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Measuring the Lexical Richness in English Majors' Answers to Examination Papers

Abstract

Language classes are expected to foster the growth in the size of students' vocabulary, first receptively and then productively. Recent test data have indicated a significant growth in students' productive – as opposed to receptive – vocabulary size in the course of one academic year (Hajiyeva, 2015a). This study investigates the relative pace of the growth in the size of productive vocabulary; it includes data for free productive vocabulary knowledge with the intention of exploring the growth in students' vocabulary after ten months of instruction. This required a measurement of the lexical richness as expressed in students' answers to examination papers. The results show that due to increased exposure to various subject-specific courses, students increase their productive vocabulary knowledge. The findings also indicate that such growth does not ensure that students' written answers to examination papers are always accurate in terms of meaning, form, associations, collocations and register. The potential implications of the findings for language teaching and learning are discussed briefly.

Key words: lexical richness, productive vocabulary, academic words, low-frequency words, answers to examination papers

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1. Introduction

A recent study exploring the relationship between receptive and productive vocabulary sizes and their increased use by English majors set out to test the same students at the beginning of both the first and second years of tertiary education (Hajiyeva, 2014; 2015a). The longitudinal data obtained from this study indicated, on the one hand, that there were no signs of growth in the students' receptive vocabulary knowledge, whereas, on the other, their productive vocabulary knowledge grew significantly (Hajiyeva, 2015a). The students' productive vocabulary size grew by 21 per cent and when expressing the raw scores as the number of word families, it grew from 806 word families that were actively known before the intervention to 974 word families actively known after the intervention in one year of study. This offered evidence for Melka's (1997: 100) claim that the distance between receptive and productive knowledge should be regarded as a 'continuum of knowledge' gradually stretching from receptive to productive mastery. Melka's conceptualization implies that after having achieved a certain vocabulary knowledge receptively (e.g. 1,966 word families in our case), students began to transform it into productive vocabulary. This idea better explains the fact that the boundaries between receptive and productive vocabularies are not fixed, but vary according to diverse linguistic factors, types of learning, needs and circumstances (Melka, 1997; Zhong & Hirsh, 2009). This finding of a growth in productive vocabulary knowledge at a lower level of the knowledge continuum is different from the commonly reported pattern of productive vocabulary growth at an advanced level of the knowledge continuum (see Laufer, 1998; Laufer & Paribakht, 1998). I agree with Zhong and Hirsh (2009: 106), who state that productive cannot always grow faster than receptive vocabulary because, if it did, the size of the receptive vocabulary would always be smaller than the productive which would seem unlikely. They rightfully question the time it takes for productive vocabulary knowledge to grow faster than receptive vocabulary knowledge.

In order, therefore, to investigate the relative pace of productive vocabulary growth, I decided to employ some measures of lexical richness which focuses on how many different words are used in a text (see sub-section 2.2 for a detailed discussion) in this follow-up study. In addition to a 'vocabulary-size test of controlled productive ability' (Laufer & Nation, 1999), which served as an instrument in my previous study, I include data for free productive vocabulary knowledge (cf. Laufer & Nation, 1995) and explore whether or not growth is still evident after ten months' instruction. Since using 'student-produced texts' is important in English language teaching, it is essential to gain insights in the 'variation' in these particular texts (Durrant, 2015: 2). This view stems from Hutchinson and Waters (1987), according to whom the above-described observation is based on the premises of English for Specific Purposes (ESP). This reinforces the idea that particular areas of discourse are generally associated with a range of homogenous texts so that limiting teaching to one area can make the learning process more controllable. For example, a study reported by Chung and Nation (2003) states that although technical vocabulary which is largely of interest and use to people working in a specialised field and does not occur in other fields is less noticeable in the applied linguistics text compared to other subjects or fields, they still make up a very large proportion (20.6%) of the running text – much larger than the 5% suggested in Nation

(2001: 12). In this sense, analysing English majors' answers to examination papers will give some insight into the students' existing productive vocabulary knowledge and allow me to explore their productive vocabulary knowledge not only in terms of the frequency lists but also their use of technical/specialised and academic vocabulary and inform the language teachers about the steps to be taken to facilitate their teaching and learning process.

Laufer and Nation (1999) state that learners may be able to formulate a sentence using low-frequency words in both free-from-constraint and constrained contexts such as sentence-writing tasks or a fill-in task which requires supplying a missing word. However, students may be unwilling or reluctant to do so when they write their own compositions or essays. The students' imperfect knowledge, lack of confidence and uncertainty about the correct usage of a word are among the factors that may cause this reluctance (Laufer & Nation, 1999: 37). The researchers, therefore, 'refer to the ability of using a word at one's free will as free productive ability'. This is one way of measuring lexical richness and concerns 'how well words have been used in speech and writing' (Nation & Webb, 2011: 245). This type of measurement is evaluated by various types of measurement tool and program, such as *LFP* (Lexical Frequency Profiles) (Laufer & Nation, 1995), *P_Lex*[1] (Meara & Bell, 2001), *V_Links*[2] (Meara & Wolter, 2004), and *BNC-20 Profile (British National Corpus)* (Cobb, n.d.).

Unlike previous studies that measured the lexical richness of learners' compositions, essays, narratives or presentations on various topics, I now analyse students' answers to examination papers for undergraduate subject-specific elective courses by applying to them some of the above-mentioned frequency-based comprehensive methods (see sub-sections 2.3 for further discussion). By doing so, I measure the lexical richness of the students' answers to examination papers in an attempt to quantify the degree to which they are using a varied and large vocabulary of their own free will.

With these constraints in mind, these research questions are addressed in this article:

1. What is the measurement of lexical richness in learners' answers to examination papers from the perspective of vocabulary growth?

2. How frequently do high-frequency, low-frequency, academic and specialized/ technical words occur in students' answers to examination papers?

1 *P_Lex* measures the lexical complexity of texts in terms of the amount of vocabulary beyond the 2,000-word level (Meara & Bell, 2001).

2 *V_Links* are testing tools that develop a measure of lexical organisation for English (Meara & Wolter, 2004).

2. Theoretical background

2.1 Measuring vocabulary size

Vocabulary knowledge is so closely tied to academic success that it has become an integral component of language learning (O'Dell, 1997; Sinclair & Renouf, 1991; Van de Poel & Swanepoel, 2003). Vocabulary is important in enabling language instructors, researchers and course designers to identify their students' vocabulary knowledge and growth when organising and planning course syllabuses and materials (Nation, 2011). Indeed, the number of words known by learners is the measure of their progress in learning a language (Sinclair & Renouf, 1991). Studies done so far (see Corson, 1997; Leki & Carson, 1994 for further discussion) show that for writers with academic purposes, it is essential to gain productive control of the Graeco-Latin vocabulary of English in order to be recognised as a member of the academic writing community and that students see lack of vocabulary as the major factor affecting the quality of their writing. In this regard, vocabulary plays a significant role in the assessment of the quality of written work (Nation, 2011).

Meara (1996:37) also emphasizes the importance of vocabulary size by pointing to the fact that learners with large vocabularies are more proficient in a wide range of language skills than learners with smaller vocabularies, and that there is some evidence to support the view that vocabulary skills make a significant contribution to almost all aspects of L2 proficiency, including writing skills. In other words, second- and foreign-language learners' vocabulary size has always been one of the major indicators of the vocabulary used in their writing (Laufer & Nation, 1995). That is why, quantifying the degree to which these writers use a large, varied vocabulary – that is, measuring lexical richness – is of such importance in vocabulary teaching.

2.2 Measuring lexical richness

Nation and Webb (2011: 246) define **lexical richness** as '*the quality of lexical knowledge that is demonstrated in a text'*. The **quality** – or depth and breadth – **of knowledge** in a text is therefore indicated by:

- the number of tokens, types, lemmas and word families;
- the proportion of lower-frequency words;
- the number of errors;
- accuracy and variation in the form;
- accuracy and specificity in meaning;
- collocational use;
- semantically correctly used parts, etc.

Apart from these qualities, measures of lexical richness distinguish between more and less proficient learners, indicate the strengths and weaknesses in their productive vocabulary and, in lengthier texts, provide an indication of the growth of their productive vocabulary size.

McCarthy and Jarvis (2007) suggest that measures of lexical richness should take into account word frequency as a criterion for measurement. Likewise, Laufer and Nation (1995) and Meara and Bell (2001) emphasize 'the value of including frequency in a measure of lexical richness', since frequency data can give teachers a more useful evaluation of their learners' productive vocabulary knowledge (Nation & Webb, 2011: 251).

2.3 Frequency-based comprehensive methods: Lexical Frequency Profile (LFP) vs. British National Corpus (BNC) 20,000 Profile

Schmitt (2010) has introduced a term 'frequency-based comprehensive method' to describe the frequency distribution of written output. This is measured by means of various tools such as *LFP, BNC-20 Profile*, *P_Lex* and *V_Size*. These measures have taken somewhat different approaches using frequency as a criterion. One of the best-known and pioneering frequency-based measures is *LFP,* which uses the *Range* software (available at http://www.victoria.ac.nz/lals/). *LFP Range* is a tool which attempts to measure free productive vocabulary 'use' and not 'size' in second-language learners' written compositions (Laufer & Nation, 1995; Laufer, 2005). It differentiates between frequent and non-frequent vocabulary and calculates both the proportion of academic words used in written input and the proportion of words not in the list (NiL). *LFP* has been the subject of various debates in the literature regarding its validity, reliability, sensitivity and ability to show vocabulary improvement (Horst & Collins, 2006; Meara, 2005; Smith, 2005). This debate also stems from the inclusion of the calculation of academic vocabulary in frequency-based analyses, since the AWL (Coxhead, 2000) is not solely frequency-based and varies widely in frequency (Schmitt, 2010). *LFP* makes frequency distinctions at four levels: 1st 1,000, 2nd 1,000, AWL and NiL. As Laufer (2005: 583) states, the *LFP* does not tell us 'whether learners can produce certain words when prompted to do so, but what proportion of frequent vs. infrequent vocabulary they choose to use in their writing'. In other words, the *LFP* cannot give any information concerning how well these words are used.

Yet another more 'fine-grained frequency analysis' (Schmitt, 2010: 208), which may have better measurement characteristics, is *BNC-20* (Cobb, n.d.). This is web version of VocabProfile which categorizes the lexis of texts according to frequency and provides such an analysis. This program is available at www.lextutor.ca and unlike the *LFP Range* it gives a frequency breakdown of vocabulary at each 1,000 level up to and including the 20,000 level. But the *BNC-20 Profile* does not provide us with the required academic vocabulary output because it does not differentiate between academic and non-academic vocabulary. Furthermore, it is based on the British National Corpus, which provides a better representation of current English than the General Service List (GSL)

information (West, 1953) provided by the *LFP*. Thus, it should be noted that the *BNC-20 Profile* is a much improved tool.

3 Research settings and research methodology

In this section, the research settings and research methodology used in the study are explained.

3.1 BA2 university setting

A bachelor degree in English Language Teaching (BA) – a four-year programme (240 European Credit Transfer and Accumulation System (ETCS)) – which trains English-language teachers at Azerbaijan University of Languages (AUL), involves a group of second-year BA (BA2) English majors. All the second-year students have to follow a curriculum that includes courses in the academic programme in which they are enrolled. Second-year BA students are therefore offered the following courses: Pedagogy (Didactics), Modern Azerbaijani/Russian, Azerbaijani Literature, Hearing and Pronunciation (English Phonetics) and an elective. These courses make up 39 per cent of the second-year programme and are conducted in the mother tongue. In contrast, courses through the medium of English include Intermediate Reading and Speaking (a practical course taught from the pre-intermediate level in the first-year to the advanced level in the fourth year) and Communicative Grammar (a practical grammar course) and two electives take up the remaining 51 per cent of the second-year teaching programme. All second-year students are also offered a foreign language (either French or German), which constitutes an additional 10 per cent of the programme. In these practical and elective courses, the course materials – general English and subject-specific university textbooks, supplementary materials such as newspapers, extra reading passages, graded readers, oral presentations and written assignments – are mediated through English. This is not always adhered to, except for in the examinations, which have to be written solely in English.

3.2 Elective courses

Elective courses taught through the medium of the English language (Module 1) at the Faculty of English Language Teaching make up almost one-quarter of the courses taught in English (51 per cent). Second-year electives offered at Azerbaijan University of Languages include:

- Study Skills
- Critical Reading and Effective Writing
- Communication and Social Interaction
- Teaching English to Young Learners

All second-year students are required to register for any two of these courses, and earn seven credits – covered in 105 academic hours – for each course, if they pass their final written examinations.

A multi-score system is used to assess the educational progress of BA2 students. The maximum score within this system is 100 points for each course: the first 50 points are accumulated during the semester through attending and participation during class as well as through the grades for their individual work; the remaining 50 are earned during the examination session. Course syllabi and other materials as well as examination topics are distributed to the learners beforehand (see 3.3 for further discussion), whereas examination cards with a specific set of five topics are not distributed in advance.

Examinations are usually written at the end of a semester as soon as all the courses are completed. Each student is assigned a unique identification code by the dean of the faculty and students' written answers to examination papers are kept anonymous in order to assure transparency in the assessment process. Examination conditions are strictly enforced, with zero tolerance of cheating and/or copying. Any student breaching the examination code of conduct is disqualified.

3.3 Elective examination topics

Written examinations are a widely accepted summative assessment method at Azerbaijan University of Languages. As Fellenz (2004) points out, written examinations can assess many topics at once and within a short time span, especially in big classes. The same applies to AUL's setting, where the lecturers hand students examination cards with five randomly chosen topics. In general, students are expected to prepare or revise for a list of 30 to 40 examination topics on each elective course. These topics are accepted and agreed upon by all the lecturers who deliver the electives and by heads of department. The assessment conditions are equal for all learners in the sense that topics are bundled fairly on each card according to their level of difficulty. Each question/topic is therefore assessed according to a 10-point system, meaning each examination carries a total of 50 points. A sample examination card for the course *Teaching English to Young Learners* is given below:

1.	*Classroom management and atmosphere.*	*10 points*
2.	*Dialogs and role play.*	*10 points*
3.	*Learning and teaching vocabulary.*	*10 points*
4.	*Oral work. General comments.*	*10 points*
5.	*Classroom language.*	*10 points*

As seen from the above example, a student with this examination card has to elaborate on these topics in written form. There is no official written word limit for each question

and lecturers emphasise the 'quality' of the content of the students' answers to the examination paper rather than its 'quantity'. Although the analysis of examination topics or questions is beyond the scope of this article, suffice to say that almost all examination topics are based on the factual, conceptual and procedural knowledge subcomponents of the *Knowledge Dimension.* This requires remembering and understanding knowledge through explanation, interpretation and classification according to the *Cognitive Process Dimension* of Bloom's Revised Taxonomy (Krathwohl, 2002). In other words, these students are assessed according to their knowledge of terminology, specific details and elements, classification and categories, theories, models, subject-specific skills, techniques and methods.

3.4 Research methods

3.4.1 Materials and instruments

For the purposes of this study, written answers to the examination papers of a group of Azerbaijani BA2 students majoring in English language teaching for four elective courses taught at AUL were randomly collected at the end of the fourth semester: *Study Skills* (N = 13), *Critical Reading and Effective Writing* (N = 13), *Communication and Social Interaction* (N = 13) and *Teaching English to Young Learners* (N = 13). In total, 52 students' answers to examination papers were manipulated. These students were from the same university, the same faculty, and were taught by the same university instructors. They were all native Azerbaijani (which is a Turkic language) speakers and their age ranged from 18 to 19. Since examinations are handwritten, all the answers to examination papers were typewritten electronically in their original formats, including errors. All minor spelling mistakes which do not distort the word (e. g. *choise* instead of *choice*) were corrected. This did not occur often. If, however, major spelling mistakes, which were far beyond the intended original word, for example, *pharagraf* instead of *paragraph* were observed, they were not considered as acceptable as this could distort the word or lead to a new meaning not related to the intended context like *rot* instead of *root*. A wrong derivative of a word was not considered wrong since all derivatives that make up one-word family have the same frequency. Thus, all major spelling mistakes were eliminated from the analysis and gathered in a separate file for further reference as they highlight the learner's lack of ability to use the word productively (cf. Read, 2000). Learners' answers to the examination papers were then combined in order to form a *Learner Corpus* (LC) of 41,720 words.

In order to answer the research questions put forward in this study, I entered the text file of the LC into the computer programme for the *BNC-20 Profile* (Cobb, n.d.) with the exception of the estimate of academic words, for which the *LFP Range* software is employed (see sub-section 2.3 above for more details).

It is a fairly simple matter to use the *BNC-20 Profile* interactively to estimate the lexical level of a sizeable text and to find out how many words the text contains from frequency bands as determined by analysing research corpus. The *BNC-20* gives a wealth of frequency information: types, tokens, percentage of coverage of each band, cumulative percentage of coverage, and word families. Figure 1 illustrates an example VP (vocabulary profiler) output for this page of the article.

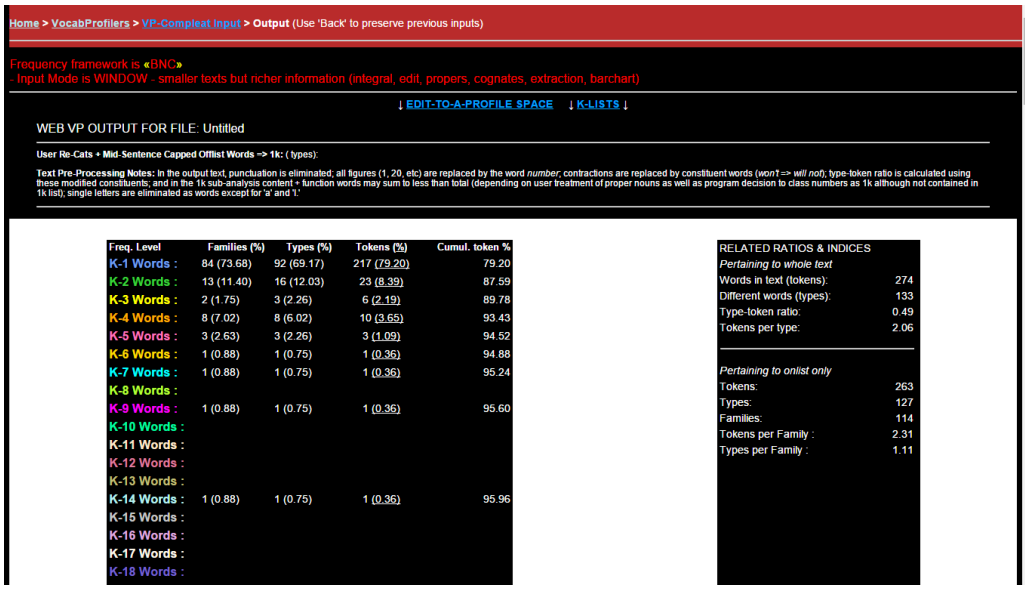

Figure 1. An example VP output

3.4.2 Concepts applied in data processing

The words in the texts are classified into categories of frequency, expressed in *tokens*, that is 'running words' (Nation, 2011: 7) or all the words in the texts; *types*, which are different words used in the texts, and *word families*, comprising a headword, its inflected forms and its closely related derived forms. The notion *word lists* refers to the three word lists of the most frequent 1,000 word families in *LFP* and the 20,000 BNC word family lists in the *BNC-20 Profile*. It should also be noted that size figures of the learners' free productive vocabulary knowledge are given in word families although it is advantageous to count learners' productive knowledge of the words in word types or *lemmas* (all family members of the same base word) (Nation & Webb, 2011). However, I decided to count and present the estimates of the present study in terms of word families in order to create a basis for direct comparison with the previous estimates.

4 Results and discussion

In this section, the results of the study will be related to the research questions. The findings will be presented and discussed.

Research Question 1: What is the measurement of lexical richness in learners' answers to examination papers from the perspective of vocabulary growth?

In order to answer the first research question and estimate the total number of word families used by these learners, students' answers to examination papers were analysed by running the programme *BNC-20 Profile*. Frequency bandings at each 1,000 level up to and including the 20,000 level (Table 1) show that second-year students used 1,705 word families, although the amount of vocabulary beyond the 10,000 band is relatively minor and makes up only a handful of words.

A type and token analysis is also presented in Table 1. The results show that 36,505 tokens (running words) out of 41,720 tokens belong to the word list 1 which comprises 84.6 per cent of the overall corpus. The same applies to word lists 2 and 3 which, respectively, give an increased coverage of 95.30 and 97.39 per cent. Table 1 indicates 2,549 word types, that is, different words used by students in their answers to examination papers, of which 1,376 belong to word list 1.

Table 1: Tokens, types and word families in the Learner Corpus

Word lists	Families	Types	Tokens	Cumulative token (%)
1	729	1,376	36,505	87.50
2	436	599	3,256	95.30
3	198	240	870	97.39
4	121	134	367	98.27
5	54	68	184	98.71
6	38	42	119	99.00
7	40	45	119	99.29
8	24	27	74	99.47
9	20	22	35	99.55
10	9	9	12	99.58
11	10	11	38	99.67
12	4	4	5	99.68
13	8	9	16	99.72
14	3	3	3	99.73
15	2	2	7	99.75
16	2	3	4	99.76
17	3	3	6	99.77

Word lists	Families	Types	Tokens	Cumulative token (%)
18	1	1	1	
19	2	2	3	99.78
20	1	1	3	99.79
Off-list	??	48	93	100.00
Total	1,705	2,549	41,720	100.00

The results show that in their answers to examination papers the second-year students used 1,705 word families from different frequency levels. Taking into account that these students' productive vocabulary size, as measured by the vocabulary-size test of controlled productive ability, was estimated as 974 word families at the beginning of the second year (Hajiyeva, 2015a), after ten months a growth in vocabulary of 731 word families was observed. A vocabulary-size test of controlled productive ability evaluates learners' knowledge of particular selected words from the frequency bands when compelled to do so by a teacher or researcher (Read, 2000). The results of the current study indicate that these students ***used*** a number of word families at their own free will. This is in contrast to the result reported by Horst and Collins (2006) in which *LFP Range* did not identify the expected increase in the use of less frequent words in the texts produced by beginner English-language learners over 400-hour intervals of instruction. The learners made substantial progress in language proficiency during this time, but *LFP Range* did not reflect this improvement. However, a more detailed analysis conducted by the researchers did show lexical improvement in terms of using fewer French cognates, a greater variety of frequent words, and more morphologically developed forms. In other words, there was clearly improvement in lexical production, but just not of the frequency-based type which the *LFP-Range* could discern. In this regard, the *BNC-20 Profile* which served as an online tool in the current study for analysing the lexical richness in the students' answers to examination papers seems to be a much improved tool from which to draw an LFP-like frequency analysis of student-produced texts.

Although the *BNC-20 Profile* cannot address the 'quality of use' issue (see sub-section 2.2) (Schmitt, 2010: 208), it has proved to be a valuable tool for describing the frequency distribution of the written input produced by second-year English majors. In other words, the *BNC-20 Profile* indicates whether low-frequency vocabulary appears in student-produced texts, but it cannot give any information about how well it is used. The words could be used inappropriately, and the VP output would still indicate their usage. Thus the *BNC-20 Profile* VP output gives little indication of the degree of mastery of the productive lexical items. For example, students in the current study have used 1,705 word families, but the data do not provide information about how competently students used the word families. An observable increase in the number of word families used does not mean that these words are always correctly used in terms of meaning, associations, collocations and register. Since vocabulary choice and usage is a strong indicator of whether a writer has adopted the 'conventions of the relevant discourse community' (Nation, 2011: 178), it is important that students understand they are not misusing the words. For example,

if we examine the passage below, '*The choice of language' (Communication and social interaction course)*, we can observe some mistakes in the correct use of form and meaning, collocational and prepositional use, register and grammatical form. While the lexical analysis of this extract shows that this student has used 35 word families from the first, second and third frequency bands, how well or appropriately they did so can be seen from the extract itself.

Example 1. An extract from a student's answer to an examination paper

Language is important for use. When we speak people, we use language. When we spoke with people, we must guess audience. We communicate with child, or adult, teenager. When we communicate with children, we try to understand, every detail in soft form. We under explain everything in child's language. When we communicate with teenagers, we try to explain everything as a teenager's language. Also the same things belong to adults. We must understand their languages. We must choose right language.

Schmitt (2010) suggests that all words that have been incorrectly used should be deleted manually, but he also states that it is important to keep them in order to obtain a full picture of the learners' estimates of the quality of their lexical knowledge/usage (see sub-chapter 2.2 above for detailed information). In that sense, all incorrectly used words were kept in the original texts in order to observe productive vocabulary growth. Regarding the growth of vocabulary, Laufer (1998) states that it is possible to make significant changes in terms of productive vocabulary knowledge, but that it is difficult to convert this knowledge into productive use. She also suggests that one cause of this may be a lack of encouragement or, as Corson (1985) states, a lack of motivation or the desire and opportunity to use a word. Students might know vocabulary but, because the opportunity and desire to use a particular word does not arise, that word remains as part of our 'unmotivated' vocabulary (Nation, 2011:183).

Conversely, in this particular study – perhaps owing to a strong desire to pass examinations – students appear to have transformed their productive vocabulary knowledge into productive vocabulary use, but with a number of errors. I assume that this reluctance to misuse certain words in the answers provided by students to examination papers stems from a lack of systematic assessment criteria developed by lecturers in order to evaluate students' written answers to examination papers. Data obtained in students' free active vocabulary may be the result of the lack of incentive to use more advanced, infrequent, and error-prone words. Perhaps, content-oriented teachers may be satisfied with the learners' ability to elaborate on certain concepts, notions and issues. Moreover, grading conventions at AUL emphasise the quality in content rather than the correctness in the use of vocabulary and almost never reward lexical richness. Laufer (1998) rightfully claims that these do not encourage the learner to take a risk and use more difficult vocabulary. Therefore, I can conclude that if students are well aware of the fact that incorrect usage of vocabulary has an impact on their grade, they will then attempt to write more accurately.

To sum up, the evidence presented in the study indicates that Azerbaijani students have added 731 word families to their existing productive vocabulary knowledge and have reached the productive vocabulary knowledge of 1,705 word families after ten months of instruction as they are exposed to different subject-specific course materials. The current study investigated productive vocabulary growth in a normal classroom setting and not in an experimental situation. Yet the conclusion seems to be that a large number of words can indeed be learnt as Laufer (1998) claims even when the learning context is not natural. The results obtained underscore the fact that classroom instruction can indeed provide an optimal setting for vocabulary development.

Research Question 2: How frequently do high-frequency, low-frequency, academic and specialized/technical words occur in students' answers to examination papers?

Table 1 above shows the distribution of the written input of second-year English majors' answers to examination papers. A close examination of the table shows that the first 2,000 word families already provide 95.30 per cent text coverage. If we express raw figures in terms of word families, then 1,165 word families out of the first 2,000 are present in students' answers to examination papers. These results do not indicate that high-frequency word families are well represented here. Nation (2011) states that a language's high-frequency word families are critically important, therefore considerable time should be spent on studying them throughout a language learning programme. He also suggests that this can be achieved through direct teaching, direct learning, incidental learning (guessing from context in extensive reading) and planned meetings (graded readers) with the words. In line with this observation, the extent to which high-frequency word families are currently used by second-year students is unsatisfactory and needs further consideration.

Regarding the usage of academic words, *LFP Range* analysis of the Learner Corpus (LC) shows (see Figure 2) that students have used 248 word families of the 570 academic word families developed by Coxhead (2000) which, when expressed in individual word types, gives a coverage of 12.5 per cent.

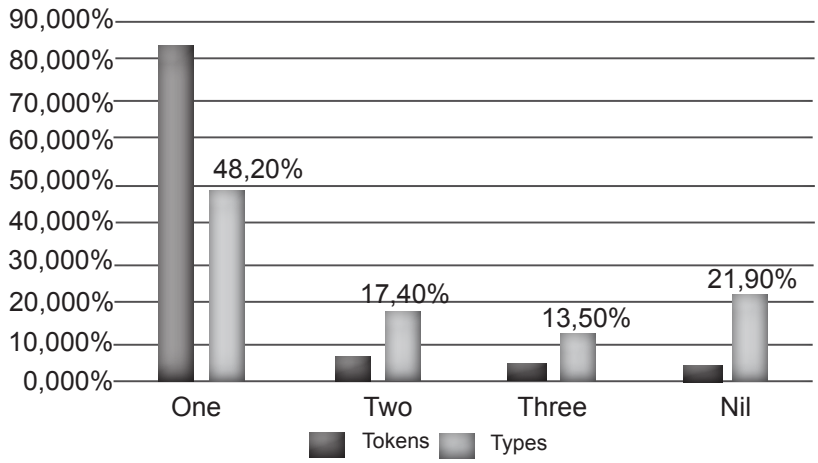

Figure 2: Percentage of tokens and types of word used in LC

Academic vocabulary – also called sub-technical vocabulary – includes a substantial number of words in academic texts and provides 10 per cent coverage of the texts (Coxhead, 2000). However, a corpus-based analysis of subject-specific textbooks to which second-year English majors at AUL are exposed shows that academic words constitute only a small coverage (6.5 per cent) of the words in the University Textbook Corpus (Hajiyeva, 2015b).

I therefore decided to observe whether or not academic words which are more frequent in subject-specific textbooks taught at AUL occur in the students' answers to examination papers. In order to achieve this, I developed a new word list comprising the 127 most frequently used academic word families in student subject-specific textbooks and included them in the *LFP Range* programme; students' answers to examination papers were examined against this list.

The results show that out of 127 most-frequently used word families in these textbooks, 103 word families were present. This indicates that the students have mainly used those academic words most frequently found in their textbooks. However, the same usage problem can be observed with regard to the academic words. For example, the incorrect use of the form of the word *'secretiveness'* in the sentence '*People think that these type of persons are more secretiveness and suspicious'* shows that although a student is familiar with the word, they have not used it in the correct form. This outcome points to the importance of including these most frequent academic words in a pedagogical word list which will be developed in near future in order to help these students to deal with their academic needs and teach them ways of using the words appropriately in terms of their correct form, meaning and collocational use.

Regarding the occurrence of low-frequency words – words occurring very infrequently – the results show that these words are indeed of moderate frequency and cover only a small proportion in students' answers to examination papers. If we consider any words falling beyond the 2,000-word level, excluding academic words, as members of low-frequency word families, then in my LC only 292 word families are considered as low frequency. It is also known that 'one person's technical vocabulary is another person's low-frequency word'. Chung and Nation (2004: 252) identify technical vocabulary as subject-related vocabulary which occurs in a specialist domain and is part of a system of subject knowledge. In the current study technical/specialised vocabulary was identified by making use of clues that are important to conveying the message of the text in the student textbooks as well as to using an index list provided in subject-specific textbooks. Among those 292 low-frequency word families are technical/specialised words such as *curriculum, conjunction, coherence, metaphor, disclosure, lexical, kinaesthetic, cliché, paraphrase* – words that are subject-specific and are usually taught by a content teacher. It should also be noted that, perhaps owing to familiarity with the topic, the students have used the great majority of the technical/specialised words correctly in terms of form and meaning in the sentences, excluding some grammatical mistakes. For example, in the extract below we can see that the student is familiar with the term *'cliché'* and uses some examples to introduce it to the reader.

Example 2. An extract from a student's answer to an examination paper

The 'How did it go today?' question is cliché question. If you ask a cliché question you will get a cliché answer. For example: 'pretty good', not bad' and 'usual'.

Put differently, students make a good use of the terms and specialised words in their answers to examination papers, perhaps owing to the content-oriented examinations which test students' knowledge of terminology, specific details and elements, classification and categories, theories, models, subject-specific skills, techniques and methods. This outcome proves that as Nation (2011:20) states beyond the high-frequency word families, learners' vocabulary knowledge grows through exposure to their specialisations (Nation, 2011: 20).

5 Conclusion

This study carried out the measurement of lexical richness in university students' answers to examination papers and their productive vocabulary size from the perspective of vocabulary growth. It also investigated the occurrence of low-frequency, academic and specialised/technical words.

The results show that in comparison to the growth achieved in the previous study (Hajiyeva, 2015a), second-year Azerbaijani English majors' productive vocabulary knowledge increased by 731 word families and reached 1,705 word families by the

end of the second year. The learners' current productive vocabulary growth suggests development that is approximately two times greater than that attained in the previous study which was indicated that students used 974 word families. Based on this finding, it cannot be assumed that productive vocabulary always grows faster than receptive vocabulary because, if this is so, the estimates of productive vocabulary would always be higher than the estimates of receptive vocabulary. This outcome, on the contrary, shows that the pace of the development of productive vocabulary might indeed depend on the learners' needs – for instance, to pass an examination – familiarity with the topic, and their motivation. As Bialystok and Hakuta (1994:140) state these '… factors probably do not make much difference on their own, but they can create a more positive context in which language learning is likely to flourish' (see Griffin & Harley, 1996; Myles, 2002 for further discussion). However, despite tangible growth in vocabulary, students' answers to examination papers do not always ensure accuracy of meaning, form, associations, collocations and register. In other words, even though the instruments used in this study do show that they are valuable tools for describing the frequency distribution of written input and the occurrence of high-frequency, low-frequency, academic and specialised/technical words, they cannot deal with the issue of the appropriateness of vocabulary use.

Further analysis of the written input through the *LFP-Range programme* showed that high-frequency word families are not well represented and that students must develop their knowledge and usage of these words in order to perform well in their answers to written examination papers. This study suggests that, indeed, as Nation (2011) puts it, high-frequency words are so important that sufficient time and effort should be given to improving and promoting learners' mastery of them. Another conclusion to be drawn from this study is that, perhaps due to the existence of content-oriented examination questions, students in this study made better use of the specialised/technical words than academic words or low-frequency word families. This indicates that familiarity with a topic enables correct vocabulary usage.

6 Pedagogical implications

The findings of this study can be useful in the field of language pedagogy. This type of study is likely to inform language teachers, course designers and developers about the course content and the materials to be distributed during in-class teaching hours and self-study time. In this sense, such findings can be used by language teachers in a pedagogical context to make decisions concerning whether or not learners have enough lexical resources necessary to function effectively in the target language, for example, write answers to examination papers. Moreover, studies of this kind – measures of lexical richness – provide relevant information for planning successful syllabus according to the needs of learners. If the available teaching materials and resources do not meet students' specific academic needs, then the findings of this type of study could be beneficial in developing tailor-made course materials for certain students.

To improve and develop learner's vocabulary knowledge, teachers and syllabus designers should pay more attention to both the content and the vocabulary needs of learners when they select related resources. These resources need to have the necessary lexical items for the learners which include high-frequency words, low-frequency words, academic words and specialised/technical vocabulary. Language teachers and syllabus designers should pay more attention to the ways of promoting vocabulary more effectively among language learners. For example, this study suggests that high-frequency words are worth special attention and thus should be taught directly. The direct teaching and learning of the words should also prove to be valuable: Ellis (1990) states that courses involving direct attention to language features have been found to result in better learning than courses that rely solely on incidental learning. Coxhead (2000) correctly states that direct teaching through vocabulary exercises, teacher explanation, and awareness raising and deliberate learning (using, for example, word cards) needs to be balanced against opportunities to encounter the vocabulary in message-focused reading and listening and to use the vocabulary in speaking and writing.

The findings in this regard, suggest a more prominent position for vocabulary instruction in foreign language teaching. The selection of resources should be investigated thoroughly which includes the classification of lexical items according to their levels of frequency and the focus on both content and language skills. The distinction between high and low-frequency words is important for teachers because it makes it necessary for teachers to know what stage their learners are at in their vocabulary development. It means that teachers can identify and remedy the deficiency in their students' vocabulary with a targeted aim. To study the vocabulary directly, teachers and learners can work from the list of high-frequency and academic word families. By focusing on the types of vocabulary in both message-focused and language-focused ways, learners should be able to make this important vocabulary part of their working knowledge of the language. This will help learners to make their academic study more manageable and, ultimately, meet their specific academic needs.

Schmitt and Zimmerman (2002) also state that learners do not know all of the members of a word family, even if they know some of these word forms. Studies of this kind can show whether students misused the correct forms of the words in the sentences in particular contexts or not. In this regard, certain activities that deal with the derivative forms of the target words should be included in the vocabulary learning and teaching process. For example, based on the measures of lexical richness or otherwise in students' answers to examination papers, teachers may collect all the misused word family members and adapt or adopt an activity like the one given in Table 2. Teachers may use tables of this kind in their teaching, leaving some cells empty, and ask the students to complete the tables and place all the family members according to their parts of speech. Sometimes, more than one form is possible. In Table 2, an *X* indicates that there is no form or that a form is uncommon. It is therefore essential that learners be able to recognize bases in words – for example, to see the relationship between *theme* and *thematic* or to differentiate *verb* from *verbal, criticise* from *criticism*. In other words, learners need to know why, for example, *verb* is not included as a noun in the noun

column (as an example of a base) and *criticism* is not included in the same column as an example of a noun form. It is important that learners are taught that *verb* and *verbal*, *criticise* and *criticism* are two different base words (head words) and that they have various meanings and family members (see Bauer and Nation, 1993). For example, the word *verb* has two family members (verb and verbs), whereas the word *verbal* has 13 family members (*verbal verbally nonverbal verbalize verbalizes verbalized verbalizing verbalise verbalises verbalised verbalising verbalisation verbalizations*).

Table 2: A sample verbal task involving placement of family members

Verb	Noun	Adjective	Adverb
X	literacy	literate illiterate	literately illiterately
criticise (BrE) criticize (AmE) criticising (BrE) criticizing (AmE)	criticiser criticizers	criticisable criticizable	X
X	theme	thematic	thematically
verbalise (BrE) verbalises verbalised verbalising verbalize (AmE) verbalizes verbalized verbalizing	verbalisation verbalisations verbalization verbalizations	verbal nonverbal	verbally

Adapted from Schmitt, Schmitt and Mann (2011)

The analysis of students' answers to examination papers and, in general, examination topics, questions and the evaluation process also shows that certain steps should be taken to develop clearly defined rubrics as a means of communicating expectations, providing focused feedback on students' answers to examination papers and grading their final products. Teachers should know that a well-designed rubric should support learning outcomes, and have criteria for success based on expected outcomes. Language teachers should also make sure that clearly defined performance is assessed. Rubrics should include clear wording with numbers. Teachers should also provide students the general scoring criteria by which they will be evaluated prior to the examination. Students need to know how instructors assign grades on essay exams, term papers, or for the assessment exercises to be useful learning experiences. Rubrics or markers should overtly analyse the word-family use as presented in the Table 2 and then provide direct feedback to students about which word families they mastered well, and provide them with a list of word families that they have not mastered yet. However, teachers usually assume that indirect feedback is what should always be used since it requires

the students to monitor their own errors and to try to fix the error on their own since such a strategy promotes learner autonomy. There are indeed many reasons for using indirect feedback on students' written papers but it is important to recognize that there are many reasons why a student makes an error, from carelessness to overgeneralizing.

Typically, teachers need to suit the feedback to the type of error and the students' level of proficiency and diligence. For example, there are some errors like the incorrect use of collocations which might warrant direct rather than indirect feedback. Asking students to self-correct such an error would be very challenging for students if they are not familiar with the types of collocations. In this regard, in many instances error correction for word choice is best handled through direct correction. To sum up, every student is unique with special needs and the more written feedback can be suited to the student and the type of error, the more likely it will lead to greater writing proficiency for the student.

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ya u Gudisa Nyambo - Jenala yo Dyondzisa Ririmi
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yokuFundisa iiLwimi - Ibhuku Lokufundisa Ulimi -
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- Jenale ya Thuto ya Dipuo - Ijenali Yekufundzisa Lulwimi
- Jena?a ya u Gudisa Nyambo - Jenala yo Dyondzisa
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