Standardization of an online tool for tracing electronic dictionary users' strategies

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Abstract
In order to be efficient in understanding and producing texts while improving their vocabulary, good dictionary users should have a number of reference skills (Elola et al. 2008; Fraser 1999; Gavriilidou 2013). Especially digital dictionaries and smart technology require the development of new skills for their successful and efficient use. Since research into skills required for electronic means is very limited, our aim is to create a reliable and valid online tool, the Strategy Inventory for Electronic Dictionary Use (S.I.E.D.U.), for the evaluation of skills users should have for a successful online search. The purpose of this paper is to present the construction steps and characteristics of S.I.E.D.U. and to provide data about the instrument test specification and content validity.

Keywords: online dictionary, electronic lexicography, dictionary reference skills, instrument validation

1 Introduction

The use of a dictionary, especially effective look-up, is a demanding cognitive process that requires increased mental effort (Gavriilidou 2014; Mavrommatidou 2017; Szczepaniak 2003; Wojtys 2009). A dictionary is not a simple book of lexical entries, read like any other text. People do not necessarily start reading from the first column till the last one or need to take into account the whole lexical entry. Dictionaries are actually used like "maps in the hands of a tourist" (Wang 2007: 15), since users need

to know how to use them, what to look for, where to find and how to interpret the required information.

Research into pedagogical lexicography, however, has been disadvantaged by the lack of a standardized instrument to objectively assess the strategies employed by dictionary users while selecting and using a dictionary, especially an electronic one (Gavriilidou 2012; Gavriilidou & Mavrommatidou 2016). Therefore, the creation of a reliable online tool, the Strategy Inventory for Electronic Dictionary Use (S.I.E.D.U.), was deemed necessary for the evaluation of users' skills when trying an effective look-up in a digital environment. The steps followed for the creation of such a tool and data about its test specification and content validity are presented in this paper.

2 The construction steps

2.1 Test specification

For the construction of the instrument items a detailed review of literature was conducted in order to define the effective dictionary user and attempt to make a list of reference skills of the successful one. For this reason, users' skills applied in both printed and digital dictionaries were considered.

Béjoint (1981) claims that two are the basic reference skills during dictionary search: users have to be able to (a) find the lexeme they are looking for, after pointing out either the right entry or the right subdivision of an entry (b) retrieve the specific piece of information they need (meaning, spelling, etc.). Although the identification of the proper entry is easier and quicker in electronic dictionaries, the detection of the right subdivision and the retrieval of a specific piece of information are still necessary in this type of reference tool.

Seven steps for effective dictionary look-up, some of which are identical in both types of dictionaries (printed and digital) are suggested by Scholfield (1982). According to him, an amount of prior knowledge (e.g. rules of English, dictionary conventions, etc.), a constant testing of hypotheses, and inferencing are required. He also points out the need of locating the unknown word in a text, searching it in the alphabetic list, reducing multiple senses of polysemous words by elimination, and understanding the definition of the unknown word by integrating it in context.

Bogaards (1994) emphasizes familiarity with the structure of a dictionary, as well as knowledge of the grammatical rules of a language, skills that apply both to printed and digital dictionaries. Furthermore, Roberts (1997) claims that the effective user has to be aware of the various dictionary types and the specific categories of information found in each one. According to her, success lies not only in finding the appropriate information, but also in achieving the goal in the shortest period of time (which is easily feasible when using an electronic dictionary).

Nesi (1999) in her study proposes a six-stage taxonomy of reference skills:

a) before the study,
b) before dictionary consultation,
c) locating entry information,
d) interpreting entry information,
e) recording entry information,
f) understanding lexicographical issues.

Her taxonomy includes a number of reference skills useful in all types of dictionaries, such as knowledge of the circumstances when dictionary consultation is necessary or not, distinction between relevant and irrelevant information, knowledge of lexicographical terminology, awareness of dictionary features and lay out, ability to select the correct meaning, etc.

Nation (2001) distinguishes between receptive and productive use of dictionaries and points at the importance of analysis of the context of the unknown word and correct application of the meaning to it in the first case, and check of the grammar, word classes, inflected forms and collocations in the second case. Thornbury (2002)stresses the understanding of the abbreviations found in a dictionary entry, awareness of the symbols, and cross-checking translation equivalents of bilingual dictionaries. Although many symbols and abbreviations are eliminated in electronic dictionaries since there are no space constraints, some may still exist, as many of the new reference tools remain outdated, often appearing as mere copies of printed dictionaries (Atkins 1996). Finally, Lew and Gallas (2008) classify the reference skills into four categories (a) Reference (b) Inference (c) Understanding dictionary conventions, and (d) Acquiring extra information. They focus on the need to understand definitions, phonetic symbols, grammatical information, derivative

words, idiomatic expressions, etc. They also examine the role of the socio-cultural context in understanding and correctly interpreting meanings.

Most of the above desribed skills (such as awareness of the various dictionary types and the specific categories of information found in each one, finding the lexeme in the right entry or the right subdivision of an entry, understanding the definition of the unknown word by integrating it in context, etc.) are transferred to digital products. However, some other skills, necessary in printed dictionaries, are no longer relevant because electronic dictionaries may do part of the user's job (Lew 2013a: 79). For example, they can automatically reduce an inflected form to a citation form or present compound words or idioms without having to search for each constituent element (Gavriilidou & Mavrommatidou 2016). Furthermore, users may find the appropriate entry without having adequate knowledge of alphabetic sequencing or have the possibility to use more than one dictionary at once (Atkins & Varantola 1997; Béjoint 1981; Nakayama & Osaki 2008 cited in Ronald & Ozawa 2008). This is obviously the case of most electronic dictionaries that combine greater degree of sophistication, with different technical functions and search techniques.

On the other hand, in digital media, new reference skills are required, which are not applicable in printed dictionaries. More specifically, students need personal judgment and thinking when choosing the lexical sources online. The reliability of the sources is a key issue that should not be neglected by users (Rothenberg 1997). Koren (1997) indicates that an electronic dictionary implies the acquisition of computer skills, such as vocabulary reading through pop-up windows, clicking some buttons, etc. Lee (2000) and Winkler (2001) (as cited in Petrylaité et al. 2008) supportsthe idea that the Internet with the wealth of information and its non-linear presentation of data compels students not to follow a predetermined path but develop navigation skills across and within different lexical entries via hyperlinks. Hargittai (2005) highlights the need for familiarity with the Internet terminology so that navigation in the electronic media is more effective.

Furthermore, online lexicological tools require, apart from specialized navigation capabilities, skills in windows switching and searching as well as lexical capabilities such as skimming and scanning (Krajka 2007; Tan 2009). Engelberg and Lemnitzer (2009) (as cited in Lew 2013b) report different search techniques (e.g. Incremental, Wildcard, Boolean, Filtered, Sound, Fuzzy-spelling, Inflected form, External-text-based, Scanner-based, Index-based and Picture-based searches) while

using electronic dictionaries. Apart from the two final techniques which apply to print dictionaries, the rest are exclusively digital (Lew 2013b).

Pastor & Alcina (2010) listed other possible search techniques (using an exact word, a partial word, an approximate expression, an anagram, and a combination of words) in electronic dictionaries. Their classification also divids the resource or specific sections that contain searchable information into four types: 1) entry field, 2) content field, 3) thematic field index, and 4) external links access field. Szczepaniak and Lew (2011) and Lew (2011) discuss the value of illustrations (images charts, tables, and photographs), sound recordings or menus in the presentation of complex or idiomatic words and their effect on retention, which certainly constitute different ways of extracting information, making thus necessary the development of different capabilities and decoding skills on behalf of the user (Gavriilidou & Mavrommatidou 2016). Lastly, Lew (2013b) reports that it is necessary to be aware of hyperlinks, structure and content of various dictionaries and develop digital skills and search strategies or navigation capacities so that an effective online search takes place.

2.2 Item writing

After consulting the relevant literature with respect to the definition of strategic dictionary use, the appropriate reference skills in print dictionaries and the new possibilities offered by the digital means, an exhaustive list of reference skills was prepared. This list included 74 items, that would form part of the V1 of our questionnaire, were written in Greek. These included reference skills concerning five main areas of interest:

a. Dictionary use awareness skills (Questions 1-21)

b. Strategies for dictionary selection (Questions 22-38)

c. Lemmatization strategies and acquaintance with dictionary conventions (Questions 39-51)

d. Navigation skills (Questions 52-59)

e. Look up strategies in the new electronic environments (Questions 60-74).

For assessing dictionary use strategies, the basic structure of the S.I.D.U. questionnaire (Gavriilidou 2013) was followed. It was the researchers' priority to include a wide variety of strategies, to use clear and unambiguous wordings and have

enough representative items in Likert scale format. Our V1 pilot version was then checked for content validity.

3 Content validity of V1

In order to measure content validity, the method of multiple judges was preferred (Hambleton & Rogers 1991; Haynes et al. 1995). Eight experts, university professors with a long experience in dictionary compilation specializing in Lexicology or Language Teaching, were asked to judge the relevance and usefulness of each of the 74 items of our questionnaire. These experts were asked to select which items they thought were "essential" (circle 1), "useful but not essential" (circle 2) and "not necessary". Only items considered "essential" by more than half of our experts were retained.

In this way 15 items with poor evaluation were removed and the final version consisted of 59 items (Percentage 79,7%). Four alterations also occurred based on experts' feedback on the wording used, the adequacy of the items checked and their representativeness. The pilot V2 version of 59 items included the following items:

a. Dictionary use awareness skills (Questions 1-19, total items 19)

b. Dictionary selection strategies (Questions 20-33, total items 14).

c. Strategies for lemmatization and acquaintance with dictionary conventions (Questions 34-43, total items 10).

d. Navigation skills (Questions 44-48, total items 5) and

e. Look up strategies in the new electronic environments (Questions 49-59, total items 11).

4 Reliability of V2

4.1 Sampling

To estimate the S.I.E.D.U. reliability, the questionnaire was administered to 120 undergraduate university students of the Department of Greek Philology, Democritus University of Thrace in November 2015 and April 2016. They were all between 20

and 30 years of age and native speakers of Greek. They were informed about the purpose of the survey and consented to participate in it.

4.2 Measures

The Cronbach Alpha coefficient was computed in order to provide a measure of the reliability of S.I.E.D.U. The Cronbach Alpha coefficient for the total scale was .92, suggesting a very high degree of internal consistency of the overall instrument. Computed values of the Alpha coefficient for Dictionary use awareness skills was .88, Dictionary selection strategies was .74, Strategies for lemmatization and acquaintance with dictionary conventions was .78, for Navigation skills was .79 and for Look up strategies in the new electronic environments was .68.

5 Content validity of V2

The V2 was then checked once more for its content validity. Two different groups, one of expert users (university professors and Ph.D. students) and one of non-experts (pupils and undergraduate students) discussed each item of the V2 and all commentaries were evaluated. It was soon deemed necessary to make some alterations in the format of the questionnaire, given the fact that the sample was unable to understand a number of questions which mainly included technical vocabulary (e.g. Boolean search, wildcard search etc.). In addition, students foundsome of the questions referring to both printed and digital dictionaries confusing, resulting in too much time required to respond.

For these reasons it was decided to create the V3 S.I.E.D.U. in a digital format so as to give explanations of difficult terms using explanatory notes or images. Google questionnaires with appealing presentation, ease of use and quick processing of results were chosen. In order to achieve even higher degree of consistency and to avoid users' labor (because of the time needed to complete the digital questionnaire) it was considered necessary to limit the number of questions to those referring exclusively to electronic dictionaries (eliminating questions common in both printed and digital forms). In this way the new V3 version included the following 31 items:

a. Dictionary use awareness skills (Questions 1-2, total items 2)
b. Dictionary selection strategies (Questions 3-11, total items 9).

c. Strategies for lemmatization and acquaintance with dictionary conventions (Questions 12-19, total items 8).
d. Navigation skills (Questions 20-24, total items 5) and
e. Look up strategies in the new electronic environments (Questions 25-31, total items 7).

Therefore 17 items were removed from the first category (Dictionary use awareness skills), 5 from the second (Dictionary selection strategies), 2 from the third (Strategies for lemmatization and acquaintance with dictionary conventions) and 4 from the last one (Look up strategies in the new electronic environments). Since the first two categories assess similar features, it was deemed more appropriate to consider questions 1-11 as one category (Familiarity with different types of electronic dictionaries and the conditions of their use).

6 Content validity of V3

The third version of the questionnaire was completed by 20 first year pupils of the Nikisiani High School in Kavala during the school year 2016-2017. The pupils, despite some initial difficulties with internet access, did not face any difficulties while completing the questionnaire. After being informed about the research goals, eight male and twelve female pupils submitted the questionnaire within 10 minutes, considering the whole process rather easy and enjoyable. The fact that the teacher had been working at the same school made them feel comfortable and strengthened their honest and spontaneous comments.

The respondents made corrections that had to do with a) the need to replace some difficult terms with simpler ones and b) the proposal to split question 21 ("I can find the dictionary I am looking for by typing specific URLs or search machines e.g. Google") into two parts, since it is likely that one strategy may be used more than the other. These data were taken into account and the digital questionnaire with 32 questions was presented in its final form (Version V4) (https://docs.google.com/forms/d/1EfEEXdcmxJ0grI3cTG_e5K43I0QStHeHhIraewyu8G4/edit?ts=58403cb9).

7 Reliability of V4

7.1 Sampling

Next, the questionnaire was distributed to 548 participants, among whom 244 were high school pupils (119 males and 125 females) and 304 were university students (73 males and 231 females). The pupils came from different high schools of Kavala (Nikisiani, Podochori, Eleftheroupoli, Krinides, Nea Peramos, Thassos), Xanthi and Komotini and were all between 15 and 18 years old. The university undergraduate students came from different departments and faculties of Komotini, Athens, Thessaloniki and Patra (e.g. the Department of Greek philology, Foreign Languages, Engineering, Chemistry, Mathematics, Financial Studies and Medicine). The age range of 214 participants was from 15 to 24 years, while 90 participants' age ranged from 25 to 50 years. The questionnaire was administered from February to May 2017.

7.2 Results

The Cronbach Alpha coefficient for the total scale was .92 suggesting a very high degree of internal consistency of the overall instrument. Computed values of the Alpha coefficient for Familiarity with different types of electronic dictionaries and the conditions of their use was .80, Strategies for lemmatization and acquaintance with dictionary conventions was .78, for Navigation skills was .79 and for Look up strategies in the new electronic environments was .80.

8 Discussion-Conclusion

Electronic dictionary use is a challenge for the majority of students. Recent experimental data show low performance of pupils, students or adults in electronic dictionary use. In order to improve instruction in electronic dictionary use, researchers need to better understand which factors contribute to effective dictionary use. In addition, educators must understand the strengths and weaknesses of students in regards to skills that support effective look ups so that they can design instructional interventions to best support electronic dictionary use. The S.I.E.D.U. produces valid and reliable scores that may be used in making research and educational decisions.

The contribution of the present study is to elaborate on the construction steps, content and reliability of Strategy Inventory for Electronic Dictionary Use (S.I.E.D.U.). Internal consistency was found to be high in all subscales, as well as in the overall instrument. The reliability indices of the last version also suggest a remarkable improvement compared to the previous ones.

This study equips researchers with a tool to study the behaviour of electronic dictionary users. In addition, it provides a valid and reliable measure to be used by educators in designing instructional interventions to support effective dictionary use strategies and attitudes.

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