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## **Language learners' seeking paths and strategies: one dimension of digital literacy**

The aim of this article is to study how students search for relevant information on the internet, focussing on their use of sources and search strategies in order to accomplish given tasks. In addition, the aim was to study what type of seekers' profiles can be found in different tasks. By *digital literacy*, we mean the critical assessment and use of digital technologies and competences in digital communication and discourse. Finnish L2 students of French (n=10) and Spanish (n=10) took part in a translation course and participated in a three-part small-scale qualitative study: a translation task, a pedagogical intervention and a translation commentary task. In this article we focus on the seekers' paths and strategies forming seekers' profiles in tasks one and two. The results showed that the seekers' profiles tend to remain similar for different tasks. The number of queries used did not always result in success in terms of finding the correct answer.

**Keywords:** digital literacy, information seeking paths and strategies, seekers' profiles

## 1 Introduction

This article presents the results of a study reporting on information seeking<sup>1</sup> competence as one dimension of digital literacy and how students use this critical skill as a part of their emerging academic expertise. Our study concerns non-native academic learners who are majoring in foreign languages. The academic context refers to studying in a certain scientific field and acquiring expertise in which general and field-specific information seeking competences are expected learning outcomes. More precisely, the objective is to study how students search for relevant information on the internet, with an interest in their use of sources and search strategies. We wanted to answer the following research questions:

- 1) What type of seeking behaviours or search paths can be distinguished by different groups?
- 2) Do the seeking behaviours or seeking paths diverge in different tasks?

In the following article, basic aspects of information seeking and digital literacy will first be introduced. Secondly, the three-part small-scale study and especially the two tasks under study will be presented before discussing the main findings and their importance to the field of foreign language learning and teaching.

## 2 Information seeking as a part of digital literacy

The development of ICT has led to major transformations in contemporary life and has brought about a *digital culture* (Gere 2002). It is a culture that requires new types of social agency (Cope & Kalantzis 2010) that are complex as they cover the use of not only the internet but also all screen-based media. The texts and discourses are multi-modal and hypertextual,

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1 The term *information seeking* was chosen for use in this article at the general level. Other possible terms were *information searching*, used here when related to the task complexity; *information retrieval* (IR); and *data retrieval* (DR), with the last two being more common in the domain of information science studies.

including technological actions that are embedded in the pages for users to perform (see e.g. Kress 2003; Kalantzis & Cope 2012). Information seeking on the internet has become a fundamental activity in contemporary society (Singer, Norbistrath & Lewandowski 2013), at least in high-income countries where young people are characterized as *digital natives* (see, for instance, Barton & Lee 2013).

This leads to the discussion of the relevant and critical use of material found on the internet in terms of literacy (Gutiérrez & Tyner 2012; Olson & Torrance 2009). Scholars from many different fields – for example, the information and educational sciences – discuss the phenomenon within a large range of concepts that can cause confusion and misunderstanding. Gilster (1997) uses the term *digital literacy*, but many other terms have been introduced: for example, *multiliteracies* (The New London Group 1996; Kalantzis & Cope 2012); *web literacy* (Mackey & Ho 2005); *information literacy* (Mackey & Ho 2005; Pinto & Sales 2010); *media and information literacy* (UNESCO 2008); and *media literacy and digital competence* (Gutiérrez & Tyner 2012). In our approach, we start in the field of digital communication and discourse, which will serve as the basis for our definition of digital literacy and lead to our pedagogical view of language learning and teaching.

We understand digital literacy to comprise two dimensions (cf. Johansson forthcoming). The first dimension covers the relevant use of digital technologies that includes critical assessment concerning the selection and use of software. The second dimension refers to those competences in digital communication and discourse that are language-related or other semiotic competences in the use of digital texts (reading, writing, speaking, listening and viewing, etc.) (Dervin, Johansson & Mutta 2007; Martin 2005; Guitert & Romeu 2009; Newrly & Veugelers 2009; Thurlow & Mroczek 2011). This definition thus comprises multi-modality, in which written modes are complemented by others, such as oral, visual, audio, gestural and tactile (Kress 2003; Kalantzis & Cope 2012).<sup>2</sup> Users seek, share, distribute and produce

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2 Kalantzis & Cope (2012: 148–149) discuss the concept of critical literacies as a part of critical literacy pedagogy which “comes with recognition that all representation and communication involves human identities, and that these differ” – this is also termed ‘postmodern education’. Another type of critical literacy involves students as social actors and discusses their values and identities as active citizens. These concepts are not discussed further in this article.

new knowledge on the internet in ways relevant and appropriate to their information and knowledge needs. Furthermore, digital literacy is better described as an ongoing process depending on an individual's life situation. In this context, remaining digitally literate means learning and using new technologies continuously and adopting these processes in everyday life (Martin 2005; Newrly & Veugelers 2009).

Recently, interactivity in creating and sharing knowledge has become an essential part of activity on the internet; therefore its impact on information seeking has also increased. New software has been designed to facilitate collaboration and sharing of information online, and as a result there has been an enormous accumulation of distributed or collaborative knowledge (Kress 2003). This has changed users' relationships to knowledge and how they read and write. According to Dobson and Willinsky (2009: 302), one of the strongest examples of this change can be described as the Wikipedia phenomenon, where people collaborate freely to create the world's largest open source encyclopaedia "with minimal governance, a policy of maintaining a neutral point of view, and a growing multilingual authorship and intellectual property". This phenomenon has led to discussion of the issues of trust formation and assessing the credibility of information found digitally. The findings suggest that in forming trust, users rely on a range of factors such as authorship, references, expert recommendation, quality of writing and editing, and on verification via links to external reference sources. However, it appears that quality is also partly a subjective concept that depends on the user's unique point of view (Yaari, Baruchson-Arbib & Bar-Ilan 2011; see also Dobson & Willinsky 2009). In other words, the users decide which information is trustworthy and if this information is sufficient as part of their decision making process, or if more information is needed. This kind of interactivity is an extra challenge for achieving digital literacy.

Search engines such as Google and other online materials are widely used for finding information quickly (Mutta, Pelttari, Salmi, Chevalier & Johansson 2014; Salmi & Chevalier 2010; Massey & Ehrensberger-Dow 2011). The use of a search engine requires the individuals to generate keywords relevant to their query or need; evaluate the relevance of the results provided by the search engine; and then to select one or more web pages to visit

(e.g. Al-Eroud, Al-Ramahi, Al-Kabi, Alsmadi & Al-Shawakfa 2011). If the search engine does not provide relevant results, the information seeking activity becomes more complex (i.e. an information search task) as the individuals have to reformulate their query by adding and/or suppressing keywords (e.g. Dommes, Chevalier & Lia 2011). The process becomes even more complex when the individuals have to search in a non-native language (Aula & Kellar 2009).

In the current article, translating to another language is a central part of the information seeking procedure. For all types of translators, from those translating literature to those localising software, the web has become an essential tool. Translating is not only the act of putting words found in a dictionary one after another, but transferring the ideas contained in a text from one language to another – “an expert activity which constantly requires information” (Pinto & Sales 2007: 532) – and the transfer of ideas necessitates getting acquainted with the subject matter of the text. In this study, translation and/or multilingual information seeking (Al-Eroud *et al.* 2011) is included in the tasks performed by the participants, but it is also a strategy used when seeking information. In regard to the tasks, they can normally be divided into two main categories, namely information seeking and information search tasks, the latter requiring problem information, domain information and problem-solving information (Byström & Järvelin 1995). An information seeking task could be one where the participants are asked, for example, “What is the height of the tower of Pisa?”; whereas an information search task could have questions like “Where can bog rosemary be found in France?” or a task with no right answer such as “What is the frequency of the radio station ‘Radio Santé?’” (Mutta *et al.* 2014). Our tasks were considered information search tasks; they were seemingly simple, but required some complex processes in order to find the correct equivalent of the words. The task complexity was increased by multi-modal representation on the internet through conceptual-cognitive complexity (Kress 2003). It is notable that the task’s complexity can be more or less objective or subjective, depending for instance on the participants’ previous knowledge of the subject matter (Singer *et al.* 2013).

### 3 Three-part small-scale qualitative study

At the University of Turku, ten Finnish L2 students of French (Group A) and ten Finnish L2 students of Spanish (Group B) took part in relevant translation courses and participated in a qualitative study that consisted of three parts: a translation task (Task 1); a pedagogical intervention; and a translation commentary task (Task 2). The background information of the participants is presented in Table 1:

TABLE 1. Background information.

Group A	Gender	Age	Year	Major	Minor
P1	F	19	1	French	German
P2	F	19	1	French	-
P3	F	22	3	English	French
P4	F	24	3	Swedish	French, English, Spanish
P5	F	19	1	French	Spanish, Phonetics
P6	F	19	1	French	Pedagogy
P7	F	21	1	French	-
P8	M	23	3	French	Economics
P9	F	21	3	English	French
P10	M	20	1	French	Pedagogy
Group B	Gender	Age	Year	Major	Minor
P11	F	26	3	French	Spanish
P12	F	35	3	French	Spanish
P13	F	21	2	Spanish	German
P14	F	26	3	Italian	Spanish
P15	F	21	2	Spanish	Multiculturalism
P16	F	27	2	Spanish	Italian
P17	F	24	3	German	Spanish
P18	F	19	2	Spanish	French
P19	F	23	2	Spanish	Phonetics, Estonian
P20	F	27	2	Spanish	Tourism, Cultural History

The French language group consisted of eight women and two men (age range: 19–24 years). Six (6) of these participants were first-year students, four (4) were at least third-year students, and seven (7) had French as a major and three (3) as a minor subject. In this case, the major subject was English

or Swedish. The Spanish language group comprised ten women (age range: 19–35 years); six (6) of them were second-year students and four (4) at least third-year students. In addition, six (6) of the group had Spanish as a major and four (4) as a minor subject. In this case, the major was French, Italian or German.

All students participated voluntarily and received feedback on the tasks. The tasks were evaluated only for the use of the study; the results did not affect the participants' course evaluations. The data were analysed independently by both researchers, and disagreements about interpretations regarding, for instance, the correct answers were discussed and resolved. In this article we will concentrate on the first and second tasks of the study (see Figure 1 below). The awareness raising intervention and its impact on search paths and strategies are discussed in Mutta *et al.* (2014).

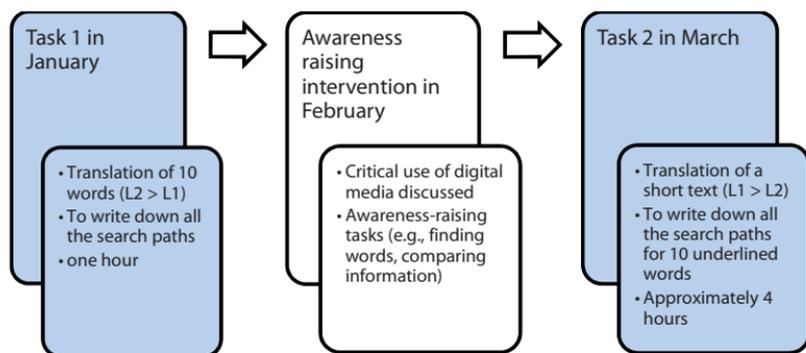


FIGURE 1. The steps of the three-part study.

The tasks presented here were conducted in the following manner. The first task was a translation of 10 words from French or Spanish to Finnish during one lesson. The time for this task was limited to one hour. Short instructions were given in Finnish to explain the task and the subject areas of the words, which were partly different because of cultural differences between the languages but belonged to the same subject area (gastronomy, education, geography, animals or biology, culture, and economy) (see Table 2 below). Note that even if some of the words could be found quite easily in English

through Google or Google Translate, for instance, the participants had to make several queries before finding the corresponding Finnish equivalent. The participants were asked to write down all the search paths they made. Before the second task, teachers presented an awareness raising intervention on the critical use of digital media.<sup>3</sup>

TABLE 2. Requested words of Task 1.

	Subject area	French/Spanish	English
1	Gastronomy	la galette des rois / el roscón de reyes	king cake
2	Education	le mémoire de master / el centro educativo concertado	master's thesis / state financed private school
3	Geography	la calanque / los bufones	calanque / blowholes
4	Biology / Animals	le couteau arqué / la navaja	razor shell
5	Culture	L'Assomption / Las Fallas	Assumption of the Virgin Mary / traditional celebration in commemoration of Saint Joseph in the city of Valencia
6	Economy	le taux plafond / el copago	interest rate cap / co-payment
7	Biology / Animals	le plongeon catmarin / el colimbo chico	red-throated diver
8	Education / Work	le CAPES / las oposiciones	secondary-school teaching diploma / public examinations for vacancies in the public sector
9	Gastronomy	les tripes / las migas	tripe / Spanish dish based on crumbs
10	Economy	le prêt hypothécaire inverse / las actividades de bajo valor añadido	reverse mortgage / low value added activities

3 During the intervention, topics such as expertise in language, contemporary digital, multi-modal and media literacy, and meta-cognitive awareness were discussed. The pedagogical intervention was based on the following studies: Chevalier & Tricot (2008); Dervin *et al.* (2007); Jewitt (2006); Johansson & Dervin (2007); Marcoccia (2012); Manganot (2012); and Metros (2003). The intervention also contained awareness raising tasks, such as finding words, comparing information found from different sources, evaluating the trustworthiness of Wikipedia as a digital information source, and the appropriateness of Google Translate as a tool in translation tasks.

The second task was a translation of a short popular science text from Finnish to French or Spanish with 10 words requiring further translation commentary. The same text was used for both groups. Brief instructions were given in Finnish, and it was requested that the participants translate the whole text and write down all the search paths used for the underlined words presented in Table 3:

TABLE 3. Requested words of Task 2.

	Ten underlined words	French/Spanish	English
1	aivovaste	réponse neuronale, cérébrale / respuesta cerebral	neural response
2	musisoiva	pratiquer une activité musicale / practicar música	instrument-playing
3	tarkkaavaisuus- taidot	capacité de concentration / capacidad de atención	concentration capacity
4	käyttätymis- tieteiden laitos	Institut des Sciences Comportementales / Departamento Ciencias del Comportamiento/ de la Conducta	Institute of Behavioural Sciences
5	dosentti	docteur (HDR) / doctor habilitado	adjunct professor (PhD)
6	aivosähkökäyrä	électroencéphalogramme / electroencefalograma	electroencephalography
7	osoittaa	(dé)montrer / demostrar, poner de manifiesto	show
8	muokkaantumiset	modifications / modificaciones	modifications
9	muskari	atelier musique pour enfants, atelier d'éveil musical / clases de iniciación musical	playschool involving musical activities
10	ryhmäopetus	enseignement en groupe / enseñanza en grupo	group work

Through these two tasks, it was determined which strategies and arguments were used by these students in the process of searching for and finding the relevant information. In addition, the aim was to understand what types of seekers' profiles emerged among the students. The categorization of their information seeking strategies and paths relied on earlier studies examining the use of search engines (Google) and multilingual online dictionaries (Massey & Ehrensberger-Dow 2011; Salmi & Chevalier 2010). A grounded approach was also used, which means that some categories emerged from

the students' own responses, such as the use of Wikipedia and their own implicit decision-making (cf. Woore 2010).

## 4 Results

The queries made by students were categorized into six search groups: **Google queries** including any options used (e.g. Translate, Images, advanced search) (**G**); **Wikipedia queries** in all languages (**WP**); **MOT** online dictionary searches in all languages (**M**); **other bi- or multilingual dictionary queries** (**O**); **monolingual dictionary queries** (**ML**); and the participants' **own implicit and/or explicit knowledge with decision making** (**Own**). The last category refers to activities including the participants retrieving a word from memory or deducing the meaning themselves without consulting a dictionary. Example 1 illustrates the categorization as M + G [= MOT and Google] – the text the participant wrote is translated from Finnish:

- (1) *tarkkaavaisuustaito* 'concentration capacity' (Task 2): I checked the word corresponding to 'capacity' from MOT-dictionary, which gave the answer *taito* (*kyky*) = *capacité*. Then I combined it to [and made] a form *capacités d'attention* and checked by means of Google if this combination should give some search results [P8]

It should be noted that all queries were calculated from explicitly indicated queries, even if they might include others that are implicit and thus not verbalised.

### 4.1 Queries and task complexity

The results indicate that the total number of queries made by Group A and Group B increased from Task 1 to Task 2. However, there was an increased number of queries from Task 1 to Task 2 at the group level in Group A but not in Group B. Table 4 shows all the queries made by the participants in the two tasks:

TABLE 4. Number of different queries made in Task 1 and Task 2.

	Task 1	Task 2
Group A	185	270
Group B	317	278
$\Sigma$	502	548

In Task 2, the time per task was approximately 4 hours in both groups, varying from 2.5 to 6.5 and from 2.5 to 8 hours in French and Spanish respectively. Some participants commented that the search time was longer because, in addition to the translation task, they had to write down the search paths for the 10 underlined words. The multiformity of this task could explain why some individual participants had fewer explicit queries in Task 2 than in Task 1.

Moreover, the results indicate that across the whole data range (Groups A and B), the explicit queries from Google and Wikipedia decreased slightly from Task 1 to Task 2 (39.8% vs. 38.4% and 18.9% vs. 9.1%, respectively). The use of other categorised sources increased from Task 1 to Task 2: namely MOT (21.1% vs. 24.5%); other dictionaries (15.5% vs. 18.8%); monolingual dictionaries (1.4% vs. 3.1%); and the student's own knowledge (2.2% vs. 6.6%). In addition, there was a great deal of individual variation in both groups, which is not discussed further here (see more in Mutta *et al.* 2014).

The search task was considered objectively quite complex. On the basis of the results related to the time spent on this task and its relative success and/or failure (see below), it appears that the task varies in objective and subjective complexity (cf. Singer *et al.* 2013). Some words that we considered simple to search for generated several queries, such as *galette des rois / el roscón de reyes* 'king cake' (Task 1); whereas some complex words generated fewer queries than expected, such as *musisoiva* 'instrument-playing' (Task 2). The subjective complexity is also observed in the long search paths encountered for seemingly easy words when students tried to understand the functionality of the word in a specific context. It appears that the main reason for these differences is individual search behaviour, which is discussed next.

## 4.2 Information seekers' profiles

Regarding the individual paths taken, our study reveals different profiles of information seekers in both groups. We can refer to them as *go-straight-forward seekers*, *advanced seekers* and *rely-on-your-own-intuition seekers*, i.e. those who trust in their own language skills, knowledge and judgement. It is noteworthy that these profiles represent general tendencies on the part of individuals and that there was some variation related to specific words; this might be related to the subjective complexity and familiarity of these words. The go-straight-forward seekers just checked the dictionary and maybe one other source (see Example 1 above). For their part, the advanced seekers' paths were highly diverse, including both queries made in dictionaries and several pages on the internet to find the best alternative available. Examples 2–7 reflect advanced seekers' paths:

- (2) *copago* 'co-payment' (Task 1: economy): M (Spanish) + ML (RAE) + G (Spanish) + G (Spanish) + M (English) + M (Spanish) + O (Eur-Lex) + G (Finnish) + G (Spanish + Finnish) + O (ProZ.com) = 11 different sources used. [P11]
- (3) *navaja* 'razor shell' (Task 1: animals or biology): M (Spanish) + O (IATE) + ML (RAE) + M (Spanish) + M (Spanish) + M (Spanish) + G (Image, Spanish) + G (Image, Finnish) = 8 different sources used. [P19]
- (4) *la galette des rois* 'king cake' (Task 1: gastronomy): G (French) + WP (English) + WP (Finnish) + G (image) = 8 different sources used. [P3]
- (5) *tarkkaavaisuustaito* 'concentration capacity' (Task 2): G (Finnish) + G (Duodecim) + O (suomisanakirja) + G (English) + G (English) + G (English) + O (linguee) = 7 different sources used. [P9]
- (6) *käyttäytymistieteiden laitos* 'Institute of Behavioural Sciences' (Task 2): O (WSOY) + O (linguee) + G (French) + WP (French) + G (French) + MOT (French) + G (French) = 7 different sources used. [P3]
- (7) *muskari* 'playschool involving musical activities' (Task 2): M (Finnish) + MOT (Finnish) + G (Spanish) + M (Finnish) + G (Spanish) + G (Spanish) = 11 different sources used. [P11]

These examples reveal how complex the search paths might be. Furthermore, the search paths characterise clearly the mindset of an advanced seeker. Such seekers were not content with the first option they found; they used alternate sources, often in different languages, and attempted to confirm the suitability of their answer. Their activity was underlined by reflection and searching for exactitude. However, it could also be argued that multiple queries and complex paths are a sign of a measure of insecurity in their seeking process due either to poor L2 competence or some personal attributes of the seeker. Thus, in spite of several queries, advanced seekers did not always succeed in their seeking process (see below).

Finally, in Group B, the rely-on-your-own-intuition seekers were usually students who had, for example, spent time in a Spanish-speaking country, whereas in Group A, their own expertise was often related to previous knowledge of another language such as English. Example 8 shows the typical trail of an information seeker relying on their own knowledge, apparently without hesitation; whereas Example 9 illustrates the use of meta-knowledge acquired from previously-learned languages:

- (8) *muokkaantumiset* 'modifications': I used the same word as modify, so, I do not need here any query. [P12]
  
- (9) *aiovaste* 'neural response': I remembered that the word corresponding to *aiovaste* is *neural response* in English, and so I decided to use Google and to see what results the keyword *réponse neurale* would give. [P8]

As in some earlier studies (Singer *et al.* 2013), it is difficult to distinguish a successful from an unsuccessful search in terms of task time or number of queries. In Examples 1–4 and 7–9 the students did find the correct answer for their queries; but in Examples 5 and 6, besides exploring several sources, the student did not succeed in finding the correct equivalent. To sum up, in Task 1, 34% of the translations of single words were erroneous in the whole data range (68 out of 200 words). The number of errors alternated from 0 to 8 (10 words per person) and the queries from 8 to 52. It is notable that in Group A, several students did not have time to end the task in the time allotted; in fact, only 77 words out of 100 were found. In Task 2 the results were quite similar: 38.5% of the translations were incorrect (77 out of 200 words), the number

of errors varied from 0 to 8 (10 words per person) and the queries from 14 to 53. That is, the participants could make 21 or 51 queries with 2 errors in the translation of the asked word or 26 queries with 1 or 6 erroneous answers.

All in all, this result indicates that a high number of queries did not necessarily lead to the correct answer. However, there is a slight difference between the groups. In both tasks, Group A made more errors than Group B: 36 (53%) vs. 32 (47%) in Task 1 and 50 (65%) vs. 27 (35%) in Task 2. One plausible explanation for the differences between Groups A and B might be the different ages of the participants and their acquired language skills, as they each took the course at a different stage of their studies. Students in the Spanish group (B) took the course later in their studies and were older than those in the French group (A). In addition, all students in the Spanish group (B) had completed at least two term-long Spanish translation courses before taking part in this particular course, whereas in the French group (A), the participants had completed one term-long translation course. Moreover, students with French or Spanish as a minor subject might have completed equivalent courses in their main area of study.

### **4.3 Strategies used for finding information**

As outlined previously, digital literacy consists of two dimensions in which participants use different strategies. The first dimension is the relevant use of search engines. In this study the first overall strategy was that all the participants used Google, which indicates that they formulated a search phrase containing one or more words and typed it in the text box. Advanced search methods related to the formulations also included the use of the different search possibilities available in Google. Among these, the participants used Google Images and Google Translate. The second dimension of digital literacy is skills that are directly language-related or other semiotic competences with digital texts. Here, the selection and finding of relevant information in another language when using Wikipedia or Google was a major strategy. Participants went to the Wikipedia article dealing with the topic in French and then changed the language within Wikipedia to open the corresponding article in Finnish, if it existed. If the article did not exist in Finnish, the participants sometimes accessed it in

another language they were familiar with (usually English). Furthermore, another strategy involved the use of a third, intermediate language to find some more information about the topic. Latin in particular was used as an intermediate language in those questions dealing with animals or biology (Task 1). There, the participants would first find a page about the topic in the source language (Task 1); then look up the scientific (Latin) name of the plant or animal on that page; and finally use the Latin name with the language preference option to find its name (and its taxonomic family) in the target language.

Increased use of the online dictionary MOT in both groups and other dictionaries in Group A most likely reflects the nature of the second task, as it can be classified as a complex information search task in which the students were asked to translate a text into a foreign language. In fact, the results indicate that in both tasks, MOT was the first step taken in the process of searching out adequate solutions for the words in Group B. In Group A, for its part, the trajectory of the search path was slightly different. In both tasks, the participants started their search most often with Google or other dictionaries, even if the use of MOT also increased in this group from Task 1 to Task 2.

## **5 Conclusion**

We can conclude that some of the results corroborate earlier studies. Searching for information on Google and other online search engines were the most widely used information seeking strategies (Massey & Ehrensberger-Dow 2011). However, the students developed several individual search paths to complete the tasks. Advanced search methods included the use of the different search possibilities available in Google (Google Images and the language preference option). On several occasions, students used multilingual search strategies (including, for example, English) to find the appropriate answer or translation equivalent. English was systematically used by some participants who were first-year students of French or had French as their minor subject. In this case, two possible reasons are suggested: they felt more comfortable with English than with French, and more information elements are posted in

English on the web (cf. Aula & Kellar 2009). We could distinguish three main seekers' profiles: *go-straight-forward seekers*, *advanced seekers* and *rely-on-your-own-intuition seekers*.

To answer the second research question about whether the seeking behaviour or seeking paths diverge in different tasks, we can conclude that our participants' profiles tend to remain the same between these two tasks, even if the awareness raising intervention might have affected their choices in Task 2 and made some of them more conscious and critical of their use of sources; this is not discussed further in this article (see Mutta *et al.* 2014). Some participants made many queries, even for words that were considered simple; others made only a few queries for the same words. This result might be related to their language competence, their translation experience and/or familiarity with the words being searched for. In this study, task complexity was revealed to be partly a subjective measure (cf. Singer *et al.* 2013). We also found that the number of queries used was not related linearly to the correct answer. Furthermore, the time available per task might also have affected the results: in Task 1, the participants had only one hour at their disposal; for Task 2, time on task was not limited.

As for to limitations, the study's design as a mainly small-scale qualitative one prevents any generalization about the results to the wider population. The results were affected by individual variation, which was partly due to the heterogeneity of the groups (different age groups and/or proficiency levels; and different background factors related to the course). Further research is required to determine whether the strategies described here are characteristic of other similar learning contexts: for instance students from other disciplines, students with different linguistic backgrounds or more advanced learners in their studies. It is possible that the participants' behaviour was influenced by the time on task. A study design where logging user behaviour is combined with a think aloud method could make the use of explicit queries more reliable.

In this learning context, the students showed engagement with and aptitude for critical assessment and critical use of digital technologies and information sources. They could also use multiple seeking paths and strategies to do so. However, this study confirms that, in spite of their

multiple skills with technological devices, social media or navigating the internet, today's digital natives still lack some critical knowledge in their information seeking competences. It is not about the quantity of queries, but their quality and the persistence required to find the information sought after. Increasing awareness of and training in digital literacy is therefore an indispensable part of the process. These digital natives still need further scaffolding to support them on their way of becoming digitally literate experts in their future careers.

## References

- Al-Eroud, A. F., M. A. Al-Ramahi, M. N. Al-Kabi, I. M. Alsmadi & E. M. Al-Shawakfa 2011. Evaluating Google queries based on language preferences. *Journal of Information Science*, 37 (3), 282–292.
- Aula, A. & M. Kellar 2009. Multilingual search strategies. In D. R. Olsen Jr., K. Hinckley, M. Ringel Morris, S. Hudson & S. Greenberg (eds) *CHI Proceedings of the 27th international conference on human factors in computing systems*. Boston, MA, 3865–3870. Available at DOI: 10.1145/1520340.1520585.
- Barton, D. & C. Lee 2013. *Language online: investigating digital texts and practices*. London: Routledge.
- Byström, K. & K. Järvelin 1995. Task complexity affects information seeking and use. *Information Processing & Management*, 31 (2), 191–213.
- Chevalier, A. & A. Tricot 2008. *Ergonomie des documents électroniques*. Paris: Presses universitaires de France.
- Cope, B. & M. Kalantzis 2010. New media, new learning. In D. R. Cole & D. L. Pullen (eds) *Multiliteracies in motion*. London: Routledge, 87–104.
- Dervin, F., M. Johansson & M. Mutta 2007. Écriture académique: collaboration multimodale et co-constructions identitaires en FLA. *Synergies*, 2, 93–106.
- Dobson, T. & J. Willinsky 2009. Digital literacy. In D. R. Olson & N. Torrance (eds) *The Cambridge handbook of literacy*. New York: Cambridge University Press, 286–312.
- Dommes, A., A. Chevalier & S. Lia 2011. The role of cognitive flexibility and vocabulary abilities of younger and older users in searching for information on the Web. *Applied Cognitive Psychology*, 25, 717–726.
- Gere, C. 2008. *Digital culture*. London: Reaktion Books.
- Gilster, P. 1997. *Digital literacy*. New York: John Wiley & Sons.
- Guitert, M. & T. Romeu 2009. A digital literacy proposal in online higher education: the UOC scenario. *eLearning Papers*, 12, 1–15.
- Gutiérrez, A. & K. Tyner 2012. Media education, media literacy and digital competence. *Comunicar*, 38, 31–39.
- Jewitt, C. 2006. *Technology, literacy, learning. A multimodal approach*. London: Routledge.

- Johansson, M. (forthcoming). Reading digital news: participation roles, activities, and positionings.
- Johansson, M. & F. Dervin 2007. Choix en matière de curriculum à l'université finlandaise et expertise à l'oral. *Travaux de didactique du FLE de l'Université Paul Valéry*, 57, 27–46.
- Kalantzis, M. & B. Cope 2012. *Literacies*. Cambridge: Cambridge University Press.
- Kress, G. 2003. *Literacy in the new media age*. London: Routledge.
- Mackey, T. P. & J. Ho 2005. Implementing a convergent model for information literacy: combining research and web literacy. *Journal of Information Science*, 31 (6), 541–555.
- Mangenot, F. 2012. Ecrire avec l'ordinateur: du traitement de texte au web social. *Le français dans le monde*, 51, 107–116.
- Marcoccia, M. 2012. Conversationnalisation et contextualisation: deux phénomènes pour décrire l'écriture numérique. *Le français dans le monde*, 51, 92–106.
- Martin, A. 2005. DigEuLit – a European framework for digital literacy: a progress report. *Journal of eLiteracy*, 2, 130–136.
- Massey, G. & M. Ehrenberger-Dow 2011. Investigating information literacy: a growing priority in translation studies. *Across Languages and Cultures*, 12, 193–211.
- Metros, S. 2003. *Upgrading the “e” in e-learning from “electronic” to “engaged”*. Plenary address to the Ninth Sloan-C International Conference [accessed May 22, 2014]. Available at <http://sloanconsortium.org/conference/proceedings/2003/plenary.htm>.
- Mutta, M., S. Pelttari, L. Salmi, A. Chevalier, A. & M. Johansson 2014. Digital literacy in academic language learning contexts: developing information-seeking competence. In J. Pettes Guikema & L. Williams (eds) *Digital literacies in foreign and second language education*. CALICO monograph series, volume 12. Texas State University: Computer Assisted Language Instruction Consortium (CALICO), 227–244.
- Newrly, P. & M. Veugelers 2009. How to strengthen digital literacy. Practical example of a European initiative “SPreaD”. *eLearning Papers*, 12, 1–9.
- Olson, D. R. & N. Torrance (eds) 2009. *The Cambridge handbook of literacy*. New York: Cambridge University Press.
- Pinto, M. & D. Sales 2007. A research case study for user-centred information literacy instruction: information behaviour of translation trainees. *Journal of Information Science*, 33 (5), 531–550.
- Pinto, M. & D. Sales 2010. Insights into translation students' information literacy using the IL-HUMASS survey. *Journal of Information Science*, 36 (5), 618–630.
- Salmi, L. & A. Chevalier 2010. Recherche d'informations sur Internet – stratégies des internautes en fonction de leur profil. Paper presented at the *6th Conference of the European Society for Translation Studies, 'Tracks and Treks in Translation Studies'*, 23–25 September 2010, University of Leuven, Belgium.
- Singer, G., U. Norbirsath & D. Lewandowski 2013. Ordinary search engine users carrying out complex search tasks. *Journal of Information Science*, 39 (3), 346–358.

- The New London Group = Cazden, C., B. Cope, N. Fairclough, J. Gee, M. Kalantzis, G. Kress, A. Luke, C. Luke, S. Michael & M. Nakata 1996. A pedagogy of multiliteracies: designing social futures. *Harvard Educational Review*, 66 (1), 60–92.
- Thurlow, C. & K. Mroczek 2011. Introduction: fresh perspectives on new media sociolinguistics. In C. Thurlow & K. Mroczek (eds) *Digital discourse: language in the new media*. New York: Oxford University Press, ix–xlv.
- UNESCO 2008. *Teacher training curricula for media and information literacy*. Report of the International Expert Group Meeting. Paris: UNESCO [accessed January 13, 2014]. Available at [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=27508&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=27508&URL_DO=DO_TOPIC&URL_SECTION=201.html).
- Woore, R. 2010. Thinking aloud about L2 decoding: an exploration of the strategies used by beginner learners when pronouncing unfamiliar French words. *Language Learning Journal* 38 (1), 3–17.
- Yaari, E., S. Baruchson-Arbib & J. Bar-Ilan 2011. Information quality assessment of community generated content: a user study of Wikipedia. *Journal of Information Science*, 37 (5), 487–498.