WEB SEARCHES FOR LEARNING
How language teachers search for online resources

MARIA BORTOLUZZI[1] AND IVANA MARENZI[2]
[1]UNIVERSITÀ DI UDINE, [2]L3S RESEARCH CENTER HANNOVER

Abstract – This paper discusses the results of a project investigating the use of web searching for professional purpose by language teachers of different school levels. The study focuses on language teachers' actual practice: criteria for planning the web search, identifying and selecting resources, sharing and using them for their teaching practice. Resources (Open Educational Resources in particular) have been multiplying on the web, but finding specific resources is often difficult because they are not uniformly classified and organized on the net, and there are no user-friendly interface/tools that facilitate search. This research project aims at identifying best practices and developing guidelines for web searching in language teacher education. The research questions addressed are: How do (language) teachers search for resources on the Web? What categories of resources? What strategies do they adopt for selecting, assessing and sharing resources? We interviewed and recorded six expert teachers about their web searches for educational purposes; we video-recorded their web searching tasks while they were commenting on their online choices through think-aloud protocols. The results of data analysis show main trends in the strategies used by these expert teachers: personalization of the web searching process by accessing websites suggested by trusted colleagues offline or online; selecting trustworthy websites of well-known institutions; relevance of resources not created for educational purposes; need for adaptation and re-contextualization of resources; web searches for class activities as a reflection on teaching practice and personal development. Ultimately web searching is a heuristic process of personal and collective learning for professional purpose in a lifelong perspective.

Keywords: web search; multiliteracy; learning; language teacher education; OER.

1. Introduction

This study is part of the project LearnWeb-OER and Websearching for Learning run by the L3S Research Center (Hannover, Germany) in collaboration with Udine University (Italy). The project focuses on the use of Open Educational Resources (OERs) and web search processes by language teachers of different school levels (https://www.l3s.de/projects/internal/LearnWeb, Marenzi and Zerr 2012). The wide-ranging aim is identifying the main variables of professional web searches in order to create efficient interfaces and guidelines that can help teachers find the resources they need.

Open Educational Resources have become one of the focuses of education practice and reflection in the last decade (see, among others Iiyoshi and Kumar 2008; Camilleri, Ehlers, and Pawlowski 2014, Beaven 2015). Open Educational Resources means digital educational materials (learning objects, open courseware, etc.) which are freely available online with minimal or no restrictions to be accessed, used and adapted by users for non-commercial purposes. "Their principal use is by teachers and educational institutions to support course development, but they can also be used directly by students" (UNESCO 2002, Paragraph 3). As Beaven writes, "OER can be entire textbooks, assessment materials, lecture notes and other classroom resources, and are usually in a digital form

(e.g. text, video, audio, etc)" (Beaven 2015, p. 77).

In the last decade OERs have been multiplying on the web, and it is increasingly time consuming for teachers to find suitable learning resources for their teaching contexts due to several reasons: resources are widespread and numerous especially for languages such as English, but they are not uniformly classified and organized on the net, and, as far as we know, there are no user-friendly interface/tools that facilitate search to date (Nürberger, Stange and Kotzyba 2015, Hwang *et al.* forthcoming).

The overall objectives of this project are two-fold: one from the perspective of computer developers and the other we are discussing here, from the perspective of language teachers and educators. On the one hand, the L3S Research Center aims at developing an interface that can help non-technical users in searching efficiently and finding materials useful for learning in different scenarios (for their students and for their professional competence). The second overarching objective investigates teacher practices: how teachers approach web searches, select, use and re-use the resources they find, reflect on teaching and learning in context and improve on their educational practice. The present paper focuses on some aspects of this second overarching objective: identifying best practices of expert teachers engaged in web searching, and developing guidelines for teacher education (pre-service, in-service and lifelong). Web searching is viewed in this paper as a process of professional learning and heuristic process of discovery (Vakkari 2016) that contributes to teachers' multiliteracy knowledge processes, and practices of meaning making through experiencing, conceptualizing, analyzing and applying (Kalantzis and Cope 2010; Cope and Kalantzis 2015b).

The wider theoretical framework of the study lies within a flexible view of socio-constructivism (Williams and Burden 1997; Goodfellow and Lamy 2009; DOTs and More DOTs projects), and multiliteracies studies (Cope and Kalantzis 2009a, 2009b, 2015a; Jones and Hafner 2012; Barton and Lee 2013).

The article starts with an outline of the study and its wider inter-disciplinary context; then, the results of data analysis are presented and discussed. Further developments of our ongoing research are outlined in the concluding section.

2. The context of the study

The present project investigates web searching for teachers as a heuristic process of professional learning and contextualizes it to the specific context of language teaching and learning (Krathwohl 2002; Vakkari 2016). It will identify efficient web searching strategies for sharing and knowledge-process development (Yelland, Cope and Kalantzis 2008; Marenzi and Nejdl 2012; Marenzi 2014a, 2014b; Nürberger, Stange and Kotzyba 2015; Marenzi, Bortoluzzi and Kalyani 2016), and contribute to guidelines for teacher development about web searches for teaching and learning purposes. More specifically, the practical objective focuses on how expert teachers approach web searches and select, assess resources reflecting on their own practice. The present paper discusses the data gathered by observing six expert teachers searching the web through think-aloud protocols and commenting their search habits and choices through interviews. The main questions are:

- How do (language) teachers search for resources on the Web?
- What categories of resources do they look for?
- What strategies do they adopt for selecting, assessing and sharing resources?

The data analysis has two complementary and related research levels (see Table 1): for computer experts, and for language teachers and teacher educators. For computer experts, the data point towards ways for improving searchability of resources and a systematization of online resources. Their expectations are based on identifying attributes of resources and datasets: the practical outcome will be constructing interfaces to improve on web searching and, secondly, having guidelines for OER design and planning. This part of the research will be discussed in other papers.

The present paper focuses, instead, on the data analysis for language teachers and teacher educators. It aims at investigating some main aspects of the heuristic process of web searching by expert language teachers; identifying best practices and improving on guidelines for teacher education (pre-service, in-service and lifelong) to enhance teacher multiliteracy and digital skills. We analyse reflections and comments by expert teachers on the multimodal resources and on the processes and online actions they use when searching, selecting, sharing, assessing, using, re-using and adapting resources. The practical outcome of the study will be a series of guidelines for multiliteracies in teacher education for pre-service, in-service and lifelong learning. Table 1 summarises the complementary viewpoints of computing experts and teachers/teacher educators.

For computing experts (the focus of papers within the computing field)	For language teachers and teacher educators (the focus for language teacher education)
Expectations	**Expectations**
Attributes of OERs for efficient searches in different contexts	Reflection and comments on resources, processes and online actions.
Practical outcomes	**Practical outcomes**
Improvement of searchability tools for online resources	Critical reflection on resource selection, assessment, use, adaptation and sharing.
Guidelines for creating more efficient professional search interfaces, and resources planning and online positioning	Guidelines for teacher education within a lifelong perspective

Table 1
Outline of expectations and outcomes.

3. Theoretical framework

The study is grounded within a flexible socio-constructivist framework of learning and teaching (Vygotsky 1962, 1978; Williams and Burden 1997; Bortoluzzi and Marenzi 2014; Richards 2016) whereby co-construction of meaning is essential to understand issues and practices and to improve on individual and group knowledge and competence. Richards writes:

> From a socio-cultural perspective, teacher learning is seen to take place in a context and evolves through the interaction and participation of the participants in that context. Teacher development is not viewed as translating knowledge and theories into practice, but as constructing a new identity as well as new knowledge and theory through participating in specific social contexts and engaging in particular types of teaching activities and processes. (Richards 2016, p. 3)

The connection between searching and learning has been recently investigated by several studies (see Vakkari 2016 for an overview). Focusing on professional searches as collective sensemaking, Nürberger, Stange and Kotzyba (2015, p. 2) remark that "[f]or

professionals the search is rather a creative process in which domain specific information is collected and very often used to derive solutions for an application domain."

This study looks at how web searching online is related to professional learning in the practice of expert teachers while they are looking for resources, selecting, sharing, assessing, using and adapting them for their professional practice. As described in Section 4, we analysed the teachers' actions when they searched for resources, and we also recorded and analysed their reflections and critical evaluation on the resources, their online actions and choices. Complementing action and reflection on action contributes to a complex view of teaching in a lifelong learning perspective (European Union 2007). Edge remarks that learning from more experienced teachers means "theorizing and reflecting upon it and then take action improving one's practice" (Edge 2011, p. 19; see also Wallace 1999).

Searching, selecting and adapting online resources are multiliteracies competence for teachers that can "[o]ffer and encourage multimodal expressions of meaning" (Yelland, Cope and Kalantzis 2008, p. 202). In recent years, multiliteracies, namely the multimodal awareness and competence in text production and fruition, have become central in teacher education and professional learning (Cope and Kalantzis 2009a, 2009b; Jones and Hafner 2012). In our study, we observe and reflect upon the multiliteracies competence of expert teachers in order to identify successful practices of heuristic web search for teacher education.

4. Methodology and data gathering

The part of the project discussed in this article focuses on the practice of professional "non-technical users". These are teachers who are experienced and successful in their profession, with a positive attitude towards digital tools for learning and teaching, but are not computing experts. The case study, planned and implemented on ethnomethodological principles (Dörney 2007), is small-scale, in-depth and focused on the individual users; the data are qualitatively analysed and the categories data-driven (Section 5).

As a first step (May/June 2014) we asked experienced teachers from different school levels to fill in a questionnaire on their school practice, professional preparation and use of digital resources; the questionnaire had the aim to help us identify the teachers who would be most suitable to collaborate in the project.[1] We invited teachers from different Italian school levels (nursery, primary, secondary school) and we decided on the following requirements: 1. pre-school and primary school teachers also had to have an experience of teaching English as a foreign language to young learners; secondary school teachers had to be English language teachers. 2. they had to be experienced teachers (at the time of data gathering, the youngest teachers had already taught for 8 years). 3. they had to be ready to reflect critically on their practice. 4. they had to have a positive attitude towards digital technology and possibly use it in their teaching; we wanted to avoid low level digital competence because it could prevent them from carrying out efficiently the tasks we would ask them to do.

Through the questionnaire analysis, we identified 5 language teachers whose answers revealed a complex and reflective point of view towards teaching and learning, and a positive attitude towards digital technology for teaching purposes. To maintain

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[1] The questionnaire can be found at http://yell.uniud.it/?page_id=661

anonymity, the 5 teachers will be called Sarah (nursery school), Silvia (primary school), Barbara (secondary school and private tuition), Laura and Cristiana (secondary school). We decided to include in the study also Maria, a university lecturer, teacher educator and researcher in digital technology for education; she is the only interviewee who is not a language teacher and her comments and answers offer a different expert user point of view. She was contacted directly and not selected on the basis of the questionnaire.[2]

The analysts became part of the context in which data were gathered due to the interpersonal relationship established with the single teachers (see Section 4.1.). This feature allowed the analysts to ask specific questions about the interviewees' teaching contexts: the semi-structured interviews were adapted on the basis of the analysts' background knowledge and the teachers' answers to the questionnaire.

The following sections describe the process of data gathering: the semi-structured interviews (via Skype), the recorded online web searching tasks with screen-capture and recording of the think-aloud procedure.[3]

4.1. Data gathering

4.1.1. Semi-structured interviews about teachers' web searches

In July 2014 the 5 teachers and the pedagogy researcher (from now on they will be referred to as "the 6 teachers") were interviewed and recorded via Skype. Semi-structured interviews were used and adapted to elicit clarifications about relevant answers given in the questionnaire and on the basis of their individual teaching context. Five interviews were carried out in English and one in Italian. The interviewers used the research questions reported in Section 2 as guidelines and asked the following working questions adapted to the individual teaching context of each interviewee: What content do you search for when looking for teaching/learning resources? What kind of resources do you look for? How do you search? What keywords do you use? What are your search strategies? How do you select and assess resources for your teaching context? How do you share them?

4.1.2. Recorded think-aloud protocol for three web searching tasks

At the end of the interview, we asked the teachers to perform for us three web searches as if they were looking for teaching/learning materials for their students/pupils. While carrying out the web searches, they were required to explain aloud what they were doing while searching, the rationale for their decisions, and what criteria they used to select, ignore or explore resources. The tasks were carried out in English and only one teacher used Italian. One week before the interview, the teachers had received detailed information[4] about the whole procedure including a link to a video explaining the purpose of the interviews. The interviewees were also informed about the tasks they would be asked to perform while their actions and voices were recorded:

1. Open a portal you normally use for searching teaching resources, and find a search you already used for your teaching.

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[2] Participants signed the consent form which allows us the use of data for research purpose.
[3] We used Adobe Connect to record and capture teachers´ actions on screen.
[4] The information documents sent to the teachers can be found at http://yell.uniud.it/?page_id=661.

2. Use the same portal to look for a new resource or topic you have not investigated yet, but you would like to use in the future.

3. Look for a new resource from scratch.

4.1.3. Sets of data

We asked the teachers to think of real or realistic situations of web searches for their own teaching contexts, be it primary, secondary or, for the researcher, higher education. The two sets of data (recorded interviews and recorded think-aloud protocols with screen-capture of web searches) were analysed manually and qualitatively due to the specificity of the teaching contexts the interviewees had in mind. The interviews were separately transcribed and commented. In the present study the multimodal analysis of the video screen-capture is not included. The following section reports the data analysis and its results.

5. Data analysis

On the basis of the literature in the field, the preliminary questionnaire and our research questions, we identified a series of possible categories to be validated through the pilot data analysis. Most importantly, the pilot data analysis showed us how the teachers themselves named variables and processes. Therefore, the final categorization we adopted is relevant to the research questions and the design of the study, but also data-driven and coherent with the ethnomethodological approach adopted for the study. The data analysis was manually carried out and cross-checked by three analysts using the collaborative annotation tool eMargin (https://emargin.bcu.ac.uk/).

The six main categories used for data analysis are listed below and discussed in the next sections. The general definition of the category is the questions used to identify the digital action/object they refer to.

How do teachers search?

1. *Search terms*: How do teachers search for content/topic? What keywords/key expressions do they use? E.g.: human rights, writing activities, Mondrian, etc.
2. *Multimodal actions*: What are the actions teachers identify? E.g.: searching, choosing, finding, using, adapting, re-contextualising, creating, linking, etc.
3. *Multimodal function objects*: What are the digital objects mentioned by the teachers when searching the digital environment? E.g. download button, overhead toolbar, link, etc.

What kinds of resource do teachers search for?

4. *Multimodal text-types:* What types of multimodal text do teachers search for? How do they refer to the kind of multimodal texts they are searching for? E.g.: podcast, video, image, etc.

For what context and purpose do they search?

5. Context and purpose:

Context: How do teachers refer to the context of use of the website/resource they are looking for? E.g.: class activity, background information, etc.
Purpose: How do teachers refer to the final purpose for their search? E.g.: for what kind of activities in class? For improving professional skills? Etc.

How do they decide what to choose?

6. Website credibility, reputation, trustworthiness, use of specific search metadata:

Website credibility, reputation and trustworthiness: How do teachers refer to how credible and trustworthy the website/resource is? E.g. author, reputable education institution, official organization, etc
Use of specific search metadata: How do teachers refer to information about the website/resource? E.g.: date, ranking, etc.

As expected, some of the above categories overlap; for instance, multimodal text-types can be also used as search terms. When this occurs, the item is listed under both categories. Since the analysis is not quantitative, but qualitative, this choice does not skew the results, but shows how these categories interact and are related in the teaching practice.
The present discussion will only include four out of six main categories: multimodal actions and multimodal function objects are excluded because of the repetitive quality for the former category in the data, and the very low occurrence of the latter category. The four main remaining categories are presented in the following section.

5.1. Search terms

As mentioned above, *Search terms* respond to the following questions: How do teachers search for content/topic? What keywords/key expressions do they use?
In the two sets of data (interviews and think-aloud protocols) we identified the following data-driven sub-categories for search terms as defined by the teachers themselves (in brackets some examples from the data):

- **General topic and personal names** (e.g. human trafficking, human rights, geometry and art, Malala, Nelson Mandela, Mondrian).
- **Familiar websites** (e.g. Insegnanti 2.0, WebEnglish teacher, Glogster).
- **Websites of reputable organizations** (e.g. United Nations, BBC Education, academic websites).
- **Social platforms used for professional purposes** (e.g. Facebook, Twitter, Pinterest).

As a generalised tendency, there is a great variety of topics, not limited to educational themes. This is more so for teachers of older learners (secondary and higher education); however also primary and nursery school teachers carry out their searches using surprising and unexpected topics or keywords. For instance, Sarah (pre-school teacher) searched for "Mondrian" websites to prepare lessons on basic geometrical shapes for very young children. Primary school teacher Silvia searched for the string "Arca di Noé" (Noah's Ark)

to gather materials about a reading book for children. This wide-ranging freedom offered by the Internet clearly demonstrates that educational websites and digital environments are only a partial answer to the needs of teachers for 'authentic' resources (however complex this concept might be in language teaching: see Guariento and Morley 2001; Richards 2012). These resources are often more challenging for students and teachers, but also more motivating and innovative as the teachers explicitly mention in the interviews. This shows that starting from prior knowledge (familiar search term) they move onto a search for learning whereby information retrieval turns into a 'knowledge' quest and a process from familiar to unknown (Vakkari, 2016).

The second tendency seemingly points towards the opposite direction: given the amount of resources available, teachers need to personalise searches and render them less random. Thus teachers tend to rely on the one hand on familiar websites and, on the other, on websites of reputable organizations. The former trend moves towards a personalization of searches based on Facebook groups suggestions (colleagues become Facebook friends), other teachers' blog or one's own blog (e.g. Cimetta's blog, Ziraldo's blog, *I ragazzi del Fiume*, etc); we can call this tendency a 'digital-word-of-mouth' or recommendation from digital friends. This strategy often blends the trustworthiness of the official institution and the familiar trustworthiness of the colleagues recommending the resource.

Our data confirm the expectations based on the literature: searching goes from more general to more specific queries (Vakkari 2016, p. 10), and the process of sensemaking is influenced by web searching itself. However, web searching is also refined through processes that include the professional context and interpersonal relations as the next variables will show.

5.2. Multimodal text-types

Jones and Hafner (2012, p. 50) write: "[The] practice of combining multiple modes is known as 'multimodality', and texts that are made up of a combination of modes in this way are called **multimodal** texts" (bold in the original). The concept of multiliteracies (Kalantzis, Cope and Cloonan 2010; Marenzi, 2014a; Cope and Kalantzis, 2015a) closely interacts with multimodal resources to make meaning.

As expected, the teachers mention a great variety of multimodal text-text types; in our data analysis we identified three overlapping sub-categories:

- genres or sub-genres: e.g. advertisement, social ad, novel, podcast, websites, blog, portal, etc;
- digital format: e.g. video, audio, music file, pdf, etc;
- sections or part of multimodal text: e.g. section, paragraph, image, banner, etc;

The remarkable unexpected result yielded by the data is that experienced teachers seem to have only a limited interest for text-types overtly related to school work such as exercises, lesson-plans, worksheets, interactive learning pages, etc. Many educational text-types are mentioned, but the overwhelming majority of web searching is directed to text-types not originally created for teaching purposes.

As seen for the category *Search term* (Subsection 5.1), the data show on the one hand the preference for 'authentic' materials, and on the other the need for personalising their searches (teachers' blog, my blog, online teachers' groups, Facebook posts, etc) for all school levels.

Given that the questions we asked and the tasks we set explicitly mention the educational context, the amount of non-specifically educational text-types is even more

salient. It can be added that the teachers interviewed are careful and reflective in using ready-made educational resources. Adaptation is fundamental both for generic materials and for educational materials found online. They explicitly remark that they have to re-contextualise or re-elaborate all materials before using them in class.

Sarah (pre-school teacher) thus underlines the need for adaptation:

> I use more than everything single activities and I adapt [them] to my settings at school. I don´t actually copy the lesson plan as it is, sometimes, but not often, very rarely.
> I prefer to create my own worksheets, but sometimes [online resources] give me some ideas, so I have a look anyway, even if I´m not going maybe to use them so much.

Expert teachers are independent users of the materials they find online which they always adapt. The process of sensemaking during web searching is thus complemented by the interaction with the resources after selection (Vakkari 2016).

5.3. Context/purpose

The teachers focused on their own teaching *Context* when they searched, as explicitly stated in our questions and in the tasks of the think-aloud protocols. Analysing the data, we identified the following interaction between the sub-categories of *Context* and *Purpose* (Table 2).

Context	Purpose
Class activity or materials suitable for a certain age and group (related to the level of complexity of resource for language or/and content)	• specific activities in class • ready-made resources to use in context • ideas to adapt to context • additional materials to give students • improving students' study skills • improving proficiency in the language for individual/group of learner/s
Professional development for the teacher	• improving teacher's proficiency in the language • learning new teaching methodologies • solving educational problems • sharing ideas with colleagues
General background information for the teacher	• expanding on personal knowledge and cultural background

Table 2
Context and purpose in teachers' web searches.

Since the default request we made was to contextualise their searches for their classes and groups of students, it is all the more remarkable that all teachers mentioned their professional improvement. In general, the valuable teaching materials they find for their teaching context also represent background information and resources for professional development for themselves and colleagues. Our data confirm that web searching is perceived as an individual and collective process of learning (Nürberger, Stange and Kotzyba 2015, p. 4): the teachers' search for their lesson preparation becomes an opportunity for professional discovery. As Laura said: "I think technologies are necessary to improve class management, [and] to improve my own learning, daily learning."

Searches often lead to assessing resources collaboratively with colleagues, either online (through digital means) or offline (meeting colleagues face-to-face). Barbara summarises:

> But of course I would first of all try to use [the new resource found on the Internet] with my colleagues and it is usually what we do when we find something new that we are not sure of, or we are not sure if it might be effective, we exchange material and we see how another person reacts to it […]– there is a lot of […] collaboration.

As seen in the previous section, these teachers actively interact not only among themselves, but with the resources through material adaptation; for instance, Cristiana remarks:

> I resort to ready-made lessons, but I never use them the way I find them. I always try to make them my own lessons, in the sense that they may prompt, they may spark something that I had not spotted, but then I always need – but I need to work on them, otherwise I can´t introduce [them to] my students […] because they do not belong to me.

Resources have to undergo a process of appropriation and professional sensemaking in order to become professionally useful for the teaching context. Throughout the interviews and think-aloud protocols, the emphasis is not so much on the resource itself (however original, useful and suitable), but on the process of learning, improvement, empowerment that search, selection, collaborative assessment and adaptation of the resource offers to the teachers and, as a result, to their students. The experienced teachers' attention is focused on processes and practices rather than on teaching objects. As Ehlers writes: "OER usage, re-usage, sharing and creation are not an end in itself", but engaging with them has to result in better teaching practices and learning experiences (Ehlers 2011, p. 7).

5.4. Credibility, reputation and trustworthiness

One of the main digital skills for users is to be able to detect how credible websites are (Rheingold 2012, pp. 76-109) and to recognize whether what you find online is worth reading, using, quoting, etc. Google uses five criteria to describe credibility: Authority, Accuracy, Objectivity, Currency, Coverage (Googleguide).

During the stage of selecting resources, the teachers follow a combination of criteria to choose the websites they are interested in. In general terms we can see two main tendencies. On the one hand, the teachers focus on the reputation and trustworthiness of the website itself; this includes some characteristics which are encapsulated in the labels Authority, Accuracy and Objectivity: they tend to trust websites and resources of governmental, international, prestigious academic institutions and check the domain of the website (.edu, .org, .ac.uk, etc). For instance, Cristiana says:

> I look at the address, I immediately see whether it is a governmental website. For example in the case of the human rights teaching pack, it was an official governmental website, so I go ahead. For example when I use the BBC materials, obviously I know that [it] is material that is filtered, that is well searched. So I always try to go for websites that are either governmental or are linked to an educational institution.

On the other hand, they also rely on websites and portals suggested by trusted offline or social media colleagues in a collaborative process of assessment which is mentioned by all teachers (see previous sections).

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Their attitude towards metadata (ranking and popularity) is interestingly careful and critical; the teachers mention that a high-ranking website is not necessarily qualitatively suitable for their context and purpose of use. Maria, who teaches digital skills for learning in higher education, thus summarised her procedures for web searching and assessing findings:

> I always look for the author or I try to have a quick look at the website, in order to see if it´s first of all relevant, but also […] credible, who are the authors; if even the layout of the website is, so to say, credible, scientific. […] I expect to have information on the authors […]. Then in some cases I waste time resetting, lots of time in seeing, making also other researches and seeing what a website is about [and] sometimes it could be time wasted. In other cases for serendipity I find, for example what could be a useful resource for my job. I sort by relevance, by citation, by year, by… I read if there is something that explains what the website is about.

6. Discussion of data analysis

Our original expectations aimed at identifying main attributes for search terms and preferred multimodal text-types. These expectations were only partly met, as discussed below; however, what we found shifted our focus more prominently to the value of web search as a learning process. In this section we summarize the main findings resulting from the data analysis:

- How do (language) teachers search for resources on the Web?

The data show that search terms used by language teachers may span across any topic and therefore they are not a suitable predictable variable for improving on searchability. It is rather the strategies used for searching that point us towards interesting trends. The two main strategies used by expert teachers are called here 'personalization' and 'trustworthiness'.

Given the increasing amount of online resources, experienced teachers rely on themselves as a flexible network of experts (Vuorikari et al. 2012, Vuorikari and Brecko 2014); they search for resources trusting professional peers they meet in school and/or online and rely on their suggestions (Nürberger, Stange and Kotzyba 2015). It is a complex network of collective intelligence (Rheingold 2012) and professional competences that results into personal or school networks and blogs: Facebook groups, Cimetta's blog; Ziraldo's blog, *I ragazzi del fiume*, YELL/TELL.

The second trend, 'trustworthiness' implies relying on credible, well-known, institutional websites and portals. It partly overlaps with the trend just mentioned because online resources of well-known, official or educational institutions are often recommended by online/offline trusted colleagues through what we call 'digital word-of-mouth'.

These two strategies (personalization and trustworthiness) rely on grass-roots professional authority on the one hand, and on institutional authority on the other. Together, they promote a loop of digital competences encompassing the personal and the official, the private and the public sphere of the teaching profession. One level feeds into the other seamlessly: the private sphere of a professional personal blog or Facebook group merges into the public sphere in a lifelong learning loop.

- What categories of resources do expert teachers look for?

Multimodal text-types searched by the teachers are in great variety; one typology might include several: for instance, a pdf file might include written text, an image, an audio-file link and a video link. Our expectation of the relevance of Open Educational Resources for teaching was only partly met: our interviewees looked for websites created for educational purposes, but they also underlined the relevance of online resources not purposefully created for teaching. Resources originally created for non-educational settings and purposes were deemed more challenging, but also more motivating, original and adaptable for the teaching context. These resources greatly contribute to the professional development of the teachers themselves and to the heuristic process of learning while searching. Both educational text-types and text-types not purposefully created for educational contexts are always adapted and carefully re-contextualized; the expert teachers we interviewed tend to use them as a springboard for ideas, activities, practices. The key steps are: finding realistic resources, re-contextualizing them, learning from the process.

- What strategies do they adopt for selecting, assessing and sharing resources?

The trends previously described are also valid for selection and evaluation of resources. The strategy of sharing resources and ideas in order to assess them collaboratively is mentioned by all teachers as a face-to-face or online practice of discussion. In the words of these experienced teachers, web searching is closely related to sharing resources and practices with colleagues to achieve a better selection process and learn collaboratively. This transforms the individual process of professional development into a collective process. In the interviews, "colleagues" can be professionals working in the same school or area, Facebook friends and online experts working in a different country.

As found in other research studies (Beaven 2013, p. 67), re-posting online adapted resources does not appear to be a common practice. The reasons might be various: once the resource is downloaded and adapted, it might seem a disrespectful practice to upload it again with changes. The factor of time might also negatively influence this behaviour: re-uploading adapted resources means transforming the new version into a format that can be understood and positively assessed by colleagues, and this process is time-consuming.

Selection and assessment of resources is a highly valued result of their searches: searching for resources becomes for expert teachers learning new teaching strategies and ideas, background information and educational opportunities for themselves; networking with colleagues in order to do so is mentioned by all interviewees as a fundamental necessity for informed and reflective professionals ('digital word-of-mouth').

The present study has a number of limitations. The number of teachers interviewed is small: the study is qualitative and in-depth and needs to be complemented with quantitative data on web searches. Also, we only focused on the verbal part of the interviews. The multimodal analysis of the screen-capture videos during the think-aloud protocols will be the focus of another research paper.

Nevertheless, the results of the data analysis offer some preliminary guidelines for multiliteracy teacher education. Experienced and digitally expert teachers from different school levels used the following good practices to enhance their searches:

1. Belong to trusted teachers' networks to share resources and practices with colleagues and groups (offline and online);

2. Collectively select, assess and adapt resources and practices to contextualize them through peer-to-peer practice;

3. Rely on trustworthy and authoritative online portals and websites (trusted

environments, well-known institutions, educational domains, etc);
4. High quality resources for students represent valuable resources for lifelong professional learning;
5. Teacher-generated resources and practices are a wealth for other teaching contexts, and for colleagues and students alike.

7. Concluding remarks and further research developments

Nürberger, Stange and Kotzyba (2015, p. 2) write:

> For professionals the search is rather a creative process in which domain specific information is collected and very often used to derive solutions for an application domain.

They underline the need of taking into consideration specific users' contexts to support the whole search process. Thanks to the contribution of expert teachers, the present paper has identified some main trends in professional web searching for language teachers and guidelines for multiliteracies.

Recent research has demonstrated the close link between web searching and learning (Vakkari 2016) and the results of the present data analysis have clearly shown the close connection between the search process and professional learning and development. Expert teachers from different school levels show they are aware of the connection between web searching for finding resources for their classes, and their own professional development and lifelong learning. Expert teachers engage in different and complementary kinds of searches. First, they carry out "exploratory search" information in order to fill a gap of knowledge or practice (Marchionini 2006); secondly, they engage in what is called "collaborative search" (either online or offline) whereby they share the resources selected and assess them with trusted peers (Nürberger, Stange and Kotzyba 2015, p. 4).

The present study has a number of limitations. The number of teachers interviewed is small: the study is qualitative and in-depth and needs to be complemented with quantitative data on web searches. Also, we only focused on the verbal part of the interviews. The multimodal analysis of the screen-capture videos during the think-aloud protocols will be the focus of another research paper.

Nevertheless, the results of the data analysis offer some preliminary guidelines for multiliteracy teacher education. Experienced and digitally expert teachers from different school levels used the following good practices to enhance their searches:

1. Belong to trusted teachers' networks to share resources and practices with colleagues and groups (offline and online);
2. Collectively select, assess and adapt resources and practices to contextualize them through peer-to-peer practice;
3. Rely on trustworthy and authoritative online portals and websites (trusted environments, well-known institutions, educational domains, etc);
4. High quality resources for students represent valuable resources for lifelong professional learning;
5. Teacher-generated resources and practices are a wealth for other teaching contexts, and for colleagues and students alike.

The present research study had a further research development in Autumn 2015 when the results presented in this paper became the basis for further investigation of teacher multiliteracies practices, web searching for professional purposes, and the improvement of tools and strategies for web searching (Marenzi, Bortoluzzi, Kalyani 2016).

The present stage of the research (summer 2017) is the development of a search interface that will help language teachers navigate the increasing amount of online resources and efficiently select them; the aim is transforming searching from a time-consuming retrieval of documents into a rich and effective professional experience of learning for language teaching (Hwang, Marenzi, Bortoluzzi, Ronchetti, 2017).

We started positing our objectives within the domain of learning and teaching objects, more specifically Open Educational Resources and how to search for them optimally on the net, how to select and assess them. Our data, namely the voices of the expert teachers we interviewed, shifted the balance towards learning processes, rather than on objects and resources. Their focus was on multiliteracies practices and strategies as processes of individual and collective professional improvement, and shared strategies of metalearning for teachers. Dudeney, Hockley and Pegrum summarise: "it is widely accepted that literacy is a plural concept" and "not just individual skills but social practices" (2013, p. 3). Our expert teachers helped us to work and progress in that direction.

Bionotes: Maria Bortoluzzi is Associate Professor of English language, Department of Languages, Literatures, Communication, Education and Society, University of Udine, Italy.
Ivana Marenzi is a researcher in technology enhanced learning at the L3S Research Center of the University of Hannover, Germany.

Authors' addresses: maria.bortoluzzi@uniud.it; marenzi@l3s.de

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