English for Academic Purposes Related to Dentistry: Analyzing the Reading Comprehension Process

Inglés con fines académicos vinculado a la odontología: análisis del proceso de comprensión lectora

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The Universidad de la República, in Uruguay, offers reading comprehension in English courses within the career of dentistry for students to access information in this language. The study sought to analyze the fulfilment of the course's aims and to test the hypothesis that the greater the vocabulary that dentistry students possess, the better they will be able to understand written dentistry texts. A mixed approach, based on interviews and a class survey, was used. Data showed that the course's objectives were achieved. Participants stated that the course is highly meaningful, and they believed that the previously mentioned correlation exists. However, this could not be statistically verified, which indicates that multiple reading comprehension skills are involved when trying to understand academic texts.

Keywords: Dentistry, English for academic purposes, lexical acquisition, reading comprehension

La Universidad de la República, en Uruguay, brinda cursos de comprensión lectora en inglés durante la carrera de Odontología para que sus estudiantes accedan a información en esta lengua. En la investigación se analizó el cumplimiento de los objetivos del curso y la hipótesis de que entre más vocabulario poseen los estudiantes de odontología, mejor comprenden los textos académicos sobre odontología. Se utilizó una metodología mixta basada en entrevistas y una encuesta. Con la información recabada se verificó el cumplimiento de los objetivos del curso. Los participantes manifestaron que el curso es muy significativo y que existe la correlación analizada. Sin embargo, esto no pudo ser verificado estadísticamente, lo que indica que para comprender textos académicos son necesarias múltiples habilidades.

Palabras clave: adquisición de léxico, comprensión lectora, inglés con fines académicos, odontología

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Introduction

The international growth of English in academic areas has increased the number of English for academic purposes (EAP) courses at universities worldwide (de Chazal, 2014; McCarter & Jakes, 2009). Following this trend, different universities in Uruguay provide EAP courses as students will need English to access information in their field, carry out research, and participate in different academic events. The present research was carried out in 2017–2018 within the MA in English language teaching program at Southampton University (UK); and it took place at the Dental School of the Universidad de la República, in Uruguay, where a reading comprehension in English course was developed for students in the career of dentistry. This course had two main aims: (a) developing academic reading comprehension strategies that allowed students with basic levels of English to read academic books and research papers within their field; and (b) promoting acquisition of both general academic lexis and specific vocabulary related to the field of dentistry. I analyzed whether these two aims had been accomplished and the extent to which dentistry students with a basic or pre-intermediate level of English could understand academic articles while they started acquiring basic lexis from the field of dentistry. I also tried to fill a knowledge gap regarding the teaching of English as a foreign language (EFL) within the specific academic field of dentistry as, although there are studies in this field (Basturkmen, 2012), these are not focused on the understanding of academic texts in relation to the acquisition of dental terminology.

By using a combination of qualitative and quantitative research tools, data were collected and triangulated to determine what may help students understand academic texts in such a short period of time. Apart from this, I also analyzed existing knowledge regarding the teaching of reading comprehension of academic texts in ESL/EFL courses.

Literature Review

Relations Among Word Knowledge, Reading Comprehension and Second Language Acquisition

According to Uccelli et al. (2015), reading comprehension is "the product of two main clusters of skills: word recognition and language comprehension skills" (p. 338). Given the elementary levels of English of the Dental School university students who take the course, teaching reading comprehension strategies in English to them is highly challenging. To fully understand the aims of the reading comprehension course and this research, some key concepts must be defined. According to Richards (1976, as cited in Meara, 1996) knowing a word in depth means:

> a) knowing the degree of probability of encountering the word in speech or print; b) knowing the limitations imposed on the use of the word according to function and situation; c) knowing the syntactic behaviour associated with the word; d) knowing the underlying form of a word and the derivations that can be made of it; e) knowing the associations between the word and other words in the language; f) knowing the semantic value of the word; and g) knowing many of the different meanings associated with the word. (p. 46)

Based on this, discourse analysis strategies (McCarthy, 2011) also become fundamental as meaning must be derived from the context in which words appear. Narrow reading (Kang, 2015), which focuses on one topic or author, is a key concept in this study. Thus, all written texts were thematically related to the field of dentistry, which helped fulfill the course objectives and reduced the amount of new vocabulary the students had to learn.

Regarding research in lexical acquisition, it has been established that there is a relation between the amount of vocabulary known and the understanding of a language (Nation & Waring, 1997). Concerning

vocabulary size in second language learners, Nation and Waring (1997) state that,

> for adult learners of EFL, the gap between their vocabulary size and that of native speakers' is usually very large, with many adult foreign learners of English having a vocabulary size of much less than 5,000 word families despite having studied English for several years. (p. 8)

There are two different yet interconnected perspectives regarding vocabulary acquisition in second language learners and, as Schmitt and McCarthy (1997) point out, both positions must be considered during lessons as they complement each other to maximize language learning. One of the positions states that vocabulary is widened through incidental exposure to written texts (Krashen, 1989) and promotes "reading as one route to acquiring a nativelike vocabulary in a target L2" (Reynolds, 2014, p. 112), especially when there are time constraints. However, this perspective is questioned by researchers as Meara (1997) who states that "experimental evidence in support of this claim is weak [and] learners in these experiments typically acquire very few words" (p. 112). This has given place to the other perspective that proclaims that vocabulary must be explicitly taught.

According to Laufer (1992), Nation (1990), Wallace (2007), and Harkio and Pietilä (2016), there is a relationship between the comprehension of a written text and the percentage of known words. In this sense, Schmitt et al. (2011) state that second language learners should learn about 8,000 to 9,000 word families to comprehend texts as they need to know around 98% of the vocabulary in a text to understand it. However, Laufer (1992) and Nation and Waring (1997) suggest that second language learners need around 3,000 high frequency word families to understand a written text. This shows that results differ widely among researchers and that a continuum with different degrees of understanding exists for learners who have a range between 3,000 and 9,000 words. Laufer carried out a study which compared vocabulary size in L2, general academic ability, and L2 reading, and discovered that:

> 1) with vocabulary size of fewer than 3,000 word families (5,000 lexical items), no amount of general ability will make the learner read well; 2) with vocabulary size of 5,000 word families (8,000 lexical items), reading in L2 will be satisfactory whatever the general ability; 3) with vocabulary size of 3,000–4,000 word families (about 5,000–6,500 lexical items), L2 reading may or may not be influenced by general ability. (p. 95)

Based on these findings, students with an A1/A2/B1 level of English are likely to have difficulties understanding written academic texts. Despite this, students can learn vocabulary fast, as Reynolds (2014) argues that "only three encounters with unknown words may be needed to encourage acquisition if the reading of a target text is enjoyable or of importance to the reader" (p. 111). Therefore, successful teaching of lexis in a reading comprehension course seems possible and necessary.

Regarding the teaching of lexis, Lewis (2000), Meara (2002), and McCarter and Jakes (2009) criticize the fact that, despite the importance lexical knowledge has, explicit vocabulary teaching approaches are generally neglected during language lessons preventing further improvements regarding language acquisition. This leads to what Caro and Rosado-Mendinueta (2017) highlight in the sense that "limited lexical knowledge can lead EFL learners to frustration and demotivation" (p. 205) as they feel they cannot understand texts. Nevertheless, at present, complex approaches to language teaching, focused on meaning and lexical development, are considered effective and recommended during lessons (Nation, 1990; Read & Chapelle, 2001). Thornbury's (2001) "grammaring" approach to language, Lewis' (2002b) lexical approach, or Carter and McCarthy's (2006) promotion of the use of corpora, highlight the importance of using authentic texts and of analyzing different lexical aspects in them during

teaching. As Carter and McCarthy suggest, apart from teaching specific vocabulary, teachers should regularly highlight word clusters and collocations which appear in authentic texts.

Expanding Lexicon Through Narrow Reading

Krashen (1985) elaborated the "input hypothesis" that states that language learners acquire language when they receive what he calls "comprehensible input." He highlighted that students learn best when the linguistic input they receive is a little beyond their comprehension. For him, when students face both comprehensible and new input, they learn following a "natural order" that allows them to understand structures beyond their level by using and deriving information from context. He maintains that by providing adequate input, teachers can scaffold and challenge students towards learning; what students already know helps them understand and incorporate new knowledge. Based on this, Krashen (1989) suggests that English language learners acquire vocabulary and spelling through input received during reading, something other researchers corroborated (Horst, 2005; Laufer, 1992; Reynolds, 2014).

Regarding input, Horst (2005) states that it is much richer, more complex, and more varied in written texts than in spoken ones. Based on this, English language learners who want to move to the next language level may move faster by reading and receiving a complex input. According to Horst there are two different perspectives concerning the type of written texts learners must be exposed to during reading courses: (a) the "free voluntary reading," position which Krashen (1985) promotes, where there are no prescribed texts and input is based on the reading of authentic texts; and (b) the extensive reading perspective which suggests that reading courses must be designed to expose students "to large quantities of material within their linguistic competence" (Grabe & Stoller, 2002, as cited in Horst, 2005, p. 357). Whatever the approach to written texts one may prefer (which may

be a combination of both), Küçükoğlu (2013) mentions that students understand written texts better when they are taught how to predict, visualize, make connections, infer, question, and summarize. Lexical inferencing, related to ways of deriving meaning and learning words in context, is also considered a crucial skill for learners to understand the meaning of a text and develop language (de la Garza & Harris, 2017).

In addition, Kang (2015), following Krashen's (1989) advocacy for narrow reading, provided evidence that L2 vocabulary learning can be maximized through readings concerning a specific topic. Together with Nation (1997, as cited in Kang, 2015), he maintains that as repetition must occur for vocabulary to be acquired, by reading about a specific topic—such as dentistry—the likelihood of reencountering a word or word cluster is increased and, therefore, the possibilities of acquiring vocabulary are increased. Sutarsyah et al. (1994, as cited in Kang, 2015) compared the corpus of randomly selected academic texts with the corpus of texts within a specific subject, and found that the number of words and word families of the latter was much smaller than the ones in the former (which included around 300,000 words). Therefore, according to Kang, "the findings led the researchers to conclude that it would be useful to narrow the theme of reading materials by using texts on related topics rather than making use of a group of unrelated texts" (p. 168). EAP courses are designed based on this principle as they organize knowledge according to specific topics.

Acquisition of Academic Registers While Developing Reading Comprehension Skills

Uccelli et al. (2015) point out that EAP is largely "academic language as academic vocabulary" (p. 338) and that it is based on the fact that academic language registers differ from other registers. In addition, different studies (Cruz & D'Alessandro, 2015; Marshall & Gilmour, 1993) mention that previous knowledge regarding texts'

topics enhances comprehension. These facts show the importance of designing disciplinary-oriented courses where students feel motivated as they have successful experiences. In these courses narrow reading is carried out while vocabulary recognition strategies are taught (Williams, 1985) and techniques, such as the ones that McCarter and Jakes (2009, p. 126) suggest efficient readers use, are discussed and put into practice: reading for gist/skimming; scanning; the ability to predict the content of a reading passage; identifying the main thesis; identifying the author's point of view and tone; distinguishing what information is central; using known vocabulary; establishing relationships between words; understanding grammar; recognizing the organization, functions, and development of a text; analyzing a text by questioning the content, assumption, and inferences.

Method

Both qualitative and quantitative data were collected during the research. Regarding quantitative data, language tests and a survey were carried out and data were statistically analyzed (Brown & Rodgers, 2002; McKay, 2006). Apart from two regular course tests, which helped identify whether or not students fulfilled institutional and course requirements, four tests were designed to measure reading skills related to lexical acquisition (Read & Chapelle, 2001). Descriptive and correlational research (Brown & Rodgers, 2002) were used to try to isolate and examine in depth the two variables under investigation: reading comprehension and lexical growth. Regarding descriptive research, the situation and learning outcomes were described by analyzing survey answers and test responses in numerical terms (descriptive statistical analysis). And as for correlational analysis, possible significant correlations between reading comprehension and lexical growth were established by statistically comparing pre- and post-test results using Pearson's r (correlational statistical analysis).

Furthermore, I applied a class questionnaire with open-ended questions and carried out interviews to collect qualitative data (Dörnyei, 2007; Mason, 1996). I designed research tools to collect information concerning students' perceptions regarding the course's aims and approaches, and to triangulate information regarding the students' learning experiences with data collected from the tests.

Regarding ethical aspects, participants signed consent forms which informed them about issues such as the aims of the study, data handling, anonymity, and confidentiality.

Research Questions

1. Are students able to understand the main ideas in academic articles in English related to the field of dentistry after taking a 60-hour course on reading comprehension strategies?
2. Is there a correlation between lexical knowledge related to dentistry and the understanding of academic texts in the field of dentistry?
3. What approaches and strategies are perceived as effective by participants during the reading comprehension in English course within the field of dentistry?

Reading Comprehension Course: Understanding Academic Articles Related to Dentistry

As students of dentistry need English to study throughout their career, reading comprehension courses were implemented at the School of Dentistry of the Universidad de la República in Uruguay. Students from diverse socioeconomic backgrounds and with different levels of English regularly attend these courses. The course has been mainly designed for students with a basic or pre-intermediate level of English (A1, A2, or B1 level according to the Common European Framework of Reference for Languages, CEFRL) who generally cannot understand academic written texts in English. Despite this, students with more advanced levels sometimes take the course as they want to learn specific lexis related to

dentistry while practicing their English. This research was carried out during a semester in one of these reading comprehension courses.

Regarding the course, twice a week, during a five-month period, students attended two-hour face-to-face classes (60 hours total) focused on fostering successful reading comprehension strategies in English. The reading comprehension course is based on a communicative language teaching approach, and both language and reading strategies are analyzed and put into practice while different topics related to dentistry are discussed. During lessons, abstracts and written academic articles from the field of dentistry are read and debated while discourse, grammatical, or lexical issues are examined in contextualized ways (Carter, 2006; Cullen, 2008; Lewis, 2002a; McCarthy, 2011). From a learner-centered perspective, issues discussed in class may be presented either by students or by the professor to develop students' awareness. Bottom-up and top-down reading comprehension strategies (Hudson, 2007), word analysis, sentence analysis, and global text meaning (Grabe & Stoller, 2014) are also discussed while reading. To promote lexical acquisition, plenty of visual aids are used throughout the course: presentations, diagrams, word webs, flashcards, videos, pictures and drawings.

University students need to understand academic texts in English from their field of study and English courses are being implemented within specific careers; therefore, it is highly relevant to analyze successful ways of teaching academic English in specific knowledge areas. Several studies have focused on academic English in general (Benesch, 2001; Bhatia, 2002; Johns, 1997), and a lot or research has been done in the past 40 years in the field of English for specific purposes (Dudley-Evans & St. John, 1998; Hyland, 2011) concerning how to teach English while teaching different subjects. This study focused on ways of teaching and acquiring reading comprehension skills to understand academic texts in English within the field of dentistry. The purpose of the research was to find out if undergraduate dentistry students with a basic or pre-intermediate level of English, who could not read academic texts prior to the reading comprehension course, could start understanding complex academic articles related to dentistry after taking a 60-hour face-to-face-course; and, if so, whether this happened due to the acquisition of basic lexis related to their field of study.

Some language researchers state that there is a relationship between the amount of vocabulary known and the understanding of written texts (Harkio & Pietilä, 2016; Harwood, 2002; Laufer, 1992; Meara, 1996; Qian, 2002); therefore, the bigger the students' lexicon, the more they will probably understand texts, making appropriate connections, and the less they will have to rely on dictionaries and glossaries, a situation which allows them to focus on meaning. Based on this fact, the hypothesis that the bigger the lexis related to dentistry students possess, the better they will understand written texts related to dentistry, was one of the focuses of this study. Both quantitative and qualitative data were collected trying to verify them while trying to give light to other effective pedagogic approaches related to reading comprehension strategies.

Participants

Random and non-random sampling was used to select participants: undergraduate and postgraduate university students, and a Dental School professor. All participants were Uruguayan Spanish (L1) speakers.

Undergraduate Students of Dentistry

Twenty-one undergraduate students of dentistry (19 women, 2 men; $M = 22.2$ years old; $sd = 6.7$ years; $Mdn = 31.0$ years; $M = 19.0$ years) comprised the main research subjects as they took the reading comprehension in English course. Participants were students in the first, second, and third year of their career of dentistry, with a basic or pre-intermediate level of English (A1, A2, or B1 according to the CEFRL). All students who took

the course participated in the research completing the required tests and class survey. Apart from this, four of them were interviewed by using stratified random sampling as two women and two men were chosen.

Postgraduate Students of Dentistry

Two postgraduate students (Doctors in Dentistry completing postgraduate courses), a woman (42 years old) and a man (34 years old), who took a reading comprehension course like the one the undergraduate students took, were also invited to participate in the research in order to share their opinions and to pilot the tests and course's contents related to dentistry.

University Postgraduate Professor and Doctor in Dentistry

A postgraduate professor of the Dental School (a 55-year-old woman), who had published at least one article in English in an academic journal related to dentistry, was also interviewed. She was a key informant as she provided the perspective of an expert in the field concerning needs related to the acquisition of EAP.

Defining the Research Approach: Identifying Variables That Affect the Problem

Bearing in mind McNamara's (1996) suggestions concerning the elaboration of models to organize theories and ideas, a model was designed to identify the different variables that affect the understanding of written academic texts in English from the field of dentistry (Figure 1).

Data Collection Instruments

Tests

Lexical knowledge and reading comprehension skills, prior to and after the course, were assessed by using different tests. According to Read (2000, p. 9), there are three dimensions concerning vocabulary assessment. The first dimension concerns the format of the exercises that are used to measure vocabulary knowledge. The exercises may be designed to assess terms that are embedded in a larger text (for example, when terms have to be placed in a text) or they may be built to measure vocabulary in isolated ways through exercises that focus solely on vocabulary (as in the completion of vocabulary lists). The second dimension considers which vocabulary is being measured, whether it is specific vocabulary related to a particular field (for example, terms associated with the field of dentistry) or the assessment of wider knowledge by adopting a more comprehensive approach that considers all the vocabulary that appears in a text (for example by analyzing comprehension in general). And finally, the third dimension is related to the way in which the examinee can produce the expected terms;

Figure 1. Model Identifying Variables That Affect Understanding of Written Academic Texts in the Field of Dentistry
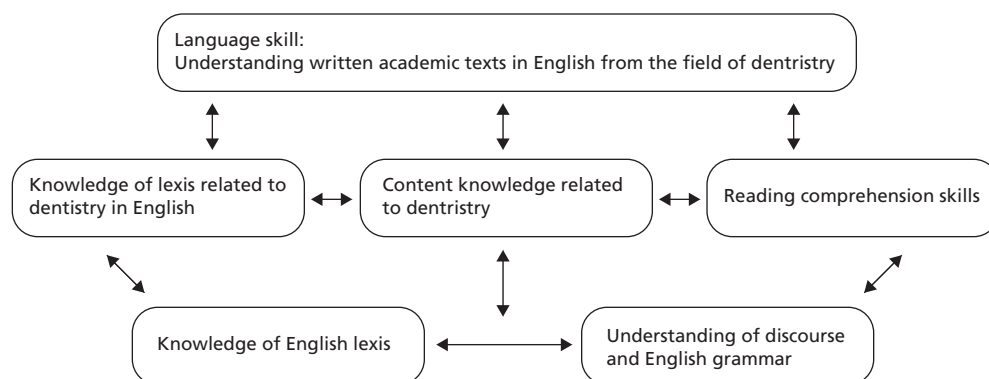
it considers whether the vocabulary can be produced independently, without relying on contextual cues, or if the presence of context is necessary for the test-taker to come up with the vocabulary being assessed.

These dimensions were considered when designing tests related to the field of dentistry and regarding English use in general. Overall, undergraduate students completed ten tests during the course: eight designed for research purposes and two to fulfill the course's requirements. Four tests were completed both before and after the course totaling eight tests; these four pre-course and post-course tests were identical. The set of tests included: (a) a test where participants had to complete a vocabulary list of 100 words related to dentistry (Pre-Test 1 and Post-Test 1, vocabulary list related to dentistry); (b) a test where participants filled a vocabulary list of 100 words concerning general use of English (Pre-Test 3 and Post-Test 3, general English vocabulary list); (c) a reading comprehension test based on a research article from the field of dentistry (Pre-Test 2 and Post-Test 2, reading comprehension related to dentistry); and (d) a reading comprehension test not related to dentistry (Pre-Test 4 and Post-Test 4, lexis and reading comprehension exercises not related to dentistry).

Interviews

Primary data were collected by interviewing four students (chosen by using stratified random sampling), two postgraduate students (selected by using stratified random sampling), and a professor who had published at least one academic paper (selected by using random sampling according to the criteria previously established). Although interviews were semistructured they were based on the following four questions:

1. Which specific aims do you think a reading comprehension course in English should have?
2. Do you think it is important for students to know specific vocabulary related to the field of dentistry? Why?

3. When do you use, or expect to use, English during your professional career?
4. What is your experience when reading books or articles in English?

Surveys

To triangulate data and provide more reliable research results, a class-written questionnaire was designed (McKay, 2006) and piloted by the postgraduate students to collect information concerning students' awareness, opinions, and points of view regarding reading comprehension strategies and lexical acquisition in English in the field of Dentistry after the course had ended. The survey was carried out in an anonymous way and included four close-ended questions (alternative yes/no questions):

1. Do you think you have learnt vocabulary related to the area of dentistry during the course?
2. Now that the course is over, do you think you can read academic articles in English?
3. Considering your experience in the course, do you think that the more vocabulary related to the career of dentistry you know, the more you understand research abstracts from your career?
4. Do you think you would understand research abstracts related to dentistry if the course was not focused on dentistry?

Results and Discussion

Information Collected During Interviews

Participants expressed the importance of learning English during their professional career. They stated that they need it not only to read research articles but also to access different Internet sites, attend congresses, study or live in other countries, learn about the latest discoveries in their field, talk with colleagues from around the world, and treat patients from different countries. The university professor mentioned the following:

Basic literature, to look for evidences, today, is mainly in English . . . [by] publishing in English international visualization is achieved. Publications that are not written in English are rarely seen by the community; with the exception of the neighboring country or countries. But if one wants to make one's work known, or if one wants one's work to become part of systematic literature reviews, or to be part of groups that produce knowledge, it has to be in English.

Concerning the specific aims of the course, undergraduate students agreed with the objectives and the course's approach and highlighted the relevance of having an English course focused on the career of dentistry within their faculty. Student 1 mentioned that the English course at the university was very different from the ones she had had during secondary school as there she had learnt things concerning "life in general;" and, in this sense, Student 2 pointed out that he was "more interested because it is related to what we do." Furthermore, Student 3 stated:

Dentistry is a career in constant renovation, and new things are constantly being created, new methods and things to be used to improve people's health; and as English is a language widely used by people to be understood worldwide…then, if we know English we can become more developed with the use of technology; learn faster about new things that people do not know.

When interviewees were asked about the importance of learning specific vocabulary related to dentistry in English, they all stated that it is fundamental for dentists to know as much dental terminology as possible because dental catalogs, materials, technological instruments, instructions, and academic articles are mainly in English. Several students stated that the strategies used in class concerning vocabulary learning and understanding (i.e., use of visual aids; morphological analysis of words; associating words; looking for

cognates, synonyms, and antonyms; analyzing lexical items present in texts such as idioms and collocations) were necessary. They also mentioned that the reading strategies put into practice and discussed during lessons, such as analyzing the use of cohesive devices, looking for main ideas, inferring, associating, and summarizing, helped them understand texts.

In conclusion, all the interviewees understood that they need English to move onwards in their professional careers and the professor highlighted that she keeps herself updated by reading articles in English, and mentioned that one way of being academically recognized by the international dental academic community is by publishing in English.

Data Gathered With Tests

The acquisition of lexis and the development of reading comprehension skills were analyzed by comparing the results of tests taken before attending the course (pre-course tests) and after completing it (post-course tests). As data were normally distributed, descriptive statistics was used to examine tests' results of the group in general. The group's mean, median, standard deviation, and minimum and maximum score were calculated (Table 1).

As Table 1 shows, all test scores' mean values rose significantly throughout the course. Regarding dental terminology, there was an 88% increment in Pre-Test 1's mean as it rose from 35.74 to 67.12 in Post-Test 1; which means that students learnt a lot of new vocabulary related to dentistry during the course as Figures 2 and 3 also show.

Figure 2 evidences that scores were very low before the course because the mean score was 35.74 out of a maximum of 100.00. Most students scored between 26.50 and 41.50, less than 50.00, and nobody scored more than 60. This confirms that most students were not familiarized with dental terminology in English when the course started.

Table 1. Students' Pre-Course and Post-Course Test Results

Test	Mean	Median	Standard deviation	Minimum score	Maximum score
Pre-Test 1. Vocabulary dentistry	35.74	33.75	11.78	11.50	56.00
Post-Test 1. Vocabulary dentistry	67.12	57.0	15.44	28.00	87.00
Pre-Test 2. Reading comprehension dentistry	2.52	3.50	2.40	.00	7.00
Post-Test 2. Reading comprehension dentistry	5.38	5.00	1.31	3.00	7.00
Pre-Test 3. General vocabulary	60.62	51.00	20.27	12.00	90.00
Post-Test 3. General vocabulary	67.07	58.5	17.35	26.00	91.00
Pre-Test 4. General lexis	5.67	6.00	3.31	.00	12.00
Post-Test 4. General lexis	8.62	3.25	9.00	4.00	14.00
Course Test 1 (Oct.)	16.05	15.50	1.50	13.00	18.00
Course Test 2 (Dec.)	19.31	17.00	3.89	10.00	24.00

When comparing Figures 2 and 3, it can be seen that test scores were much higher when the course ended (Figure 3) as the mean rose from 35.74 to 67.12, showing acquisition of dental terms. This 88% increment, together with the fact that all students passed the course's regular tests averaging around 60% of the total test marks between Course Test 1 and Course Test 2, evidenced general improvement regarding vocabulary acquisition.

In addition to this, as Figures 4 and 5 show, students were also able to improve their reading comprehension skills as Pre-Test 2's mean was doubled, going from 2.52 in Pre-Test 1 to 5.38 in Post-Test 2. Also, Figure 4 shows the problem students faced before starting the course as six students (out of 21) scored zero out of eight, and seven got a very low score, which meant that 62% of the students could not fully comprehend a research article before taking the course. Only four students scored more than 60%.

Figure 5 reveals that when the course ended there were no zero scores and that 85.7% of the students obtained more than 50% of the answers correct. After the course (Figure 5), 95% of the students got better marks than at the beginning (Figure 4), although three students scored less than 50% of the test's mark when taking the post-course test. All in all, the test marks show acquisition of vocabulary related to dentistry and improvement of reading comprehension skills in general.

Concerning tests that dealt with aspects not related to dentistry (general vocabulary and general lexis), as data in Table 1 show, a slight improvement in students' performance could be verified because the test's results mean rose (from 60.62 to 67.07 on one test, and from 5.67 to 8.62 on the other one). This probably occurred because, although the course was focused on dentistry, English was always being used, promoting improvement in all areas.

Apart from this, one of the main aims of this research was to explore the hypothesis that the more vocabulary related to dentistry students know/learn, the more a text from this area may be understood. This was studied by analyzing the correlation of the two variables—how much one depends on the other—after the course. For this purpose, the correlation of different variables was analyzed by standardizing data and using Pearson's *r* to measure the relationship between the different test scores with IBM SPSS Statistics Processor (Table 2).

Figure 2. Pre-Test 1 Results: Dental Terminology

Maximum test score: 100.00
Mean: 35.74
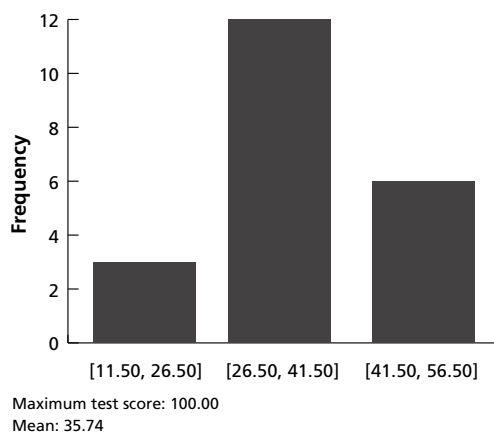
Figure 4. Pre-Test 2 Results: Scores of Reading Comprehension Related to Dentistry

Maximum score: 8.00
Mean: 2.52
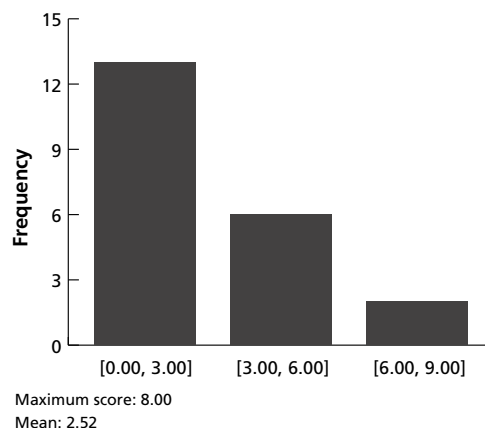
Figure 3. Post-Test 1 Results: Dental Terminology

Maximum test score: 100.00
Mean: 67.12
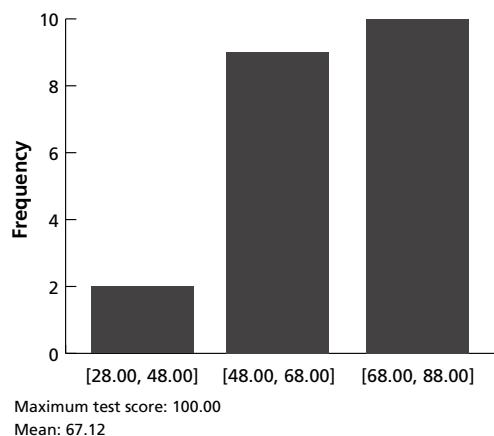
Figure 5. Post-Test 2 Results: Reading Comprehension Related to Dentistry Scores

Maximum score: 8.00
Mean: 5.38
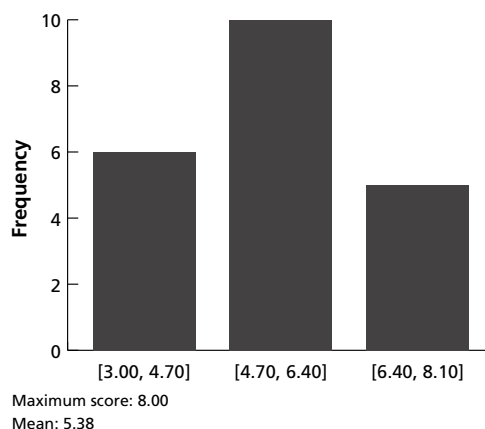
Table 2. Pearson's *r* Correlation Analysis

Variables	Pearson's correlation	*p* value
Pre-Test 1. Voc. Dent./Pre-Test 2 R.C. Dent.	0.555*	0.009
Pre-Test 2 R.C. Dent./Pre-Test 3 Gral. Voc.	0.608*	0.003
Pre-Test 3 Gral. Voc./Pre-Test 4 Gral. Lexis	0.796*	0.000
Pre-Test 3 Gral. Voc./Pre-Test 1 Voc. Dent.	0.710*	0.000
Pre-Test 1 Voc. Dent./Pre-Test 4 Gral. Lexis	0.811*	0.000
Pre-Test 1 Voc. Dent./Post-Test 1 Voc. Dent.	0.624*	0.003
Pre-Test 1 Voc. Dent./Post-Test 2 R.C. Dent.	0.104	0.654
Pre-Test 2 R.C. Dent./Post-Test 1 Voc. Dent.	0.484*	0.0260
Pre-Test 2 R.C. Dent./Post-Test 2 R.C. Dent.	0.212	0.357
Post-Test 1 Voc. Dent./Post-Test 2 R.C. Dent.	-0.216	0.348
Pre-Test 3 Gral. Voc./Post-Test 3 Gral. Voc.	0.825*	0.000
Pre-Test 4 Gral. Lexis/Pre-Test 4 Gral. Lexis	0.742*	0.000

Note. Voc. Dent. = Vocabulary dentistry, R.C. Dent. = Reading comprehension dentistry, Gral. Voc. = General vocabulary, Gral. Lexis = General lexis.

*Correlation is significant at the 0.05 level (*p* < 0.05)

As Table 2 shows, correlation between most test results exists. Showing, for example, that the more general vocabulary the student possessed when starting the course (Pre-Test 3), the better he or she performed on the lexis test (Pre-Test 4); that the wider the general vocabulary of the student (Pre-Test 3), the better he or she performed when assessed regarding dental terminology (Pre-Test 1); or that the more dental terminology the student possessed (Pre-Test 1), the better he or she performed on the lexis test (Pre-Test 4). These correlations seem logical as the wider the vocabulary of students, the better one expects students to perform on tests that involve English. However, these correlations correspond to pre-tests, and students' scores were very low on pre-tests in general, so the correlation among low scores mainly certifies low levels of English in general. Nevertheless, correlation between identical pre-tests and post-tests exists, therefore, the effectiveness of the course concerning acquisition of lexis and understanding of texts could be verified. However, regarding the hypothesis in particular, correlation between Post-Test 1 (which tested vocabulary related to dentistry) and Post-Test 2 (that assessed reading comprehension related to dentistry), could not be established as p is 0.348 and therefore the difference in p value between these two is bigger than 0.05, showing no correlation or relationship between the variables. This means that the hypothesis could not be statistically verified, and it may mean that reading comprehension involves many complex skills. To continue studying a possible statistical relationship between vocabulary and narrow reading comprehension, the number of students in the study could be increased.

Quantitative Data Collected With Surveys

As mentioned, all students completed surveys. The data collected can be found in Table 3.

Answers provided in the class survey were similar to answers given by undergraduate and postgraduate students in the interviews as students understand that the course's aims were achieved as they learnt vocabulary (100%) and reading strategies (95.2%) during the course.

Regarding the research hypothesis, after taking the reading comprehension course focused on dentistry, the students assumed that the more vocabulary related to dentistry they knew, the more they could understand articles from this field in English. Additionally, when asked if they would be able to understand these articles if the course was not focused on dentistry, 57.1% of the students stated that they would not. Hence, most students consider that the course has enabled them to understand texts from the field of dentistry because of the approach used.

Table 3. Quantitative Data Collected From Surveys

Questions	Main answers
Do you think you have learnt vocabulary related to the area of dentistry during the course?	Yes (21 students, 100%)
Now that the course is over, do you think you can read academic articles in English?	Yes (20 students, 95.2%) Not sure (1 student, 4.8%)
Considering your experience in the course, do you think that the more vocabulary related to the career of dentistry you know, the more you understand research abstracts from your career?	Yes (21 students, 100%)
Do you think you would understand research abstracts related to dentistry if the course was not focused on dentistry?	Yes (8 students, 38.1%) No (12 students, 57.1%) No answer (1 student, 4.8%) Not sure (1 student, 4.8 %)

Validity and Limitations of the Study

As ethical research procedures were closely followed during the study (the research procedure, context, and participants were clearly described, and data collected

were consistent and triangulated), it can be said that the research process complies with agreed standards regarding validity and reliability. However, as only 21 undergraduate students participated in the research, the sample was considered too small and may not represent the universe of undergraduate students of dentistry. Nevertheless, this result may also highlight the fact that understanding academic texts is highly complex and that it involves several reading comprehension skills, not just knowing specific terms. Hence, this research may add complexity to the matter as all participants believed that the most important factor regarding comprehension of texts was knowing the key terminology; yet, as this could not be statistically verified, we may assume that comprehension of texts does not rely solely on lexical knowledge, but involves multiple abilities such as knowledge concerning the content of the text; being able to predict, infer, and summarize main ideas; understanding grammar; and analyzing discourse effectively. These aspects were also discussed during the course, helping students to acquire the necessary skills to understand academic texts.

Conclusions

Academic English language courses are increasingly being taught in universities worldwide and English language teachers must become aware of effective ways of teaching during these specific courses. In Uruguay, the Dental School of the Universidad de la República implemented reading comprehension courses in English for its undergraduate dentistry students more than 12 years ago. These courses are short (60 face-to-face hours), focused on authentic academic bibliography related to dentistry, and are designed for students with a basic to pre-intermediate level of English. The objective of this research was to establish if the course's aim was being accomplished (based on institutional and students' needs), and if so, if it was mainly because students were taught specific dental terminology which enabled them to comprehend academic texts from their field.

The first thing that was determined was that the course's aims were being accomplished. Not only did interviews and surveys show students' satisfaction concerning the course, as they stated that it was relevant and that its aims were being achieved (100%), test scores also evidenced that students were not able to read academic texts when they entered the course (Pre-Test 2, $M = 2.52/8$), but could successfully do so by the end of the course (Post-Test 2, $M = 5.38/8$). In addition, test scores showed that students possessed a very narrow vocabulary when they entered the course (Pre-Test 3, $M = 60.62/100$), hardly knowing specific dental terminology (Pre-Test 1, $M = 35.74/100$). These scores improved by the end of the course as the means rose to 67.07/100 (Post-Test 3) and 67.12/100 (Post-Test 1), respectively, showing an average vocabulary increase related to dental terminology of 88%; much bigger that the increment of 10.64% regarding general English vocabulary. This shows that context-specific words may be learnt faster than general ones as students may be more motivated towards learning terminology related to their career and encounter words more frequently, enabling memorization, during specific courses.

Secondly, although all the participants believed that the research hypothesis was valid and provided reasons supporting this, no statistical correlation between vocabulary tests and reading comprehension tests could be made. Although correlation could be established among tests of the same kind, showing that students widened their vocabulary and acquired reading comprehension skills, the statistical analysis (Pearson's r) of post-course test scores regarding knowledge of lexis related to dentistry in English (Post-Test 1) and understanding of written academic texts from the field of dentistry (Post-Test 2), did not show correlation among variables ($p = 0.348$). This suggests that the sample may be too small and that other variables such as content knowledge related to dentistry, knowledge of English lexis in general, reading comprehension skills, and understanding of discourse and English grammar,

are also affecting the understanding of written texts. In this sense, although students believed the hypothesis was correct and the professor who was interviewed mentioned that knowing dental terminology eased comprehension, they also mentioned that other reading approaches and strategies discussed were necessary and effective as well.

Regarding the course's approach, all participants highlighted that the course was highly meaningful because it was focused on the career of dentistry. This shows that both the course's program and interactions during class were focused on learners' interests and needs. Therefore, language and knowledge were constructed in a dialogical way during lessons where students discussed and put into practice different reading comprehension skills while analyzing the structure and language used in academic texts.

In conclusion, as results show, the reading comprehension in English course being taught at the Dental School is highly meaningful as it allows students with basic and pre-intermediate levels of English to acquire the necessary skills to read and understand different texts from their technical field. Future courses may also incorporate genre analysis and study the rhetorical patterns that appear in academic texts.

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