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The pathways to higher education: lexical availability in adult candidate students and in young first-year students

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In the past few years there has been an increase in the number of adult students in higher education courses, many of whom have returned to school after a break. Most of these students do not intend to continue their studies from the point where they stopped; rather, they want to prepare for specific tests in order to have direct access to higher education courses, which in Portugal is a legal option for students over the age of 23. In response to this new cohort, higher education institutions need to find out what kind of students these are, determining their characteristics, capabilities and major problems, if they are to provide them with successful learning opportunities alongside younger students. This article presents a comparative study of lexical competence, focusing on lexical availability, contrasting those adult applicants to higher education who are attending a course preparatory to higher education with first-year students who have just entered higher education. The results show significant differences between the two groups, the adult group in general showing poorer results. Their withdrawal from schooling is clearly reflected in their vocabulary activation with regard to transversal themes. The most salient contrasts are related to the number of words mentioned and the frequency of words in the group, as well as the greater or lesser proximity to the topic of the terms mentioned.

Introduction

The constant changing and updating of knowledge that characterizes present-day society has modified the perspective of lifelong learning, which has received

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a new impulse in recent years. This perspective has been extended to higher education. On one hand, initial training is no longer seen as a package that provides all one needs to get a job. Rather, it is seen as the means of accessing a job, the practice of which will call for further training on an ongoing basis. Much of this training will continue to be provided by higher education institutions. On the other hand, these institutions have begun to provide access to individuals who have not completed secondary education but have entered the journey of life outside school. This journey has permitted them to develop skills recognized by the education system as a basis for entering a course of higher education. These skills may not only provide access to higher education, but may also be recognized in the specific curriculum the student applies for. In the European context, these two issues, access and recognition, have been enshrined in the so-called Bologna Process (Tuschling and Engemann 2006, Jakobi and Rusconi 2009) and are also to be found in other continents and countries, particularly in the United States of America (Robertson and Keeling 2008, Brookes and Huisman 2009), Australia (Pitman 2009) and Japan (Fuwa 2009).

As regards Portugal, access to higher education for this cohort has been available (since 1967) through the *Exame Extraordinário de Avaliação da Capacidade para Acesso ao Ensino Superior* (Extraordinary Examination of Capacity for Access to Higher Education) (also known as the 'Ad Hoc' Examination). A new system, created in 2006 (under Executive Order 64/2006), lowered the age of access to this exam from 25 to 23 and gave higher education institutions the responsibility of organizing the assessment tests. In accordance with the principles of the Bologna Process, it also has established the possibility of recognizing these students' professional experience and training by assigning them credits for their curriculum. As a result of this lowering of the age of access, but also because of the necessity of attracting new candidates, the number of adults who have not completed secondary school accessing higher education in Portugal has increased in recent years. The case of the Polytechnic Institute of Leiria (IPL), where the present study was conducted, shows that this is increasing. The total of M23 students entering the courses, in recent years, has been 167 (2006/2007); 208 (2007/2008); 397 (2008/2009); 371 (2009/2010). From 2006/2007 to 2009/2010, there is been a percentage increase of over 100%. These numbers correspond respectively to the following percentages of the total of new IPL students: 8% (2006/2007); 8% (2007/2008); 13% (2008/2009); 14% (2009/2010).

The Bologna Process has brought about various changes in the exam, one of the most significant of which was the abolition of the Portuguese language test. This was an eliminatory test, which included reading comprehension and interpretation and writing. These subjects are now included in a general knowledge test performed in many higher education institutions.

Some institutions, such as the IPL, began to organize preparatory courses lasting about six months to support these students as they developed their skills, not only in the field of literacy but also in specific areas related to the course they intend to apply for. In IPL, general knowledge is one of the subjects in the preparatory course for students who have not completed secondary school, including the development of written comprehension and writing skills.

In view of the characteristics of these students and the short duration of the course, one of the strategies adopted was to strengthen their reflective attitude,

based on their previous experience, relating it to each subject of the course (culture, society, and economy). It is intended that this focus on reflection, given the connection to the dimension of literacy, should apply to the linguistic and discursive resources deployed for the representation and transmission of knowledge. It is assumed that although these students have developed practical skills in their life experience, they have not recently been in contact with the reality of school and its relationship with knowledge (a relationship which is mainly mediated linguistically in the context of school learning, albeit not exclusively but in combination with other means).

As these students have followed a different and longer path to higher education, we may ask ourselves about the means of representation they bring to the task of building knowledge. It is also possible to compare these with those of younger students who have followed the normal school path, in order to identify common fields and specific needs of each group. These issues are particularly relevant in the context of the Bologna Process for two reasons:

- (1) these students will continue their studies alongside colleagues who have followed the usual schooling path, and
- (2) higher education institutions, in seeking to deliver personal monitoring to students, will face the challenge of providing resources and adopting strategies which will enable these particular students to achieve success (Rau 1999, Moxley *et al.* 2000, Faust and Courtenay 2002, Jongebloed 2002, Flumerfelt *et al.* 2007, Jeffrey 2009).

Against this background, we conducted a comparative study that contrasted the linguistic skills of students attending the preparatory course (which we will designate as M23 students, from the Portuguese expression *maiores de 23*—‘older than 23’) and first-year students who followed the usual path to higher education. Among the fields studied was lexical competence, elicited through a word association test, which gave us the extent of lexical availability relating to particular themes. These themes consisted of the specific modules of general subject knowledge (culture, society and economy), and the topic of Portuguese language. This inclusion is based on the fact that Portuguese language is a transversal competence within general subject knowledge. Besides that, in accordance to the reflective perspective explained above we aimed to activate the ability to take language and the relationship with it as a source of vocabulary elicitation and reflection. In this article, we will compare the two groups with regard to lexical availability.

Lexical availability is a measure of the ability to activate words that belong to a particular category or are related to a particular theme. It can be established through a word association test in which subjects enumerate the words that come into their mind regarding a topic or category (Cachapuz and Haskill 1989, Crowe 1998, Bahar and Hansell 2000, Hernández-Muñoz *et al.* 2006, Urzua *et al.* 2006, Cameron *et al.* 2008). Usually, the subject is given a certain period of time to accomplish this task, and the result of the test corresponds to the number of words produced during that period of time, usually one minute (Maskill *et al.* 1997, Lucas *et al.* 2005, Ardila *et al.* 2006). However, there are also studies in which the time limit is not predetermined (e.g., Hough and Givens 2004, Cameron *et al.* 2008).

The term 'lexical availability' arose under the influence of the sociolinguistics movement that, mainly in Spain and Latin America, undertook studies characterizing the lexicon available to different layers or groups of people (among these we find Bartol Hernández 2005, Hernández-Muñoz *et al.* 2006, Urzua *et al.* 2006, Ríos González 2007, López-García 2008, Echeverría *et al.* 2008). Since the literature derives lexical availability from the ability to associate and to display fluency, there are other names designating these or similar skills such as semantic fluency (Kavé 2006), word fluency (Hough and Givens 2004), categorical fluency (Bahar and Hansell 2000), and the word association test (Cachapuz and Maskill 1987, Maskill *et al.* 1997, Laney *et al.* 1999).

This ability to activate words by association with a category or topic corresponds to the potential lexicon: lexical availability is a concept that derives from a psycholinguistic approach, referring to the potential vocabulary that usually only manifests itself when a word creates an association link capable of activating it (López García 2008: 66)

Contrary to the basic or fundamental lexicon, which is shared by (almost) all the speakers of the language, there is the available lexicon, activated by lexical availability or semantic fluency tests, which varies widely among cultural groups (López García 2008). Educational level is one of the factors strongly related to the results of this kind of lexical competence test (Auriacombe *et al.* 2001, Mathuranath *et al.* 2003, Lucas *et al.* 2005, Mack *et al.* 2005, Cameron *et al.* 2008, Rosselli *et al.* 2009, Soares and Ortiz 2009). Soares and Ortiz (2009) found that among the tests applied (which included tests of oral comprehension, reading, graphical comprehension, naming, lexical availability, dictation and graphical naming of actions and number reading), lexical availability was the one that revealed the greatest difference among the different groups of adults, taking into account the three educational levels considered (1 to 4 years of schooling, 5 to 8, and > 9).

From the psycholinguistic point of view, the word association test is one of the most commonly applied and oldest methods in the investigation of cognitive structure (Bahar and Hansell 2000). The basic assumption here is that the subject when giving answers to the association test reflects, in the words activated and in the order of activation, at least a significant part of their internal organization of concepts and relationships between concepts (Bahar and Hansell 2000).

Lexical availability/word association tests have been used to compare different states of knowledge in learning, and also as pre- and post-tests (Cachapuz and Haskill 1987, Laney *et al.* 1999). Since subjects restructure their knowledge through the acquisition and learning of new terms, the words that embody these changes will appear in the word association test if there has indeed been an effective restructuring.

One of the most studied aspects of lexical availability has been the relationship with age (Bolla *et al.* 1998, Auriacombe *et al.* 2001, Mathuranath *et al.* 2003, Mack *et al.* 2005, Kavé 2006, Cameron *et al.* 2008). While Bolla *et al.* (1998), Auriacombe *et al.* (2001), Mathuranath *et al.* (2003) and Mack *et al.* (2005) focus their studies on older age groups, Kavé (2006) compares several groups of young people (aged 8 to 17 years) with an adult population (between 18 and 29 years old, with an average period of education of 13.9 years). He concludes that in the skills tested, i.e., naming objects represented in pictures, phonemic flu-

ency (generating words that begin with a certain letter) and semantic fluency (on three categories: animals, fruit and vegetables, and vehicles), the subjects showed a positive development between the ages of 8 and 17. Compared to adults, the 16–17-year-olds show no difference in the naming and phonemic fluency tests. However, in the case of semantic fluency, there is still a difference: adults activated more words than the group of teenagers. Kavé (2006) ascribes these differences to an increase in vocabulary, which continues during adulthood or to the further development of recovery mechanisms (retrieval) of the words from lexical memory. At the other end of the spectrum, the influence of age also causes a decrease in semantic fluency at age levels much higher, corresponding to old age (over 75, according to Mathuranath *et al.* 2003).

Among the requirements related to higher education there is the ability to activate relationships, with linguistic means to express them. Higher education, through the training it offers, will make available a large amount of vocabulary associated with specific areas of the courses. The question that arises is whether, at the moment of entering higher education, lexical availability in transversal and open areas, such as culture, society and economy, and also language taken as a topic, is substantially the same or different for students who come in along different schooling paths, specifically those who have followed an unbroken path and those who interrupted their schooling and have now returned.

These transversal themes, even if they are not among the topics studied in the course, are broad ranging in knowledge construction. They contribute to establishing the relationship of specific knowledge to society and so continue to play an important role in people's participation in the community. Therefore, alongside the basic categories (animals, fruit, vegetables, etc.) that have been used in studies comparing different social groups, or topics related to skills and expertise (measuring the learning already achieved), the general transversal themes should also be an object of study, because they are related to the capacity to establish cognitive and communicative relationships. This means that the knowledge associated with these themes is mobilized in order to construct representations of the world, to assign meanings to reality, and to share these meanings with others.

The present study

The objectives of this study were to characterize the performance of applicants to higher education who had not completed secondary-level education (M23) with regard to lexical availability and to compare it with the performance of younger students who had followed the usual school path to higher education. A number of questions arise from both a socio-cultural and a psycholinguistics perspective. As for the socio-cultural perspective, the question arises whether the specific characteristic of this group, namely the relationship of these students with schooling, including the interruption in order to enter the world of work, shows in their scores for lexical availability. From the psycholinguistic point of view, there arises the question whether the withdrawal from education was accompanied by a cognitive rearrangement, which could show up in lexical resources and in structure activation. The better we know this specific group of M23 students as applicants to higher education, the better will be the guidance provided in the preparatory course and in the following years of academic education.

The knowledge focused on in this article has a lexical nature and consists of the capacity to activate elements and relationships in association with a theme. These elements and relationships can be the basis to further elaborate reflection and knowledge in association to the theme. One area in which this knowledge emerges is writing, because it involves the activation of prior knowledge and the reconstruction of a network of relationships that may or may not be incorporated into the text. In the process of writing, during the preparatory phase (planning), some of the strategies that can be followed, such as brainstorming, are similar to the instrument used in this study. This instrument can therefore be mobilized in the context of writing tasks in order to help students reactivate prior knowledge and establish relationships based on it.

The analyzed themes are transversal, corresponding to the topics studied in the general knowledge subject within the preparatory course (Portuguese language, culture, society and economy). These themes are not only present in the educational curriculum but they are also mobilized in society, in an extended way.

Material and methods

Participants

The group of adult participants consists of 80 students who attended the general knowledge subject in the preparatory course with a view to sitting the M23 tests in the 2008/09 school year at IPL. In the curriculum, the general knowledge subject is for students who have not completed secondary education (to the 12th year). Accordingly, all the students from this group included in this study have in common the fact that they have not completed the 12th year. These 80 students represent more than half (60%) of the 132 students attending the general knowledge subject. In total, the M23 preparatory course came to 280 students, the majority having completed secondary education, and consequently not required to attend the general knowledge subject.

The students who followed the normal path to higher education and were now in their first year are the control group for comparison in this study. This group also comprises 80 students, making for a sample of equal size. These students are following higher education courses in different areas such as social sciences, technology and teacher training (in the areas of language, physical education, musical education, mathematics and natural sciences). The average age of these students is 18.6 years. The age limit defined for this group study was 19 years (the ages in this group varying between 17 and 19 years old).

Naturally, the group of adults (M23 students) presents a greater variation in age and education, as shown in the following sections.

Age. These students' age varies between 23 (the minimum age for the programme) and 57 years old. The average age is 32.7 years. There is a high proportion of students whose age is below 30 (51.3%).

Education. The average level of years of school attendance of these students is 10.9, which corresponds to the secondary level. A significant number of these students (35, corresponding to 43.8%) have attended the last year of secondary school (12th year), but without completing it successfully, as is shown in figure 2.

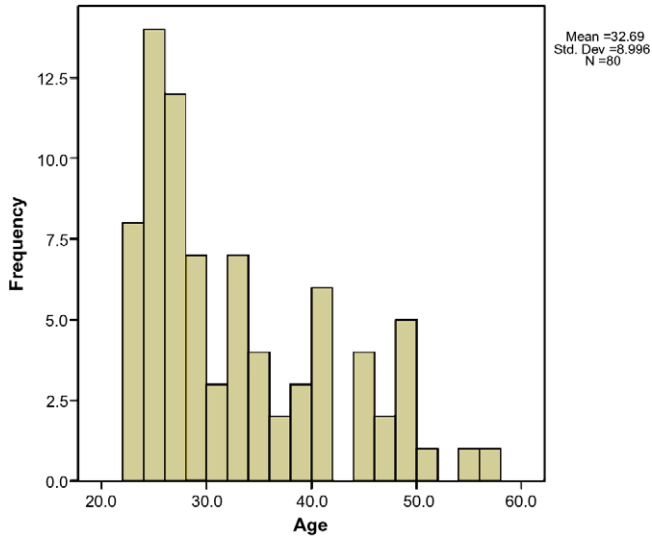


Figure 1. Age

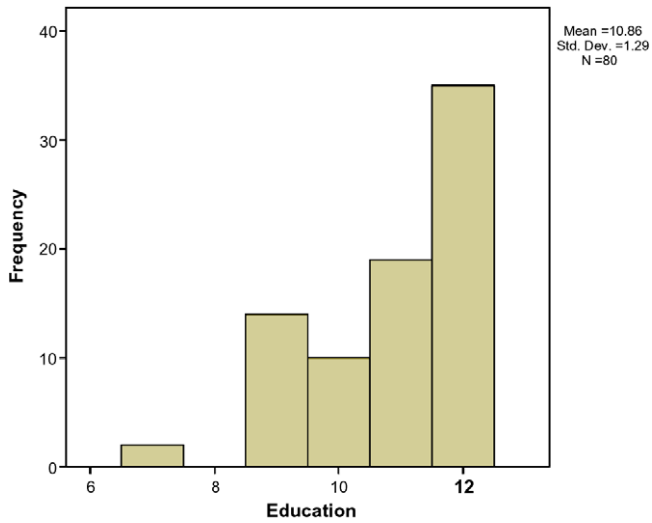


Figure 2. Education

As for other descriptors such as employment, the data collected show that a large number of the individuals have a job (69, corresponding to 87.3%). Only nine students (9%) are unemployed, and two gave no response.

The courses chosen are from different fields, such as management (21), engineering (25), education sciences and social disciplines (16), health (9), design (3), sport (4) and tourism (2), corresponding roughly to the courses taught at IPL.

Task. For the lexical availability task, students received a sheet of paper where each side was divided into vertical columns with the theme indicated at the top

(Portuguese language, culture, society and economy). As said above, these themes correspond to the areas focused on in the general knowledge subject of the M23 preparatory course. Students were asked to write in each column all the words or phrases that crossed their minds in response to the topic at the top. To carry out the task the students used writing. Oral answers are often asked for in word fluency tasks outside the school context, requiring an individual methodology. In the school context, writing answers is a natural and normal task. In relation to this test, written answers were also adopted in previous studies (for example, Maskill *et al.* 1997). This procedure enabled a simultaneous application of the task to the whole class.¹

Analysis. The data from the vocabulary activation or lexical availability task were examined according to the following indicators: number of words, frequency of each term, and also, in the case of the theme 'Portuguese language', the level of nuclearity or centrality of the terms associated with it. Number and frequency are related to, respectively, the total number of words given by each subject and the occurrence of each term across all the subjects in each group. The level of nuclearity or centrality in relation to each theme focuses on the nature of the relationship established with the theme.

The first indicator, the number of words activated, provides a measure of the ability of each subject to evoke associative relationships with the themes. This measure will allow us to establish whether there are statistically significant differences between the two groups. The presence of more than one theme will reveal whether the presence or absence of differences is limited to one or more specific themes or tends to be widespread.

The second indicator, frequency, reveals the words that in each group are the most representative of the relationship that the subjects in that group establish with the theme. At the other end of the spectrum from the most frequent words, the frequency results reveal which words were unique (i.e., emerged individually in the association with the theme). In addition to focusing attention on the most common words, which emerged in the group as the terms most representative of the association with the theme, we performed an analysis of frequency according to four levels:

- level 1, for words with a single occurrence, i.e., given by only one individual;
- level 2, for words with a frequency between two and nine occurrences;
- level 3, for a frequency between 10 and 19 occurrences; finally,
- level 4 for words with a frequency equal to or greater than 20 (which corresponds to mention by at least 25% of the participants in each group).

Level 1 corresponds to an index of originality in the word activation task.

The dimension of centrality or nuclearity refers to the semantic relationship that the words establish with the theme. For this dimension, a content analysis was conducted, based on three levels. At the first level, corresponding to the most central or the nearest to the core, the relationship is established in a more restrictive level and joins the two terms in a direct lexical/categorical relationship of inclusion. Thus, at this first level, the theme is the category and the lexical items included in the area are defined by that category. It is not necessary to activate any relationship with another more general category that includes both

terms to establish the relationship between these words. For instance, we can find this relationship between the terms *verb*, *noun*, etc. as elements of the category '(Portuguese) language'. The second level extends the relationship and includes words whose relation to the theme is activated in a broader context, shared with adjacent themes, in which the word does not maintain a relationship only with the first theme. For instance, the terms *classroom*, *learning*, *teacher*, etc., maintain a relationship with the theme 'Portuguese language' that is parallel to the relationship with other school subjects. This relationship is established within the broader context of school, which includes Portuguese language and other subjects. Finally, the third level corresponds to the relationship established by the theme with larger areas. This level corresponds to the relationship that the theme itself, 'Portuguese language', maintains as a whole with areas and terms such as *culture*, *history*, *homeland*, *society*, etc.

Operationalizing the analysis according to these three levels causes some problems for such broad, transversal themes as culture and society. Due to their amplitude, these themes can embrace a rather diversified set of words and relations, and the conceptual schemes that are activated can be very personal. The themes 'economy' and 'Portuguese language', as school subjects, have their own specific vocabulary, which is also activated as an object of study at school. It is thus possible to perform the analysis according to the levels considered. However, economy is a subject followed at school only by students from a particular area, so that access to these words through schooling is not generalized across the population. On the contrary, the theme 'Portuguese language' corresponds to a school subject followed by all students of all levels of education. For these reasons, the analysis of nuclearity or centrality was restricted to the theme 'Portuguese language'.

To perform the analysis of this area, Portuguese language, and according to what was said above, the following criteria were adopted:

- level 1, the most central one, concerning specific words, such as those emerging from the school curriculum or specific to this domain;
- level 2, of lower specificity, activating collateral relations, concerning, *inter alia*, words related to school, learning, aspects and elements that are common to other school subjects, and descriptions shared with other areas that do not belong to the language field;
- level 3, corresponding to a greatest distance from the core, situating the relationship with the theme in a larger context and providing common words from other areas of society.

Being a transversal theme, as with the other themes, Portuguese language can be taken from a broad perspective or from a more academic viewpoint, activating knowledge that has been built up since early schooling. Therefore, this theme satisfies the criterion of testing whether the words and relationships learned at school are activated and prominent, even in the case of students who moved away from school, or whether those words and relationships have been supplanted by other terms and relationships.

To ensure uniform treatment across the groups, the analysis was performed using a single list including the words from the two groups, without identifying to which group or groups they belonged. Two independent raters assigned the

levels. A very high degree of agreement (98%) was found, and the few cases of disagreement concerned related words such as *dialogue*, *expression*, etc., which are general, but also appear in the specific words of the theme. These cases were resolved by adopting the criterion of including these words under the expertise lexicon (level 1) since they belong to it, even though they have other uses in other contexts and domains.

Results

The results for the number of words expressed in the lexical availability task are presented in table 1, for the students of the M23 group and for the first year students.

For the global values, the difference between the two groups is quite marked. The M23 students show significantly lower results, as established by the *t* test of independent means. The lower average results for the M23 group are found in all themes and with significant contrasts.

As for frequency, the results of the analysis considering the different levels are presented in table 2, which presents the total number of words achieved at each level.

The results presented in table 2 show that the highest frequency (level 4) is rarely found in the M23 group, while a much higher number of words reach this level in the first year group (in total, the contrasting values are, respectively, 3 and 30 and the percentages 0.2% and 2.1%). At the other extreme, the occur-

Table 1. Lexical availability: mean number of words

	M23	1 st year	<i>t</i> test (<i>t</i> =)	Signif. (<i>p</i> =)
Global	32.2	51.6	-7.401	.000
Portuguese language	8.8	14.3	-6.069	.000
Culture	8.3	11.8	-4.758	.000
Society	6.8	12.8	-7.635	.000
Economy	8.2	12.7	-5.436	.000

Table 2. Levels of frequency

Themes	M23 levels				1st year levels			
	1	2	3	4	1	2	3	4
Port. lang.	259	83	11	1	191	114	16	10
Culture	227	59	10	2	276	90	13	8
Society	252	65	4	0	315	133	9	5
Economy	253	85	6	1	232	90	19	7
Total	991	292	33	3	1014	359	57	30
%	75.1	22.1	2.5	0.2	69.4	24.6	3.9	2.1

Table 3. Originality (mean of original words per participant)

	M23	1 st year	<i>t</i> test (<i>t</i> =)	Signif. (<i>p</i> =)
Global	12.4	12.5	.101	.919
Portug. language	3.2	2.3	1.939	.054
Culture	3.0	3.5	-1.007	.315
Society	3.0	3.9	-1.810	.072
Economy	3.2	2.3	.659	.511

rences of the least frequent level are very similar for both groups. These values give rise to the index of originality.

The average values for the originality index, presented in table 3, were calculated on the basis of the number of original words submitted by each subject. Based on these values, the *t* test of independent sample was applied, but the results do not show significant contrasts. The means of the two groups are very close. Globally, the *t* test shows a *t* value of .101, *p*=.919. Despite this overall value, the themes do not have all the same degree of contrast. The themes 'Portuguese language' and 'society' are closer to the significance threshold. However, even in the case of these two themes, the overall difference between the two groups is clearly attenuated for the index of originality.

Combining the results of the two tables (2 and 3), we can observe that in the M23 group, there are fewer subjects activating a wide range of common words. It is mainly in relation to those common or more frequent words that the difference emerges with first-year students (the value of *t* calculated solely with the values of levels 2, 3 and 4 confirms and reinforces the overall contrast already found: *t*=19.175, *p*=.000).

In addition to the distribution of frequency levels of frequency, which include singular occurrences, the aim was to discover whether the more frequent words in the two groups were the same. The following table presents the most frequent words in each group.

The results presented in table 4 show that no word under any of the four themes is indicated by all the group members, in either the M23 group or among the first-year students. The words with the highest frequency values appear in the first-year group, with a frequency of 54 occurrences (*dinheiro* [money] for economy), 44 occurrences (*livro/s* [book/s] for the Portuguese language) and 43 (*pessoas* [people] for society) in 80 subjects. In general, the M23 group provides lower frequencies, especially for the first items.

The coincidence of the most frequent words in each group is only partial: it corresponds to 23 words across the 40 and varies between five and seven words per theme; note that the most frequent word in the M23 group for the Portuguese language theme (*Camões*) does not appear among the most common words for the first-year students.

The results presented so far have shown that the M23 group activates the set of the words common to several subjects to a lesser extent. This provides evidence that the lexical availability manifested by this group is based to a greater degree on relations established in a more personal way. In a perspective of lifelong education, we here consider the possibility that this approach would not only be 'lifelong' but also be 'life-wide', to adopt the expression of Kirby *et al.*

	<i>Economy</i>		<i>Society</i>					
	<i>M23</i>	<i>Occ. 1st year</i>	<i>M23</i>	<i>Occ. 1st year</i>				
1	<i>Bolsa val. (Stock exch.)</i>	29	<i>Dinheiro (Money)</i>	54	<i>Cultura/s (Culture/s)</i>	26	<i>Pessoas (People)</i>	43
2	<i>Dinheiro (Money)</i>	26	<i>Banco/s (Bank/s)</i>	31	<i>Lei/s (Law/s)</i>	25	<i>Comunidade (Community)</i>	28
3	<i>Banco/s (Bank/s)</i>	17	<i>Bolsa val. (Stock exch.)</i>	30	<i>Pessoas (People)</i>	19	<i>Grupo/s (Group/s)</i>	24
4	<i>Gestão (Management)</i>	14	<i>Números (Numbers)</i>	28	<i>Respeito (Respect)</i>	19	<i>Cultura/s (Culture/s)</i>	22
5	<i>Crise (Crisis)</i>	10	<i>Bens (Goods)</i>	21	<i>Convívio together</i>	19	<i>Comunicação/ões (Communication/s)</i>	20
6	<i>Finanças (Finances)</i>	10	<i>Contas (Account)</i>	20	<i>Educação (Education)</i>	17	<i>Família/s (Family/ies)</i>	16
7	<i>Poupanças (Savings)</i>	9	<i>Crise (Crisis)</i>	20	<i>Grupo/s (Group/s)</i>	16	<i>Regras (Rule/s)</i>	15
8	<i>Empresas (Companies)</i>	8	<i>Compras (Purchase)</i>	18	<i>Regras (Rule/s)</i>	14	<i>Pobreza (Poverty)</i>	13
9	<i>Inflação (Inflation)</i>	8	<i>Empresas (Companies)</i>	17	<i>Religião (Religion)</i>	14	<i>União (Union)</i>	12
10	<i>Moeda (Currency)</i>	8	<i>Matemática (Mathematics)</i>	14	<i>Comunidade (Community)</i>	14	<i>Crianças (Children)</i>	11
...

Note: The items in italic appear in both groups

Table 5. Levels of nuclearity—Portuguese language

	<i>M23</i>	<i>1st year</i>	<i>t</i> test (<i>t</i> =)	<i>Signif.</i> (<i>p</i> =)
Level 1	5.0	10.7	−7.050	.000
Level 2	1.0	2.2	−4.905	.000
Level 3	2.7	1.4	3.093	.000

(2010). According to this perspective, other elements of experience besides formal education should be part of learning. The higher level of personalization revealed by the lexical availability of M23 students is in keeping with this perspective. The challenge is to enhance the relevant knowledge brought by this personal experience to the learning that students should achieve in higher education. On the other hand, this higher level of personalization may offer significant support to creativity. The connection between creativity and lifelong learning is advocated by Su (2009), who locates this on the dimension of producing ideas. The instrument used in this study is relevant to the ideation process. M23 students can mobilize their experiences of life, elicited through the lexical availability tasks. Subsequently they can work on them in order to establish the relationship between them and the new knowledge they are acquiring. In so doing, they are adopting the ‘life-wide’ perspective that Kirby *et al.* (2010) claim.

One question that arises is what lexical layers are available for each group and which routes or strategies are followed for vocabulary activation. As the Portuguese language theme is both a school subject with its own specialized vocabulary and a transversal theme in everyday life, it becomes possible to determine whether the extent of lexical availability revealed by each group lies more in words that are a result of education or in words that originate beyond school learning. In addition, as the contrast between the two groups is a matter of their educational career, an analysis of the results permits observation of the extent to which the words associated with school learning remain active in the M23 group.

The analysis of centrality or nuclearity, as established above in association with the curricular school subject ‘Portuguese language’ reveals whether the words that are activated by each group are based to different degrees on the specific language of school learning or on the more general relationships established through language. The results are presented in table 5, showing the distribution for the three levels of nuclearity established.

We can observe that the highest values are found in both groups at level 1, corresponding to the closest relationship to the theme and including the words that were the object of school learning, in association with the curriculum subject Portuguese language, in the different domains (reading, writing, speaking and grammar). Levels 2 and 3, corresponding to the extended school circle and to the extramural society circle respectively, have lower values.

The M23 group shows lower values than those of the first-year students in the results corresponding to levels 1 and 2, but has a higher value at level 3. All these differences are significant. The differences between the groups relating to level 1 and level 2 support the overall difference previously presented: it is at these levels that the M23 group shows lower results. In the case of level 3, the

situation is reversed: the M23 group has a greater number of words activated at this level than the first-year group. However, the higher value at this level is not enough to change the global situation, characterized by the M23 group activating a smaller number of items throughout the lexical availability task.

M23 students do present higher values at level 3, showing that this group has greater activation of relations in which the nucleus corresponding to the Portuguese language is associated with other fields. These relations are established inside the broad social context that includes language and where it receives its functions.

Discussion

The results show that the M23 students (adult applicants for entry into higher education) have lower lexical availability in the transversal themes of Portuguese language, culture, society and economy in comparison with first-year students who have accessed higher education via the normal route of secondary education.

Lexical competence is a basic resource in linguistic tasks. Some of these, as is the case in writing, will allow participants to devote more time to activating and exploring their prior knowledge. A high level of lexical knowledge, namely knowledge of vocabulary that could be included in a text, is an important factor determining success in writing (Muncie 2002, Smith 2003, Stæhr 2008, Wolsey 2010). Greater ability to activate terms and relations endows the subject with a wider range of options at the time of writing the text. In writing, this kind of activation is often mobilized, during initial planning and idea generation, particularly through brainstorming, which is an activity similar to the instrument that was used in this study.

In higher education, writing is one of the essential skills of successful students. This ability to activate terms and relations in connection with a theme (on which the task of word association used in the measurement of lexical availability is based) is a relevant factor and is related to performance on writing tasks that students are asked to carry out in higher education, namely in the production of expository and argumentative texts. However, despite the congruence between the two competences, the issue of the relationship between the availability of lexical resources and school performance, especially in writing tasks, should be a matter of further investigation. In fact, word association or word fluency tasks have their own requirements, and the different subjects may be more or less comfortable when the time comes to deploy specific strategies to satisfy the demands of the task. It may be hypothesized that these strategies will mainly be activated during planning, but also during the writing process, in order to generate ideas. However, the complexity of the writing process and the diversity of strategies that may be followed to achieve it may also imply that a diversity of strategies will be followed to activate the terms and the relationships required for writing. The strategy of previously constituting a thesaurus of words from which the relevant ideas will be selected is not the only one that can be followed. We may also consider the possibility that the relevant relations will be activated as the text is being constructed, arising predominantly *at the point of the utterance* (Britton 1978). Even if the thesaurus is constructed, through brain-

storming or some other content generation strategy, the writer is not limited to the terms that have been previously activated.

On the other hand, since lexical availability is a basic competence, poor performance in this task may reveal difficulties in the activation of terms and relations. The adoption of strategies to overcome those difficulties, based on the task of word association, exploring specific pathways to activate new terms and relationships, may be reflected in the component of idea generation involved in writing tasks. But this also deserves particular investigation.

A question arises as to the causes of this difference in the results. There are two main factors that make a difference between the two groups: age and education. Regarding age, this factor has been considered as having a negative effect on verbal fluency in particular categories, but only at very high age-levels, i.e., in old age (Bolla *et al.* 1998, Auriacombe *et al.* 2001, Mathuranath *et al.* 2003, Mack *et al.* 2005). The M23 students, with a mean age of 32.7 years, are still far from attaining that age. There is therefore no basis to assign the difference between the two groups to decreasing capacity caused by age in the skill of semantic retrieval of words. On the contrary, Kavé's study (2006) found results that point to continued vocabulary development or improvement in lexical retrieval mechanisms into adulthood. Kavé (2006) found better results for the group of young adults as opposed to adolescents, contrary to what has emerged from our study.

The explanation for this discrepancy between the groups may be searched in the other factor: education. Studies that have focused on this factor have shown a positive influence of education on lexical availability (Auriacombe *et al.* 2001, Mathuranath *et al.* 2003, Lucas *et al.* 2005, Mack *et al.* 2005, Cameron *et al.* 2008, Rosselli *et al.* 2009, Soares and Ortiz 2009). In the case of the two groups in our study, there is a contrast in the education level achieved, although it is not very marked (means of 10.9 vs. 12 years). It is perhaps more important to considering the presence of a different relationship to school. In fact, the subjects of the M23 group have experienced in their lives an interruption of school attendance for a more or less extended period. Consequently, between the two groups, there is not just a difference in educational achievement, but also the influence of the M23s' withdrawal, which may have caused disruption of cognitive processes associated with school learning and of contact with certain layers of vocabulary associated with those transversal themes. The interruption of studies may also be associated with problems in the relationship with school, which may have had consequences for the learning achieved by these students. Therefore, our results point to an explanation related to the cognitive resources provided by school learning (Maskill *et al.* 1998) and to continuous reorganization of lexical skill. The development of lexical ability relies on the subjects' experiences at the different periods of their lives, which function as sources of vocabulary. Their lexical competence will make salient the lexical resources required at different periods of life. In the case of M23 students, school has become more distant in time. In accordance with our results, this factor may have caused a lower availability in relation to the lexicon themes studied in school in association with the themes of Portuguese language, culture, society and economy. The M23 group may to some extent have reorganized their strategies of lexical activation. The school acts as a harmonizing factor, providing shared access to lexical resources. In fact, in the subset of the words with a single occurrence, there are no significant contrasts between the groups. The contrast arises when we consider the

subset of words that are shared with other group members. Therefore, first-year students share the words activated to a greater extent, i.e., there are more group members who activate the same words. It is from this factor that the higher values presented by the first-year students for the number of words result. As for the ability to establish original relations (i.e., corresponding to the words that were activated by others inside the group), the results show similar levels in both groups.

The analysis of the Portuguese language theme presents a relevant educational dimension, as it was a subject of study in school for all the participants. The results showed some aspects that may be associated with lexical reorganization. In the M23 group we found a more salient presence of relations established with the theme deriving from a wider social context, specifically with regard to aspects of social identity to which language is also related. By contrast, first-year students tend to find the words for the relationships that they activate mainly through mobilizing school knowledge, which is still quite fresh in their minds. The strong predominance of words of the highest level of nuclearity (level 1) indicates a greater presence of the operations of specification and analysis in the case of the first-year group.

Indeed, these results show that the two groups mobilize their strategies for vocabulary activation with different emphases. In the case of the M23 group, there is a stronger presence of the strategy corresponding to establishing *collateral* or *surface* relations in association to the theme of Portuguese. The mobilization of adjacent words and concepts in the broader context of social phenomena supplants the values of the first-year group. In turn, this group bases vocabulary activation to a greater extent on the strategy of establishing depth relationships, i.e., relations resulting from the specification and analysis of the different areas from the study of the Portuguese language.

Conclusion

The present study revealed differences in lexical availability between adult students (aged over 23) attending the preparatory course for the exams permitting access to higher education and first-year students who followed the normal academic route to enrolling in a course of higher education.

These results confirm and expand the position that the level of lexical availability is influenced by the level of education. This factor appears in our study of higher education levels than those studied by Smith and Ortiz (2009), who mainly considered contrasts between education levels lower than that of secondary education. Our study found contrasts between adults aged over 23 who have achieved different school levels but did mostly attend secondary school, and first-year students in higher education. The results that we obtained indicate that, besides the influence of the educational level attained, we must therefore also consider the influence of factors related to dropping out of school for a certain period of time. These factors may be relevant even when the level of education attained by subjects already goes beyond primary education (as with the vast majority of adult participants in our study).

In fact, the drop-out experience of the M23 group may be reflected in the levels of lexical availability attained. The analysis indicates that interrupting

school may affect the strategies and relations activated in retrieving words in the lexical availability task. While superficial and collateral relations increase, deep relations, requiring a greater mobilization of analytical skill, tend to decrease. Another difference that becomes evident is the reduction of the number of words with high frequency within the group. These words correspond to relationships that are activated by a large number of members of the group. School knowledge functions as a source and as a lexical reference. Interrupting school attendance leads to a greater weight of more individualized words and relationships.

Even if the differences already exist at the time that M23 students leave school and are not entirely a consequence of the withdrawal, the period in which students did not attend school does not annul these differences. Upon return to school, which M23 students seek to try to enter into higher education, there comes the challenge of enhancing the life experience that these students have acquired. A fundamental of this challenge is that the return to studies must be taken not only from the perspective of lifelong, but also from the perspective of 'life-wide' learning, to reiterate the words of Kirby *et al.* (2010).

One specific finding should be emphasized: the more individualized words and relationships that emerge in the results of the M23 students imply a challenge to use the life experience of these students to develop their creativity, namely in relation to the process of idea generation (Su 2009). Likewise, the finding that M23 students present a lower presence of analytical strategies also represents a challenge: subsequent learning must help these students to develop their analytical skills.

Lexical skill, here measured as availability, is a variable skill that is adjustable to the needs of different moments of one's personal and professional life. At the point when M23 students want to change the course of their lives by attending a course of higher education, this step will have some implications for the lexical skills and operations that will be required and that they must retrieve.

On the basis of this understanding, it will be necessary to search for strategies that promote the development of these skills. According to the results obtained in our study, we can include among these strategies those that promote the depth analysis of a theme and others that promote contact with other perspectives on the same theme, in order to discover the relationships that other people establish with it. Activity designed to stimulate vocabulary activation, which formed the basis of our study, can be used to develop these strategies. It can be complemented by activities of sharing and comparing the words activated by different participants, making explicit the relationships established with the theme, a search for new words and relationships, confrontation between the lexical availability expressed at different times of learning the theme, for example, between the beginning and the end of a module devoted to a specific theme. This last possibility makes it possible to monitor the learning and cognitive changes, as Cachapuz and Maskill (1987: 111) claim, arguing that word association tests have the potential to be used by teachers to follow the learning of science concepts: 'The results show the potential of word association tests for use by teachers to follow the learning of concepts during science teaching.'

The development of lexical skills (through analysis of different layers of vocabulary) will help reduce the contrasts found and will favour resumption of education for this group of adults through entrance into a higher education

institution. It will strengthen the link to the experience they have already gained and will mobilize the experiences and unique perspectives that these adult students bring to learning situations (Rau 1999, Sachs 2001, Faust and Courtenay 2002, Ballester *et al.* 2005, Zepke 2005, Moore 2006, Rønning 2009, Su 2009). As Sachs (2001: 267) says:

Adult learners present educators with unique challenges. Not only are they typically older than their undergraduate counterparts, but also they are more mature in terms of their life and professional work experiences.

This experience emerges in lexical activation and can be targeted to the construction of knowledge in the new context of higher education. As Langer (2002: 899) emphasizes:

The best-designed adult learning aims to minimize the disadvantages and maximize the advantages of the experience adults bring with them to learning. Adult learners have had experience of the world and often some experience of the subject they have decided to learn.

Lifelong learning makes imperative the challenge of searching for and putting into practice strategies directed to adult students in order to ‘minimize the disadvantages and maximize the benefits’ in higher education.

Note

1. As for the completion time for the task, it was considered that the typical duration of one minute for each theme would be insufficient. The duration of task was intended to make possible deep and large activation of words related to the theme. The students were consequently given 20 minutes to complete the test. At the beginning of the task, students were warned that they should divide the available time over the four themes, devoting roughly five minutes to each. These time procedures were the same for each group, both the first-year students and the M23 students. This task was performed at the beginning of the school year, during a regular lesson.

References

- ARDILA, A., OSTROSKY-SOLÍS, F. and BERNAL, B. (2006) Cognitive testing toward the future: The example of semantic verbal fluency (ANIMALS). *International Journal of Psychology*, **41**, 324–332.
- AURIACOMBE, S., FABRIGOULE, C., LAFONT, S., JACQMIN-GADDA, H. and DARTIGUES, J.-F. (2001) Letter and category fluency in normal elderly participants: A population-based study. *Aging, Neuropsychology, and Cognition*, **8**, 98–108.
- BAHAR, M. and HANSELL, M.H. (2000) The relationship between some psychological factors and their effect on the performance of grid questions and word association tests. *Educational Psychology*, **20**, 349–364.
- BALLESTER, L., ORTE, C., MARCH, M.X. and OLIVER, J.L. (2005) The importance of socioeducational relationships in university programs for older adult students. *Educational Gerontology*, **31**, 253–26.
- BARTOL HERNÁNDEZ, J. (2005) Extranjerismos disponibles su integración y vitalidad en una comunidad de habla (Provincia de Soria, España) [Available foreign words and their integration in a speech community (Soria region, Spain)]. *Spanish in Context*, **2**, 203–229.
- BOLLA, K.I., GRAY, S., RESNICK, S.M., GALANTE, R. and KAWAS, C. (1998) Category and letter fluency in highly educated older adults. *The Clinical Neuropsychologist*, **12**, 330–338.
- BRITTON, J. (1978) The composing processes and functions of writing. In C.R. COOPER and L. ODELL (eds.) *Research on composing: Points of departure*. (Urbana, IL: National Council of Teachers of English), pp. 13–28.

- BROOKES, M. and HUISMAN, J. (2009) The eagle and the circle of gold stars: Does the Bologna process affect US higher education? *Higher Education in Europe*, **34**, 3–23.
- CACHAPUZ, A.F.C. and MASKILL, R. (1987) Detecting changes with learning in the organization of knowledge: Use of word association tests to follow the learning of collision theory. *Journal of Quantitative Linguistics*, **12**, 111–122.
- CAMERON, R.M., WAMBAUGH, J.L. and MAUSZYCKI, S. (2008) Effects of age, gender, and education on semantic fluency for living and artifact categories. *Aphasiology*, **22**, 790–801.
- CROWE, S.F. (1998) Decrease in performance on the verbal fluency test as a function of time: Evaluation in a young healthy sample. *Journal of Clinical and Experimental Neuropsychology*, **20**, 391–401.
- ECHEVERRIA, M., VARGAS, R., URZUA, P. and FERREIRA, R. (2008) DispoGrafo: Una nueva herramienta computacional para el análisis de relaciones semánticas en el léxico disponible [DispoGrafo: a new computational tool to analyse semantic relations in the available lexicon]. *Revista de Lingüística Teórica y Aplicada*, **46**, 81–91.
- FAUST, D.F. and COURTENAY, B.C. (2002) Interaction in the intergenerational freshman class: What matters. *Educational Gerontology*, **28**, 401–422.
- FLUMERFELT, S., INGRAM, I., BROCKBERG, K. and SMITH, J. (2007) A study of higher education student achievement based on transformative and lifelong learning processes. *Mentoring and Tutoring: Partnership in Learning*, **15**, 107–118.
- FUWA, K. (2009) Is the expansion of higher education in Japan for young students only or for all? A critical analysis from a lifelong learning perspective. *International Journal of Lifelong Education*, **28**, 459–471.
- HERNÁNDEZ-MUÑOZ, N., IZURA, C. and ELLIS, A.W. (2006) Cognitive aspects of lexical availability. *European Journal of Cognitive Psychology*, **18**, 730–755.
- HOUGH, M.S. and GIVENS, G.D. (2004) Word fluency skills in dementia of the Alzheimer's type for common and goal-directed categories. *Aphasiology*, **18**, 357–372.
- JAKOBI, A.P. and RUSCONI, A. (2009) Lifelong learning in the Bologna process: European developments in higher education. *Compare: A Journal of Comparative and International Education*, **39**, 51–65.
- JEFFREY, L.M. (2009) Learning orientations: Diversity in higher education. *Learning and Individual Differences*, **19**, 195–198.
- JONGBLOED, B. (2002) Lifelong learning: Implications for institutions. *Higher Education*, **44**, 413–431.
- KAVÉ, G. (2006) The development of naming and word fluency: Evidence from Hebrew-speaking children between ages 8 and 17. *Developmental Neuropsychology*, **29**, 493–508.
- KIRBY, J.R., KNAPPER, C., LAMON, P. and EGNATOFF, W.J. (2010) Development of a scale to measure lifelong learning. *International Journal of Lifelong Education*, **29**, 291–302.
- LANEY, J.D., WIMSATT, T.J., MOSELEY, P.A. and LANEY, J.L. (1999) Children's ideas about aging before and after an integrated unit of instruction. *Educational Gerontology*, **25**, 531–547.
- LANGER, N. (2002) Enhancing adult learning in aging studies. *Educational Gerontology*, **28**, 895–904.
- LÓPEZ-GARCÍA, Á. (2008) Disponibilidad léxica, gramatical y textual [Lexical, grammatical and textual availability]. *Lingüística Española Actual*, **30**, 65–86.
- LUCAS, J.A., IVNIK, R.J., SMITH, G.E., FERMAN, T.J., WILLIS, F.B., PETERSEN, R.C. and GRAFF-RADFORD, N.R. (2005) Mayo's older African Americans normative studies: Norms for Boston naming test, controlled oral word association, category fluency, animal naming, token test, Wrat-3 reading, trail making test, Stroop test, and judgment of line orientation. *The Clinical Neuropsychologist*, **19**, 243–269.
- MACK, W.J., TENG, E., ZHENG, L., PAZ, S., CHUI, H. and VARMA, R. (2005) Category fluency in a Latino sample: Associations with age, education, gender, and language. *Journal of Clinical and Experimental Neuropsychology*, **27**, 591–598.
- MASKILL, R., CACHAPUZ, A.F.C. and KOULAUDIS, V. (1997) Young pupils' ideas about the microscopic nature of matter in three different European countries. *International Journal of Science Education*, **19**, 631–645.
- MATHURANATH, P.S., GEORGE, A., CHERIAN, P.J., ALEXANDER, A., SARMA, S.G. and SARMA, P.S. (2003) Effects of age, education and gender on verbal fluency. *Journal of Clinical and Experimental Neuropsychology*, **25**, 1057–1064.
- MOORE, E. (2006) Educational identities of adult university graduates. *Scandinavian Journal of Educational Research*, **50**, 149–163.
- MOXLEY, D.P., NAJOR-DURACK, A. and DUMBRIGUE, C.Y. (2000) Seven strategies for facilitating access of nontraditional students to graduate education in social work. *Social Work Education*, **19**, 335–348.
- MUNCIE, J. (2000) Process writing and vocabulary development: Comparing lexical frequency profiles across drafts. *System*, **30**, 225–235.
- PITMAN, T. (2009) Recognition of prior learning: The accelerated rate of change in Australian universities. *Higher Education Research and Development*, **28**, 227–240.
- RAU, E. (1999) Non-traditional students in a traditional system of higher education: The German case of formally non-qualified students. *Higher Education in Europe*, **24**, 375–383.

- RÍOS GONZÁLEZ, G. (2007) Diferencias léxicas entre el hombre y la mujer en tres centros de interés: Saludos, temas de conversación y despedidas [Lexical differences between men and women in three main topics: greetings, conversation topics and valedictions]. *Filología y Lingüística*, **XXXIII**, 151–166.
- ROBERTSON, S.L. and KEELING, R. (2008) Stirring the lions: Strategy and tactics in global higher education. *Globalisation, Societies and Education*, **6**, 221–240.
- RØNNING, W.M. (2009) Adult, flexible students' approaches to studying in higher education. *Scandinavian Journal of Educational Research*, **53**, 447–460.
- ROSSELLI, M., TAPPEN, R., WILLIAMS, C., SALVATIERRA, J. and ZOLLER, Y. (2009) Level of education and category fluency task among Spanish speaking elders: Number of words, clustering, and switching strategies. *Aging, Neuropsychology, and Cognition*, **16**, 721–744.
- SACHS, J. (2001) A path model for adult learner feedback. *Educational Psychology*, **21**, 267–275.
- SOARES, E.C. and ORTIZ, K.Z. (2009) Influence of schooling on language abilities of adults without linguistic disorders. *São Paulo Medical Journal*, **127**, 134–139.
- SMITH, C.B. (2003) Vocabulary's influence on successful writing. ERIC Doc.: ED480633. (Accessed June 30, 2010).
- STÆHR, L.S. (2008) Vocabulary size and the skills of listening, reading and writing. *Language Learning Journal*, **36**, 139–152.
- SU, Y.-H. (2009) Idea creation: The need to develop creativity in lifelong learning practices. *International Journal of Lifelong Education*, **28**, 705–717.
- TUSCHLING, A. and ENGEMANN, C. (2006) From education to lifelong learning: The emerging regime of learning in the European Union. *Educational Philosophy and Theory*, **38**, 451–469.
- URZUA, P., SAEZ, K. and ECHEVERRIA, M.S. (2006) Disponibilidad léxica Matemática: Análisis cuantitativo y cualitativo (Lexical availability in Mathematics: A quantitative and qualitative analysis). *Revista de Lingüística Teórica y Aplicada*, **44**, 59–76.
- WOLSEY, T.D. (2010) Complexity in student writing: The relationship between the task and vocabulary uptake. *Literacy Research and Instruction*, **49**, 194–208.
- ZEPKE, N. (2005) Diversity, adult education and the future: A tentative exploration. *International Journal of Lifelong Education*, **24**, 165–178.