Information literacy skills of Greek high-school students: results of an empirical survey[1]

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Abstract. In this paper we explore information literacy skill levels among high-school students and the need to incorporate information literacy in the education process in Greek secondary education. More specifically, a survey was conducted among first year high-school students in Thessaloniki, Greece. The procedure provided 344 usable questionnaires. The results of the study suggest that first year high-school students in Greece are accustomed to using computers in their daily live, they use the Internet to satisfy personal needs, but they have problems in locating and evaluating information for school work. The findings of the present study clearly suggest the need to embed information literacy instruction into secondary education, and also the need to create an online information literacy tutorial. Therefore, an online information literacy tutorial is being developed in line with Big6 model and constructivist approaches.
Keywords: Information literacy, online tutorial, high-school students, education process, Greece

1. Introduction

In the last two years the Greek Ministry of Education has introduced the notion of information literacy skills in elementary and secondary education. Under this perspective, Greek secondary education promotes – at least in theory – independent learning, as well as the skills of seeking, gathering and using information ethically. In addition, the Ministry has introduced more student-centred methods of teaching, such as the project method in the first grade of Lyceum, which presupposes papers and written assignments and the development of information literacy skills. However, most public schools have no libraries, or their libraries are not well-organized. Therefore, the main purpose of the present study was to explore information literacy skill levels

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among high-school students in Greece. It has been argued that in the education sector the examination of student abilities across multiple institutions reveals that levels of information literacy are influenced by gender, race, disciplinary domain and, potentially, year level (Bruce, 2000). Therefore, the research questions addressed in this paper are as follows:

- How do students gather and use information?
- Do students have the necessary skills to retrieve, use and evaluate information?
- How do students evaluate themselves regarding information literacy skills?
- How do certain background characteristics affect perceived information literacy skills?

2. Literature Review

It seems that worldwide Internet is the main source of information for high-school students. Although there is some evidence that there is still a preference for print materials (Nielsen and Borlund, 2011), or for useful library resources (Head 2007), several studies indicate that there is a decline in the use of print reference sources in favour of electronic ones, and that students feel more comfortable finding and using electronic information (Lanning and Turner, 2010; Merchant and Hepworth, 2002). At the same time, some studies have found that students lack the skill and experience necessary to construct efficient and sophisticated search strategies, as well as to evaluate the retrieved resources (Burton and Chadwick, 2000; Jackson and Hansen, 2006; Julien and Barker, 2009; Lorenzen, 2001; Merchant and Hepworth, 2002; Rehman and Alfaresi, 2009). As a result, may authors have recognized the need for programmes that will help students identify the information they need, select the appropriate information and use it effectively to solve problems or meet information needs (Branch, 2002; Burke, 2002; Brown *et al,* 2003; Bruce, 2004; Hay, 2005; Julien and Barker, 2009; Lanning and Turner, 2010; Magara and Nyumba, 2004; Mardis, 2003; Massey *et al,* 2005; McLelland, 2004; Merchant and Hepworth, 2002). It seems that, in order to be more effective, an information literacy programme should take into consideration certain factors. For better results, the instruction should be of relevance to students' lives, learning styles, and information requirements (Brown et al, 2003). Another important factor that seems to influence information literacy is gender. The literature worldwide reveals gender differences in the use of information and technology and a relationship between gender and information literacy with inconclusive results (Steinerova and Susol, 2007; Liu and Sun, 2012; Schumacher and Morahan-Martin, 2001; Weil and Rosen, 1995; Baro and Fyneman, 2009). For instance, Liu and Sun's (2012) findings indicated that males were better than females at three out of the four aspects of information literacy, namely information consciousness, information competency and information ethics, while Songsaengchan, Chansawang and Prapinpongsakorn (2008) found that female students had higher information literacy level than male students. Studies measuring the effect of information literacy programs also indicate a connection

between information literacy on one hand and students' performance and academic achievement on the other (Bowles-Terry, 2012; Cameron et al., 2007; Glendale Community College, 2005; Gross and Latham, 2007; Katz et al., 2008; Wong & Cmor, 2011; Scharf et al., 2007). Library instruction has been found to correlate positively with student performance (Bowles-Terry, 2012; Wong & Cmor, 2011) and levels of information competency are associated with greater GPAs and both short-term and long-term student success (Cameron et al., 2007; Glendale Community College, 2005; Katz et al., 2008).

3. Research Design

In order to address the research questions, a census survey was conducted among students of high-schools. The study focused on 15 year old male and female students enrolled in the first class of Lyceum, where the project method has been recently introduced in teaching. A convenient sample of 344 students participated in the study. Students were recruited from 6 schools in the urban area of Thessaloniki, Greece.

4. Results

4.1 Students' Profile

Descriptive statistics indicated that 45.1% of the sample was male and 54.9% were female. 18.6% of the students had "excellent" grades at the end of the first semester, while 28.5% and 29.4% had received "very good" and "good" grades correspondingly. In addition, t- test revealed that girls tended to have higher grades than boys. The vast majority of the respondents (73.7%) stated that they had started using computers at Primary School, while slightly above 50% of them had access to the Internet at Primary School. Almost every student (95.9%) had access to a PC at home, but fewer (86.6%) had access to the Internet. Regarding computer and Internet use, 25.9% and 23.3% of the students claimed to spend "1-2 hours" and "more than 3 hours" per day respectively using PC and 27% and 24.7% respectively using the Internet. Also, t-test indicated that boys were heavier users than girls. However, only one third of them were searching the Internet for both personal and educational reasons and 58.4% only for personal reasons. "Facebook/blogs" and "music/movies downloads" seemed to be the most popular applications, used by 24.9% and 20.8% correspondingly. On the other hand, less popular applications were software design, programming languages, and discussion groups. Of the 344 students who participated in the present study, 117 (34%) were library users and of these, only 24 characterized themselves as heavy users.

Participants were also asked to state the number of assignments that they had done throughout the current school year, and the information sources they had used in order to accomplish them. Almost 70% of the students reported that they had accomplished short papers, 47% of the students had written long term papers, while 58.4% of the students had given oral presentations in the class (Table 1).

Table 1. Assignments that students accomplish

	None (%)	1 to 2 (%)	3 to 5 (%)	>5 (%)	Total (%)
Short paper assignments	30.4	43.2	19.5	7	100
Long paper assignments	53	30.1	7.8	9.1	100
Oral presentations	41.6	41.3	10.6	6.4	100

With regard to the information sources used for school purposes, descriptive statistics showed high use of the Internet (73.6%) and Encyclopedia/Dictionaries (69.5%), lower use of printed books/manuals (56.3%) and newspapers (49.2%), and even lower use of printed journals and magazines (26.3% and 33.6% correspondingly). For more details see Table 2.

Table 2. Use of Information sources

	None (%)	1 to 2 (%)	3 to 5 (%)	>5 (%)	Total (%)
Books/Manuals	43.7	30.9	11.9	13.5	100
Printed journals	73.7	19.4	6	0.9	100
Printed Magazines	66.3	23.4	7.6	2.6	100
Encyclopedia/Dictionaries	30.6	34.9	17.6	17	100
Newspapers	50.8	25.5	12.3	11.4	100
Internet	26.4	16.7	17.7	39.2	100

Spearman correlations were used to examine the relation between assignment preparation/use of information sources and school performance.

Table 3. *Correlations among students' school behaviour and mid-term grades*

	Grades	
	Correlation Coefficient	Sig. (2-tailed)
Assignments		
Short paper assignments	.237[**]	.000
Long paper assignments	.150[**]	.007
Oral presentations	.030	.590
Information sources		
Books/Manuals	.268[**]	.000
Printed journals	.082	.142
Printed Magazines	.116[*]	.044
Encyclopedia/Dictionaries	.346[**]	.000
Newspapers	.058	.294
Internet	.239[**]	.000

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As presented in Table 3, positive correlations emerged between "short or long paper assignments" and grades. Grades also correlated positively with students' use of all information sources, except journals and newspapers.

4.2 Students' information literacy perceived competencies
Students were asked to evaluate themselves regarding ten different information literacy competencies on a 4-point Likert-type scale, ranging from "0=not at all" to "3=very well", while there was an additional option "I cannot evaluate". Descriptive statistics (Table 4) indicated a rather moderate level of perceived information literacy skills, as in most items the majority of students chose the "enough competent" option. However, the majority of students felt very competent when "Retrieving information from Internet" (76.1%) and "Evaluating Internet search results" (49.9%) but "not at all" and "little" competent when they had to use a library catalogue (34.2% and 28.6% correspondingly).

Table 4. Perceived information literacy competencies

	Not at all (%)	Little (%)	Enough (%)	Very (%)	Cannot evaluate (%)	Total (%)
Describing the subject using keywords	5.0	26.3	**48.7**	15.9	4.1	100.0
Planning / organizing a research project	4.4	19.5	**46.4**	25.7	4.1	100.0
Compiling bibliography	11.9	**31.0**	**26.0**	24.8	6.3	100.0
Citing	7.9	17.1	**33.2**	**36.8**	5.0	100.0
Distinguishing journal from magazine	12.7	14.5	**30.7**	**35.1**	7.1	100.0
Using table of contents and indexes	13.4	23.4	**32.0**	25.8	5.3	100.0
Using reference sources	10.9	22.6	**27.6**	**36.1**	2.9	100.0
Using Library's catalog	**34.2**	**28.6**	17.0	8.0	12.2	100.0
Retrieving information from Internet	2.1	4.1	14.7	**76.1**	2.9	100.0
Evaluating Internet search results	2.9	10.0	32.3	**49.9**	5.0	100.0

With regard to the search techniques employed by students to retrieve relevant information, the simplest and most common techniques like "one keyword" and "more than one keywords" were used "quite often" and "very often" while more

advanced techniques like "searching within results" or "searching for similar results" were used "rare" or "never" (Table 5).

Table 5. Search techniques

	Never (%)	Rare (%)	Often (%)	Quite Often (%)	Very Often(%)
Keyword	6.1	12.4	21.7	**26.6**	**35.5**
More than a keyword	6.5	9.2	18.6	**31.0**	**35.5**
A phrase (using quotations)	**24.5**	**25.4**	18.6	15.2	13.1
Searching within results	**30.0**	**24.8**	19.2	14.6	10.7
Searching for similar results	**32.9**	**28.2**	22.0	12.7	5.1
	100.0	100.0	100.0	100.0	100.0

Results also indicated that students were not frequent evaluators of the information they used. Over half of the respondents (51.8%) had "never" or "seldom" applied any of the criteria usually used for the evaluation of information sources, while 23.7% used "quite often" or "very often" at least one of them. When evaluating their sources, participants most often considered the "abstract of the source", followed by the "title of the source", and the "author/creator".

5. Discussion

The majority of the respondents have been exposed to computers since they were in primary school, a finding clearly suggesting that high-school students in Greece are quite familiar with information technology. However, only one third of the students were searching the Internet for both personal and educational reasons, while more than half of the sample used Internet only for personal reasons. There is evidence in the literature that the Internet is primarily conceived by high-school students as a means of communication and as a vast repository of music and films (D'Esposito & Gardner, 1999; Machmias, Mioduser & Shemla, 1999; Pivec, 1998; Sjoberg, 1999). When the students in our survey were asked to indicate what sources they used for school purposes, they reported a preference of Internet over encyclopedias, books and other printed materials. Although slight, this tendency towards Internet is in line with findings of previous studies (Fidel et al., 1999; Williams, 1999; Lorenzen, 2001; Julien & Barker, 2009). On the other hand, survey respondents did not seem to rely much on libraries, a finding that confirms previous studies. It has been observed that many students enter colleges and universities without having used a library before (Pavey, 2006). It has been also argued that young students are unfamiliar with the traditional library environments, which are by large text-based, "require learning the system from experts (librarians), were constructed for individual use, and assume that work progresses in a logical, linear fashion"

(Lippincott, 2005, p. 13.2). However, the finding of the present study regarding low library use is also connected to local peculiarities. School libraries have not thrived in Greece for several reasons: they have not been treated as an integral part of the educational system; they have not been connected to the teaching process; they have been regarded as redundant in a centralized, teacher-centered system, where teaching is limited to a single textbook (Arvaniti, Kyridis & Dinas, 2007; Papazoglou, 2002). In most cases, school libraries are underfunded, they are staffed by school teachers instead of trained librarians and they have a small collection, usually consisted primary of encyclopedias, dictionaries and literature books, not always accessible by all students (Papazoglou, 2002). One of the research objectives of the present study was to explore how students evaluate themselves in certain information literacy skills. The majority of them felt very capable of "Retrieving information from the Internet". Next in the row was "Evaluating Internet search results", followed by "Citing sources" and "Using reference books/sources". In all other tasks students felt less efficient. With regard to search techniques, students seemed that were not very familiar with advanced techniques. As for evaluating the retrieved sources, most of them did not seem to use any of the criteria mentioned in the questionnaire. These results are consistent with the findings of other studies which found that students lack the skill and experience to construct efficient and sophisticated search strategies, as well as to evaluate the retrieved resources (Burton & Chadwick, 2000; Jackson & Hansen, 2006; Julien & Barker, 2009; Lorenzen, 2001; Merchant & Hepworth, 2002; Mittermeyer, 2005; Rehman & Alfaresi, 2009). A possible explanation for the relatively low level of search competence observed in the students surveyed may be that they acquired searching skills on their own, without any formal training, and as a result, they used the simplest and most common techniques for retrieving information. Williams and Rowlands (2006) argued that "contrary to the popular view, there is little evidence that young people are expert searchers, or even that their search prowess has improved with time" (p. 9) and attributed this lack of increase in information retrieval proficiency "to the perceived ease with which digital systems (as exemplified by the Web) can be searched" (p. 10).

6. Conclusions
The findings of the present study clearly suggest the need to embed information literacy instruction into secondary education, with information literacy learning outcomes incorporated in the curriculum. Towards this end, an online information literacy tutorial is currently being developed in line with Big6 model and constructivist approaches (Togia et al., in press). The Big 6skills model, produced by Mike Eisenberg (http://www.big6.com), is useful for problem solving; it is adaptable in any situation; it is considered ideal for integrating information literacy learning with all subject area curricula at all grade levels; and it is not a linear or step-by-step process. The online information literacy tutorial has been designed to consist of six basic sections, following the structure of Big 6skills model: (1) *Task definition*. This section is

designed to help students become capable of a) defining the problem and b) identifying the information needed.

(2) *Information seeking strategies*. This section refers to the process of determining all possible information sources and selecting the best ones; Students are suggested to brainstorm and narrow the selected sources up to the most appropriate. (3) *Location and access*. By the end of this section the students will be able to able to locate sources and find information into the sources. (4) *Use of information*. This unit refers to the process of engaging in information (e.g. reading and hearing), as well as extracting relevant and quality information; It is very important for the students to understand how to find relevant information to their topic. (5) *Synthesis*. This unit is designed to help students a) organize information from different sources and b) present the information. Students understand issues referring to copyright and how to include bibliography and citations in their papers. (6) *Self-evaluation*. The last section includes tests with feedback. This sixth unit replaces the sixth section of Big6 skills which refers to the process of judging the result and the process of information seeking.

Delivering information literacy instruction through a web-based tutorial has many advantages over traditional instruction: it allows students to control the learning process and become independent learners; it facilitates repetitive learning; it allows students to click and jump to the desired session, thus encouraging non-linear learning and maximizing the possibility of learning at point of need; it incorporates multimedia and simulation components, providing learning stimuli and authentic learning experiences (Su & Kuo, 2010). The aforementioned tutorial can be used either by students for independent study or by teachers and librarians as a useful tool for teaching information literacy skills.

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