroepsonderwijs (SCB) plays in Dutch vocational education and the Wizenoze technology they utilize.

1.1 The Dutch vocational education landscape

There are two levels of Dutch vocational education: secondary vocational education (Pre-VET) and senior secondary vocational education ((T)VET). The Pre-VET Colleges targets students between 12 and 16 years of age, while the (T)VET targets students 15 years and upwards. Pre-VET students are prepared for their professions by engaging in practice-oriented education. After two years of basic general education, students choose their profile, either a professional orientation profile or a general orientation profile. The Pre-VET track last four years. About 180,000 students attend Pre-VET Colleges.

One of the most comment next steps is to enter vocational education in senior secondary vocational education ((T)VET). Moreover, students in the Netherlands who complete the Pre-VET education level are not permitted to work yet and must obtain the (T)VET starting qualification. It offers vocational education programs in almost all possible fields of study. The durations depend on the level of study and range from one to four years. There are approximately

Manuscript submitted to ACM

a half-million students studying at (T)VET Colleges; to give you an idea of just how massive this group is, 300,000 students are studying at the Universities in the Netherlands.

1.2 The role of Stichting Consortium Beroepsonderwijs in vocational education

SCB provides information services related to the (T)VET and Pre-VET courses [1]. SCB offers information services that are directed towards the formative as well as the summative aspects of education. The former focuses on the teaching aspect of education, while the latter is concerned with the certification of the student. For the summative part of the examination, SCB is an organization that provides (T)VET-certified examinations. SCB distributes exams following a set of established qualifications (what is to be acquired).

Successful completion of the exam gives the desired civil effect. Unfortunately, all of this is somewhat of a static exercise that leaves the schools only a limited amount of room for manoeuvre to adapt to an ever-changing professional field. Formative education must then impart ability to adjust and to seek actuality. For the formative part, the SCB provides assignments. It is the ambition of the SCB to be innovative and to link up to professional movements as much as possible. Consequently, assignments and the underlying knowledge base must be dynamic.

1.3 Information landscape changes in vocational education

While in the past it was possible to design educational materials based on a method that lasted for several years, now we must be able to incorporate social and professional changes quickly in the design of educational material. As a simple example, electric cars' rise means that car mechanics need to know more about electric motors. Since professions continuously change due to technological advances and social developments, the vocational student's offered information must always be up-to-date, which means the textbook cannot be used for years on end.

There is a need to replace or at least enrich the teaching material with current and attractive online information regularly updated and adjusted. It should also be noted that the majority of pupils in Pre-VET and (T)VET courses are not proficient readers or information seekers. Their reading levels are often 2F or lower (2F is the Dutch standard for native speakers, comparable with level B1 from the Common European Framework). This means that the information they are offered must be readable for 1F or 2F-readers, relevant for educational purpose, and reliable given their assignment. It is necessary to make learning paths content more flexible (topicality), link up with lifelong learning, and make differentiation possible at the didactic level at the students' level. When online translation options are enhanced, it will also be possible to facilitate programs with a great diversity of international subjects. Programs that have a high degree of international content can also be supported better.

This means that the SCB must make optimum use of innovative digital technology to meet this need. The internet can be a wonderful source of relevant information, but it is not entirely usable as it contains too much unreliable, unreadable and irrelevant information.

1.4 Wizenoze

Wizenoze [2], founded in 2013, offers educators and students access to a closed information domain that is a collection of educational material collected from various 'public' internet sources [3]. In addition to this collection of content, an integrated search system makes the content accessible. This complete educational information service can be integrated into educational platforms as an information service. The first step in the process is to identify sources (websites) that need to be included in our collection. This step is largely manual: Wizenoze's curators screen all sources for reliability and exclude parts of irrelevant sources to education. Next, advanced internet crawlers visit the source to

gather complete web pages and update our collection. Wizenoze's technology classifies a document's readability on a five-point reading scale. An automatic classifier is trained on a unique collection of labelled texts including news, web data and textbook material. The algorithm computes a wide range of textual features ranging from basic text statistics (for example, average word length and average sentence length) to advanced statistics such as vocabulary use, noun variation, type-token ratio, and the average number of passive sentences. Wizenoze has been building and improving its core collection of trusted educational resources. Wizenoze's collection includes over 50 million educational resources from trusted sources, including text pages, videos and images. Technology has evolved to not only create the collection but to update and maintain it continuously. The entire collection is a dynamic tool that always stays relevant and reliable. Search results are ranked using a formula based on text search using the query term, and the frequency of that term on the pages presented, including (sub)headers. To conclude, Wizenoze provides an educational information service that allows teachers and students to find relevant, reliable and readable online content from the Internet.

As mentioned before SCB wants to embed educational content linked to the qualification dossiers in a didactic and pedagogical context, Wizenoze has the technology to perform the searches and has the relevant collection. That is why Wizenoze and SCB have been working together to develop a platform for teachers and students in vocational education, in which they get access to relevant, high-quality trusted information for their courses. The platform has been in use for a few months now while still being improved.

2 THE FOCUS GROUP STUDY

In the winter of 2020 a focus group has been conducted in order to evaluate and gain more insight into the use and experiences of teachers and students with Wizenoze's solution (the search system and its collection). The focus groups consisted of a sample of 17 teachers and >150 students (all year groups, level 3 and 4). The sample consisted of students and teachers from the healthcare and engineering sectors. The focus group was divided in two parts: a focus group meeting and a pilot to test our solution with their students.

The purpose of the focus group meeting was to get a better understanding of the context of the teachers and students and the learning journey that students go through. In the focus group meeting, we discussed their context, the challenges that they and their students face (the pains) and what gains students can benefit from to support their learning.

The purpose of the pilot test was to explore with the teachers how our solution can add the most value to them and to their learners. In the pilot, we asked the teachers to create an assignment for which their students could use material from from the Wizenoze solution to support their assignment. The teachers observed the students' behavior during the assignment and reviewed their students' learning outcomes. After the assignment, the teachers asked the students to fill out a short survey to evaluate the use of the Wizenoze platform. Furthermore, we asked the teachers to fill out a more elaborate evaluation survey. We also planned a one-on-one interview with the teachers to be able to elaborate on some of the things they reported in the evaluation survey. We only will report on the results of the teachers, in line with the focus of this paper.

2.1 Results

Teachers rated the use of Wizenoze on a 5-point scale (see the left table for their ratings). The percent of teachers who recommended the use of the search system and the collection of Wizenoze, based on specific reasons, is shown in the table on the right.

Subject	Rate
Learning objectives achieved	3.7
Learners performed their task better	3.4
Learners find it easy to use WS	4.0
Able to find relevant content supporting their task	3.9
Able to understand the retrieved information	3.8
Likeness to use WS in the future	4.2

Reasons	%
Access to reliable sources	40%
More supported by selection (wrt Google)	20%
Able to delve deeper into domain-specific topics	20%
There are no commercial sources	20%
There are no distracting ads	20%
There is a reading level indication	10%
More focus on teaching materials	10%

Teachers were mainly happy with the use of Wizenoze's solution, because the solution (i) offers an excellent way to get an overview of all information for a course or domain, (ii) contains reliable sources, approved by teachers, (iii) supports self-exploration, (iv) makes learning more fun, (v) is easy to use and (vi) provides fewer distractions than the internet.

However, teachers also indicated some points for improvement, namely that (i) search engine of Wizenoze is too difficult to find on the homepage, (ii) that the platform needs more content in specific domains, and (iii) that the search system needs more specific search results for the learning objectives of their course or their assignments.

3 CONCLUSIONS AND FUTURE WORK

What is clear from the focus group study is that teachers are positive about offering their students a much more targeted and domain-specific search solution to their students, compared to a generic commercial search engine. However, to really add value for their students, the solution needs to be improved in the following ways: (i) content needs still to be better matched to the course material and assignment, (ii) teachers and students need to learn about the existence and behaviour of this educational search system, its collection and the platform, (iii) results can be better targeted to the assignment or need to be more domain-specific, (iv) the added value of Wizenoze's search system versus Google needs to be communicated more clearly, and (v) the interaction should be as simple as possible.

Especially with regards to content quality and search results, more in-depth content, more actual content, a bigger range of sources, and more variety in types of content is advised to be included. In addition, more domain-specific knowledge or a categorization of search results on domain-specific themes was recommended by respondents, as well as including examples of how definitions or facts found in text-books can be applied in a vocational context.

Based on the results from the questionnaires, it appears that teachers are happy with the results but are unfamiliar with the tools. Creating awareness about the existence of the platform and Wizenoze's technology seems to be an important issue to address and to overcome the attitude of starting with Google as a resource of education. The next steps for SCB will be to make their platform more accessible and useful by creating a didactic and pedagogic layer. Other next steps could be to adjust the range of content and make the platform even more domain-specific.

Moreover, there are more wishes for the platform, one of which is to provide more information on resource utilization. Which sources are retrieved, and which are not? Which sources are obsolete, and which are always relevant? Does the search behaviour of students indicate the need for extra or fewer educational resources? Interesting research questions that will be explored further in the future.

REFERENCES

[1] 2021. Consortium Beroepsonderwijs: Samen expert op inhoud. http://www.consortiumbo.nl/
[2] 2021. Wizenoze: Delivering trusted digital content to learners. http://www.wizenoze.com/

[3] Theo Huibers and Thijs Westerveld. 2019. Relevance and utility in an educational search environment. 3rd International and Interdisciplinary Perspectives on Children amp; Recommender and Information Retrieval Systems, KidRec 2019 : what does good look like?, KidRec ; Conference date: 15-06-2019 Through 15-06-2019.