Investigating the relationship between the use of vocabulary learning strategies and English language attainment

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Abstract

Despite numerous irrefutable accomplishments in the field of vocabulary learning and learning strategies, it can be observed that there are still areas of research that have received only scant focus in the Polish context, and one of them is the relationship between the use of vocabulary learning strategies and attainment in the mastery of this language subsystem. Because of that, this research project attempts to contribute to the scarcity of quantitative investigations in the realm of vocabulary learning strategies by presenting the findings of a study which sought to establish the general pattern of vocabulary learning strategy use among Polish university students whose major subject was English and the relationship between their overall, categorical, and individual frequency of vocabulary strategy use and performance in vocabulary tests. As for the results, the study found that the participants' overall vocabulary learning strategy use, on the average, was of medium-high frequency. Furthermore, Pearson's correlation coefficients showed a positive relationship between overall and categorical application of strategic devices and vocabulary attainment. At the micro-level, the findings showed that most of the individual vocabulary learning strategy items were positively correlated with vocabulary test scores. Above all, it is hoped that the current work will contribute not only to a better understanding of the significance of vocabulary learning and vocabulary learning strategies, but will also lead to further investigations in the field.

1. Introduction

In the last thirty years, vocabulary has been increasingly recognized as a central component of language learning and use (e.g. Candlin 1988; Celce-Murcia and Rosenweig 1989; Krashen 1989; McCarthy 1990; Lewis 1993; Knight 1994; Laufer 1997; Folse 2004, Thornbury 2008; Folse 2010). More or less simultaneously, researchers became more concerned with how language is learned and not how it should be taught. Along with this change of interest grew the importance of language learning strategies. Scholars such as, for example, Rubin (1975), Cohen (1998), Chamot and O'Malley (1987), and Oxford (1990) attempted to identify, describe or classify "specific actions, behaviors, steps or techniques that learners use (often deliberately) to improve their progress in development of their competence" (Takač 2008: 52). Then, in the 1990s, a subcategory of learning strategies, namely vocabulary learning strategies (hereafter VLS), started to attract more and more attention. Numerous researchers (e.g. Sanaoui 1995; Gu and Johnson 1996; Schmitt 1997; Kudo 1999) began to examine learners' use of vocabulary learning strategies and hoped that their investigations would provide insights into how foreign vocabulary is learned. Most importantly, however, it needs to be highlighted that the available literature shows that a great number of researchers (e.g. O'Malley et al. 1985; Chamot and O'Malley 1987; Willing 1989; Oxford 2001) came to the conclusion that language learning strategies are an "extremely powerful learning tool" (O'Malley et al. 1985: 43) and have great potential to facilitate language learning and vocabulary learning and recall (e.g. Ahmed 1998; Gu and Johnson 1996; Kojic-sabo and Lightbown 1999; Nation 2001; Fan 2003). Thereupon, since it has been proved that learners who use learning strategies are likely to outperform those students who refrain from doing so, it seems reasonable to delve into the concept of VLS in the Polish context so as to check what types of vocabulary learning strategies Polish university students apply and what strategies are most effective for them when dealing with new words.

2. The purpose of the study

The general aim of the study was to explore the relationship between the use of vocabulary learning strategies and vocabulary attainment. More specifically, this research project endeavored to offer insights into the sphere of vocabulary learning strategies and vocabulary learning by investigating the following issues:
   (1) the general pattern of vocabulary learning strategy use among Polish university students whose major subject was English;
   (2) the relationship between overall vocabulary strategy use and performance in vocabulary tests;

(3) the relationship between different strategy categories and language performance in vocabulary tests;

(4) the relationship between the application of individual strategies and performance in vocabulary tests.

3. Participants

The participants of the study were 52 extramural English Department sophomores attending a Master's degree program in three university classes at the Kalisz branch of Adam Mickiewicz University, Poland. Twelve were males and thirty-nine were females. Forty-two subjects reported working as English teachers. In the course of the study, the students were expected to attend numerous practical classes such as conversation, academic writing, use of English, as well as a number of lectures on applied linguistics, classroom discourse, and varieties of the English language. As dictated by the requirements of the study, all subjects were advanced learners of English, expected to represent at least the C1 level of proficiency. Twenty-three of them reported having been learning English for 5-10 years, twenty for 10-15 years and nine for more than 15 years.

Institutions	*Percentages*
Licentiate's degree studies	71.15%
Master's degree studies	32.69%
Upper secondary school	21.15%
Private school	11.54%
Lower secondary school	7.69%
Primary school	1.92%

Table 1: Institutions that taught students about vocabulary learning strategies.

When asked about vocabulary learning strategies, seventy-seven percent of respondents stated, as seen in Table 1, that they had been taught about language strategies in various institutions. A considerable percentage answered that such instruction was provided during Licentiate's degree studies. The results were lower in the case of the remaining institutions. Namely, thirty-three percent of students reported having been taught about learning strategies during Master's degree studies, twenty-one percent in upper secondary schools, and twelve percent in private schools. The lowest results were attributed to lower secondary schools and primary schools; that is, eight percent answered that their knowledge about learning strategies increased in the former, and only two percent pointed to the latter.

4. The instrument, data collection and analytical procedures

The data for this study was gathered through a survey questionnaire and vocabulary tests that the students were required to take throughout the academic year. The tests, whose number as well as nature unfortunately varied in the three classes that took part in the study, were designed and the administered by three different lecturers. Because of that, some students were required to take four quizzes throughout the whole academic year, whereas others wrote as many as seven. In addition, some instructors focused only on receptive word knowledge and asked the participants to provide a synonym or definition of the target item; others, on the other hand, required the learners to recall the item from memory to complete a sentence and to know its collocation patterns.

The questionnaire, written in English, consisted of two parts. The first section comprised factual information about the participants, whereas the second, which was based on the VLS inventory used in an experiment carried out by Wei (2007), included 25 quantitative close-ended questions that asked the survey respondents to rate the use of their vocabulary learning strategies in ascending order ranging from 1 (never) to 5 (always) in order to determine their studying patterns. The twenty-five strategies in the instrument were grouped into eight types: dictionary use (DIC), rehearsal (REH), management (MAN), sources (SOU), guessing (GUE), encoding (ENC), activation (ACT), and vocabulary perceptions (PER). After the survey had been administered, the questionnaire numerical coefficient of reliability was determined using Cronbach's alpha, which demonstrated the overall internal consistency of 0.80.

The data collection procedure consisted of two stages. Firstly, the questionnaire, which took approximately ten minutes to complete, was administered on April 24th, 2010 during regular classes. Before it was distributed, the students had been reminded that effective vocabulary learning could be achieved in different ways and that the goal of the questionnaire was to discover how particular individuals learned foreign English words. They were also asked to be as sincere as possible about their responses and answer how they study and not how they think they should do it. The survey was not anonymous; however, all the students who decided to participate had been ensured that all the answers would be treated with strict confidentiality and no names would be mentioned throughout the research. Secondly, the vocabulary test scores were supplied by the lecturers at the end of the academic year. As for the numerical analysis, the data were imported into a statistical software package in order to conduct statistical analysis. The means of strategy use were analyzed in compliance with Oxford's (1990) interpretation, in which strategies with the mean of 3.5 to 5.0 represent high use, 2.5 to 3.4 medium use, and 1.0 to 2.4 low use. Pearson's correlation coefficients

were calculated to estimate the relationship between overall, categorical, and in-dividual strategy use and attainment in vocabulary tests.

5. Results and discussion

With reference to the first research question, the results of the analysis of the collected data showed, as presented in Table 2, that the overall mean of fre-quency of strategy use stood at 3.35 (medium-high strategy use), with the standard deviation of 0.44, and ranged from 2.29 to 4.33. The strategies that represented the highest use were: "I pay attention to the pronunciation of a new word", with the mean of 4.33 (SD = 0.80), "I highlight the words that seem important to me" and "I listen to English songs, radio programs, watch English movies etc. to increase my vocabulary", both with identical means of 4.06 (SD = 1.03 and SD = 1.08, respectively). On the other hand, the lowest frequencies of use were observed among strategies such as "I keep a vocabulary notebook to write down new words I want to learn" with a mean of 2.29 (SD = 1.35) and "I review my vocabulary regularly" with the mean of 2.5 (SD = 0.75).

Category	Strategy	Rank	Mean	SD
PER	I pay attention to the pronunciation of a new word.	1	4.33	0.80
MAN	I highlight the words that seem important to me.	2	4.06	1.03
SOU	I listen to English songs, radio programs, watch English movies etc. to increase my vocabulary.	3	4.06	1.08
DIC	I look up new words in an monolingual dictionary.	4	3.96	0.96
PER	I pay attention to the examples of how a word is used in English.	5	3.87	0.88
REH	I repeat a new word out loud several times to remember it.	6	3.71	1.26
GUE	I check to see if my guesses about the words are right or wrong.	7	3.63	1.04
SOU	I read stories, magazines etc. outside class to increase my vocabulary.	8	3.63	1.00
ENC	I associate words with those I already know.	9	3.58	0.84
ENC	I distinguish words with similar meanings.	10	3.56	0.97
ENC	I try to memorize the Polish equivalent of the word.	11	3.52	1.12
PER	I pay attention to the grammatical patterns of a new word.	12	3.48	0.99
ENC	I try to remember the sentence in which the word is used to remember the word.	13	3.42	0.86
PER	I pay attention to the unfamiliar usage of a known word.	14	3.42	1.04
DIC	When I look up a word in the dictionary, I read all the meanings of new words.	15	3.38	1.15
GUE	I guess the meaning of words I don't know.	16	3.27	0.96
DIC	I look up new words in a bilingual dictionary.	17	3.10	1.12
ACT	I use the newly-learned words as much as possible in speaking and writing.	18	3.06	0.77
SOU	When I come across a new word, I make a note of it.	19	2.96	0.98
MAN	I group words in my own way to remember them.	20	2.83	1.20
MAN	I make plans for my vocabulary learning.	21	2.81	1.32
ACT	I make up my own sentences using the words I just learnt.	22	2.71	1.08
ENC	I analyze the structure (root and affix) of a new word to remember it.	23	2.63	1.06
REH	I review my vocabulary regularly.	24	2.50	0.75
MAN	I keep a vocabulary notebook to write down new words I want to learn.	25	2.29	1.35
Overall			**3.35**	**0.44**

Table 2: Means for all vocabulary learning strategies in descending order.

As for the use of VLS in specific categories, it was observed, as displayed in Table 3, that vocabulary perceptions strategies with the mean of 3.77 (SD = 0.63), sources strategies (M = 3.55; SD = 0.85), dictionary use strategies (M = 3.48; SD = 0.65), and guessing strategies (M = 0.78; SD = 0.78) were most frequently employed and demonstrated high strategy use. Then, on the other end of the continuum, encoding strategies with the mean of 3.34 (SD = 0.45), rehearsal strategies (M = 3.11; SD = 0.68), management strategies (M = 3.00; SD = 0.81), and activation strategies with the lowest mean of 2.88 (SD = 0.75) manifested medium strategy use in compliance with Oxford's (1990) interpretation scheme.

Rank	Category	No. of Items	Mean	SD
1	PERCEPTIONS	4	3.77	0.63
2	SOURCES	3	3.55	0.85
3	DICTIONARY	2	3.48	0.65
4	GUESSING	3	3.45	0.78
5	ENCODING	5	3.34	0.45
6	REHEARSAL	2	3.11	0.68
7	MANAGEMENT	4	3.00	0.81
8	ACTIVATION	2	2.88	0.75

Table 3: Means for specific groups of vocabulary learning strategies.

On the face of it, it can be observed that the participants employed a large repertoire of VLS, as a result of which it could be hypothesized that they consider them to be "a powerful learning tool" (O'Malley et al. 1985: 43). What is more, the overall medium-high frequency of strategy use appears to be very promising, since, as proved elsewhere (e.g. Ahmed 1989; Sanaoui 1992; Kojic-sabo and Lightbown 1999; Fan 2003), successful language learners employ vocabulary learning strategies more often than poor learners. For that reason, it seems crucial to explore each of the eight strategy categories and attempt to explain the studying patterns of the subjects before proceeding to the remaining research questions, that is the relationships between the application of strategic devices and achievement in vocabulary tests.

As regards vocabulary learning strategies related to vocabulary perceptions (M = 3.77; SD = 0.63), it was the most frequently used category. The high or medium-high employment of strategies, in which the subjects focused on the pronunciation of a new word, examples of how a new word is used in English, the word's grammatical patterns and its unfamiliar usage may indicate that proficient learners are not only interested in minimal vocabulary knowledge such as translation or definition, but also are aware that in order to build up a well-developed lexicon they need to know the word's "spoken and written context of use; its patterns with words of related meaning as well as with its collocation partners; its syntactic, pragmatic and discourse patterns" (Carter and McCarthy

1991: 43). Moreover, focusing attention on unfamiliar uses of a word and its exploration in different contexts might as well be a characteristic of advanced learners who want to bridge the gap "between the everyday meaning systems and the high status meaning systems" (Corson 1995: 180-181) so as to move closer to the nativelike depth of vocabulary knowledge in the target language. The use of sources was the second most often employed category (M = 3.55; SD = 0.85). Frequent use of the Internet, books, movies and other materials to learn English independently of the teacher might account for the fact that the learners are cognizant of the numerous benefits of incidental learning (Laufer 1991; Laufer and Paribakht 1998; Schmitt 2000; Nation 2001; Webb 2008) and therefore avail themselves of sources which help them to increase foreign language exposure. The results were lower concerning the strategy "When I come across a new word, I make a note of it"; hence, it can be assumed that some students might not know that incidental learning works best when it is supported by deliberate attention (Paribakht and Wesche 1997; Schmitt 2000; Nation 2001; Nation and Meara 2002). The use of dictionary strategies was the third most often used category. It was observed that the subjects favored monolingual (M = 3.96; SD = 0.96) over bilingual dictionaries (M = 3.10; SD = 1.12). Such results, which are in disagreement with the findings of Gu and Johnson (1996), Schmitt (1997), Kudo (1999), and Fan (2003), might be explained by the fact that the participants of the present research represented higher proficiency levels and thus, unlike the subjects of the previous studies, can be used to thinking in English. Moreover, the fact that the students try to read all the meanings of new words when referring to dictionaries suggests that a bulk proportion of advanced learners is eager to delve beyond the contextual boundaries of unknown words.

Strategies aimed at guessing were yet another category that was used with high frequency. An implication of this result, which is congruent with the outcome of Fan's (2003) study, is the likelihood that proficient language learners are cognizant of that fact that guessing is an important strategy that even native speakers utilize to reinforce the perpetual processing of input in the absence of complete language knowledge (Oxford 1990: 49). Additionally, accurate guessing has been associated with successful language learners (e.g. Rubin 1975; Omiaggo 1978; Oxford 1990) who, unlike poor learners, are able to decode the meanings of unfamiliar words to proceed with the task. In parallel to that view, the fact that the subjects are willing to check the outcomes of their guesses is also significant because, as argued by Huckin and Coady (1999: 189-190), "guessing from context has serious limitations. It is still seen as an important part of vocabulary building, especially among advanced learners, but it requires a great deal of prior training". Furthermore, encoding was the first category that represented an overall medium frequency of use. However, strategies

such as "I associate words with those I already know", "I distinguish words with similar meanings", "I try to remember the Polish equivalent of the word," and "I try to remember the sentence in which the word is used to remember the it" demonstrated high frequency of application. These findings should be regarded as encouraging since translation into the learner's first language has been found to have a positive effect on vocabulary acquisition (Laufer and Shmueli 1997; Liu 2008); context can supply learners with extra information about the target word and therefore should be used "wherever possible" (Nation 2001: 309); learners should make as many associations as possible to reinforce retention (Nation and Meara 2002: 42). By contrast, the strategy in which learners analyze the structure (root and affix) of a new word to remember it ranked relatively low (M = 2.63; SD = 1.06), albeit prefix and suffix knowledge is believed to aid advanced learners in learning unfamiliar lexical items "by relating them to known words or known affixes" (Nation 2001: 264); in other words, perceiving words as part of a word family augments and strengthens one's lexicon.

When it comes to strategies concerned with rehearsal (M = 3.11; SD = 0.68), it can be seen that the participants frequently (M = 3.71; SD =1.26) repeat the words out loud to facilitate retention. This strategy has been examined by several researchers (e.g. Seibert 1927; Gary and Gary 1982; Kelly 1992), who concluded that "the ear does assist the eye in the long-term retention of lexis" (Kelly 1992: 142). Disappointing, however, was the fact that the subjects did not revise their vocabulary regularly (M = 2.50; SD = 0.75). Thereupon, it may be hypothesized that a considerable proportion of students disregard the fact that a lexical item needs to be recycled or "met again and again to ensure it is learned" (Nation 2005: 47). Management was the second least frequently used category (M = 3.00; SD = 0.81). At the micro-level, however, the strategy "I highlight the words that seem important to me" (M = 4.06; SD = 1.03) was the second most frequently incorporated individual strategy in the study. In reviewing the existing literature dealing with VLS, it can be seen that the benefits of this studying technique were pointed out by, for example, Hamzah et al. (2009), who provided evidence that learners who jotted down important words showed a greater size of vocabulary compared with those who did not do it. As for the three other strategies within this category, they were neglected by the subjects. Namely, the strategies "I group words in my own way to remember them" (M = 2.83; SD = 0.98), and "I make plans for my vocabulary learning" (M = 2.82; SD = 1.32) were applied with medium-low frequency, whereas the item "I keep a vocabulary notebook to write down new words I want to learn" (M = 2.29; SD = 1.35) received the lowest score in the questionnaire. It seems difficult to explain this finding, but it might be related to the fact that English major sophomores frequently believe that they are overworked and therefore have

no time to plan and orchestrate their learning processes. Nonetheless, these findings should be regarded as disconcerting on the grounds that planning and structured learning have been proved to influence the vocabulary size or VTS (e.g. Sanaoui 1995; Gu and Johnson 1996; Kojic-Sabo and Lightbown 1999; Zhao 2009). Finally, activation was the least frequently appreciated area. Although similar results were also reported by Gu and Johnson (1996) and Wei (2007), the incorporation of these strategies should take on greater significance for the reason that learners need to be able use a great number of words productively in order to achieve high levels of language proficiency.

Correlation (r)	Variance (r²)	Significance (p)
0.20	0.04	0.15

Table 4: Correlation between overall strategy use and achievement.

Moving on to the relationship between overall strategy use and performance, a positive relationship of 0.20 was found in the current study. These results corroborate the findings of Sanaoui (1995), Gu and Johnson (1996), and Kojic-sabo and Lightbown (1999), who also reported a meaningful, albeit stronger, relationship between strategy use and attainment. This study, therefore, indicates that a more frequent application of VLS is likely to be accompanied by higher vocabulary test scores (hereafter VTS). Nevertheless, it cannot be forgotten that, as seen in Table 4, not only did the above result fail to satisfy the necessary level of significance of the Pearson product-moment correlation coefficient, but also that the above correlation explains just around 4% of the variance in performance.

Category	Correlation (r)	Variance (r²)	Significance (p)
ACTIVATION	0.23	0.05	0.15
REHEARSAL	0.16	0.02	1.12
MANAGEMENT	0.13	0.02	0.36
SOURCES	0.13	0.01	0.37
ENCODING	0.13	0.02	0.37
GUESSING	0.12	0.01	0.39
DICTIONARY	0.11	0.01	0.45
PERCEPTIONS	0.09	0.01	0.52

Table 5: Correlations between categorical and overall strategy use and achievement.

Furthermore, Table 5 shows that the vocabulary test grades correlated positively with each strategy category. The strongest relationship was revealed between the use of activation strategies and VTS ($r = 0.23$). This is also in agreement with Gu and Johnson's study (1996), who found that activation strategies are likely to pertain to better ($r = 0.18$) performance. The results were lower regarding the other strategy categories. In particular, rehearsal strategies revealed a correlation of 0.16 and were followed by sources, management, and encoding

(all with correlation coefficients oscillating around 0.13), guessing ($r = 0.12$), dictionary use ($r = 0.11$), and vocabulary perceptions ($r = 0.09$). In reviewing the existing research on VLS, it can be seen that guessing strategies and dictionary use (Luppescu and Day 1993; Gu and Johnson 1996; Chin 1999), as well as management strategies (Sanaoui 1995; Gu and Johnson 1996; Kojic-sabo and Lightbown 1999) have been proved to have a positive effect on vocabulary test scores or vocabulary size. Still, it should be indicated that all the correlations established between different strategy categories and performance were statistically insignificant and that only one result, that is the relationship between the use of activation strategies and VTS accounted for around 5% of the variance in achievement. All the other strategy categories correlated positively with performance; however, the relationships were extremely weak as they explained less than 2.5% of the variance in the vocabulary test scores.

Turning now to the third research question, namely the relationship between the application of individual strategies and performance, Table 6 presents that the frequency of use of most individual learning strategies correlated positively with vocabulary test scores. When compared with VTS, strategies such as "I look up new words in an English-Polish dictionary" ($r = 0.21$), "I use the newly-learned words as much as possible in speaking and writing" ($r = 0.20$), "I make plans for my vocabulary learning" ($r = 0.20$) revealed the strongest positive correlations. In other words, these results were found to account for around 4% of the variance in the test results. Other meaningful relationships with vocabulary test scores, which explained around 2% of the variance in test performance, comprised tactics in which students create their own sentences with words they have just learned ($r = 0.17$), make a note when they come across a word they do not understand ($r = 0.16$), use verbal repetitions to enhance memorization ($r = 0.14$), guess the meaning of a word they do not know ($r = 0.14$), or avail themselves of extracurricular reading materials ($r = 0.13$). The remaining strategies demonstrated extremely weak positive correlations ($r < 0.10$); more specifically, they accounted for less than 1% of the variance in the vocabulary test scores and therefore are not discussed here. The results of the present study also show that there are two strategy items which correlated negatively with VTS. Firstly, a very weak inverse correlation was found concerning monolingual dictionaries. Such a result is in line with Laufer and Shmueli's (1997) and Knight's (1994) research, which also suggest that vocabulary acquisition is more effective when using L2-L1 translation rather than L2 explanation. On the other hand, researchers such as Underhill (1985) and Baxter (1985) support the contribution of monolingual dictionaries to vocabulary learning; therefore, a possible explanation of this negative finding might be that proficient language learners might in fact lack adequate knowledge on how to use monolingual

dictionaries when learning vocabulary. Secondly, one rather unanticipated finding showed that the more attention one paid to the pronunciation of a new word, the lower score they were likely to achieve on the vocabulary tests (*r* = -0.13). This finding is inconsistent with the outcome of the study conducted by Hamzah et al. (2009), who found that students who learn the sound of a word demonstrate higher vocabulary size than those who do not do it. Again, however, the negative results found in this investigation need to be treated with circumspection as they are statistically insignificant and account for less than 1.7% of the variance in achievement.

Category	Strategy	(r)	(r²)
PER	I pay attention to the pronunciation of a new word.	-0.13	0.02
MAN	I highlight the words that seem important to me.	0.07	0.01
SOU	I listen to English songs, radio programs, watch English movies etc. to increase my vocabulary.	0.03	0.00
DIC	I look up new words in an monolingual dictionary.	-0.08	0.01
PER	I pay attention to the examples of how a word is used in English.	0.09	0.01
REH	I repeat a new word out loud several times to remember it.	0.14	0.02
GUE	I check to see if my guesses about the words are right or wrong.	0.05	0.00
SOU	I read stories, magazines etc. outside class to increase my vocabulary.	0.13	0.02
ENC	I associate words with those I already know.	0.01	0.00
ENC	I distinguish words with similar meanings.	0.05	0.00
ENC	I try to memorize the Polish equivalent of the word.	0.09	0.01
PER	I pay attention to the grammatical patterns of a new word.	0.10	0.01
ENC	I try to remember the sentence in which the word is used to remember the word.	0.10	0.01
PER	I pay attention to the unfamiliar usage of a known word.	0.09	0.01
DIC	When I look up a word in the dictionary, I read all the meanings of new words.	0.05	0.00
GUE	I guess the meaning of words I don't know.	0.14	0.02
DIC	I look up new words in a bilingual dictionary.	0.21	0.04
ACT	I use the newly-learned words as much as possible in speaking and writing.	0.20	0.04
SOU	When I come across a new word, I make a note of it.	0.16	0.03
MAN	I group words in my own way to remember them.	0.00	0.00
MAN	I make plans for my vocabulary learning.	0.20	0.04
ACT	I make up my own sentences using the words I just learnt.	0.17	0.03
ENC	I analyze the structure (root and affix) of a new word to remember it.	0.04	0.00
REH	I review my vocabulary regularly.	0.05	0.00
MAN	I keep a vocabulary notebook to write down new words I want to learn.	0.05	0.00

Table 6: Correlations between individual strategy use and achievement.

Taken together, the frequencies of strategy use and their correlations with attainment reveal some interesting results. For instance, as regards various strategy categories, the students used activation, management and rehearsal strategies less often than any other strategy group while, in fact, these strategies displayed the strongest positive correlations with learning outcomes. By contrast, the vocabulary perceptions category was applied with the highest frequency; however, its Pearson product-moment correlation coefficient demonstrated

the lowest positive contribution to vocabulary test scores. Furthermore, as far as individual strategies are concerned, it can be seen that the use of monolingual dictionaries, which was the fourth most often employed technique by the participants, correlated negatively with VTS, whereas bilingual dictionaries, which were applied with much lower frequency, demonstrated the highest meaningful relationship in the current research. Moreover, among the fourteen most frequently used strategies (M > 3.5), only two displayed a positive relationship higher than $r = 0.10$. Surprisingly, however, out of the eleven strategies that were incorporated with low or medium frequency, as many as six showed a positive relationship above $r = 0.14$. On the basis of these findings, it can be seen that although the overall frequency of strategy use was encouraging, the correlations also indicated that more frequent employment of strategies presenting the most meaningful relationship to performance could have resulted in higher vocabulary test scores. Therefore, it needs to be ensured that the concept of VLS is often revisited in language classrooms to guarantee that learners not only apply a broad gamut of strategies but also select those devices that have the strongest bearing on their learning outcomes.

6. Limitations of the study

In light of the above discussion, one could assume that the hitherto-described findings have made several substantial contributions to the current research on VLS. Nonetheless, it needs to be remembered that the results must be interpreted with caution because of a number of limitations that can be detected in the present study. To begin with, the instrument of data collection could have been the main flaw in the research. The Likert-scale type responses, for example, might have presented a distorted picture of reality owing to the fact that the subjects might have wished to depict themselves in a more favorable light; thus, it is unclear whether they indeed used the strategic devices they ticked. In particular, the fact that the questionnaire was not anonymous could have substantially enhanced the possibility of false responses. In addition, taking into consideration the fact that all of those surveyed had completed bachelor's degree programs in TEFL, the answers were likely to be influenced by the their beliefs about learning strategies. To be more precise, the subjects could have answered how they think they should study words and not how they actually do it. Next, the instrument might have been flawed as it comprised only 25 vocabulary learning strategies. By contrast, Schmitt's (1997) taxonomy contained many as 58 items, Gu and Johnson (1996) distinguished 91 vocabulary learning strategies, whereas Kudo's (1999) experiment focused on 56 VLS. As a consequence, it can

be seen that the study did not manage to take into account the multi-dimensionality of learners' strategy use.

The statistical procedure that was used to correlate the frequency of strategy use and test performance can also be subject to criticism. To be exact, the Pearson's correlation coefficient might sometimes fail to prove that one variable causes an increase or decrease in the other variable because other unmeasured factors can play a role. That is why, although the Pearson product-moment correlation coefficient indicated a positive relationship between the frequency of strategy use and attainment, it cannot be stated that the application of the former was in fact the factor that influenced the outcome of the latter. Another serious drawback is that the vocabulary tests that were used in this study varied in each of the three classes into which the participants were divided. Since they were designed and administered by different lecturers, they might have differed considerably in terms of validity, reliability, as well as difficulty. Some instructors, for instance, focused only on receptive word knowledge and asked the participants to provide the meaning or definition of the target item; others, on the other hand, required the learners to recall the item from memory to complete a sentence and, what is more, took into consideration the multi-dimensional character of vocabulary knowledge. Furthermore, the current findings were often compared to other research aimed at VLS; nevertheless, it needs to be remembered that variables such as motivation, beliefs, cultural background, learning style, and attitude influence strategy choice. As a result, since the subjects of this study were Polish, attended a Master's Degree program in TEFL, and represented the C1 level of proficiency, their studying patterns were likely to be different from those of learners from previous studies who, in fact, came from other educational backgrounds and populations. Finally, it cannot be forgotten that although a number of correlations indicated that more frequent application of VLS is likely to be accompanied by higher vocabulary test scores, they were very weak as they accounted for a maximum of 5% of the variance in the vocabulary test scores the participants received.

7. Conclusions and implications

In summary, this study aimed to investigate the general pattern of vocabulary learning strategy use among Polish university students whose major subject was English, the relationship between overall vocabulary strategy use and performance, the relationship between different strategy categories and language performance, and the relationship between the application of individual strategies and performance. First, by examining the participants' responses to the questionnaire, the current research project found that the students' overall vocabulary

learning strategy use, on the average, was of medium-high frequency. Next, the frequency of use showed that the most often applied strategy categories were vocabulary perceptions strategies, sources strategies, dictionary strategies and guessing strategies, all of which demonstrated high use. The other categories indicated medium frequency of employment and included encoding, rehearsal, management, and activation strategies. Moreover, Pearson's correlation coefficients displayed a positive relationship between overall and categorical application of strategic devices and attainment. Activation and rehearsal strategy groups were most strongly correlated with vocabulary test scores, whereas vocabulary perceptions and dictionary use presented the lowest, although still positive relationship. Besides, the findings showed that most of the individual vocabulary learning strategy items were positively correlated with VLS. However, only three out of twenty-five items showed a noteworthy ($r > 20$) contribution (i.e. they accounted of around 4% of the variance in VTS) to learning outcomes. They involved behaviors in which students make plans for learning, use a bilingual dictionary, and employ newly-learned words in speaking and writing. On the other end of the continuum, two items displayed a negative correlation with VTS; more precisely, students who used monolingual dictionaries and focused on the word's pronunciation when studying vocabulary tended to achieve lower test scores than those who did not apply these strategies. Interestingly, the findings also revealed that the individual strategies as well as strategy categories which the subjects applied least frequently were the strongest predicators of higher vocabulary test outcomes, while strategic devices that were most often used displayed a rather weak or, in two cases, inverse relationship with attainment. Lastly, the limitations of this study were acknowledged and addressed.

Despite the criticisms that were outlined above, it must be emphasized that the results of the present study are mostly congruent with those of related research and support the fact that more frequent application of VLS is likely to be linked to higher vocabulary test scores. Still, replications of this investigation are needed to gain further insights into VLS use patterns of proficient language learners. For that reason, it is crucial to generate a number of useful recommendations for future studies. Firstly, if the questionnaire used in the current study was to be employed in similar research, it would have to be revisited to include more learning strategies. Secondly, it might also be necessary for future studies to support quantitative findings with other measuring techniques such as observations, interviews, self-reporting, and think-aloud procedures to find out what strategies students actually apply when studying vocabulary. Since various assessment techniques can mutually complement each other, they might help to tackle inaccuracies that were plausible in the current study. Moreover, the employment of multiple methods of strategy investigation with the same study

sample would provide more insights into the effectiveness of various assessment procedures. Thirdly, an attempt to compare the pertinence of these findings with other groups of language learners could be made. Namely, larger samples including participants from different educational milieus could be selected and juxtaposed against each other to see whether English graduates employ a greater or different array of vocabulary learning devices than, for example, university students from other educational backgrounds.

Last but not least, the findings of this research also yield some practical pedagogical implications for students, teachers, and teacher educators in the realm of foreign language teaching. It seems necessary for teacher educators to revisit the concept of vocabulary learning strategies more frequently to ensure that all their students are cognizant of the benefits of strategic devices that were neglected throughout this study as it is believed that these unused strategies may help students learn vocabulary more effectively. In particular, the study indicates that a premium should be placed on areas that involve strategy categories such as management, activation, sources, and rehearsal. In a concise manner, it was found that teacher educators should check whether students are aware that: vocabulary items must be constantly recycled in order to be remembered (Schmitt 2000; Nation 2001), incidental vocabulary acquisition works best when it is accompanied by deliberate learning (Paribakht and Wesche 1997; Schmitt 2000; Nation 2001; Nation and Meara 2002), planning and structured learning go hand-in-hand with language success (Sanaoui 1995; Gu and Johnson 1996; Kojic-Sabo and Lightbown 1999; Zhao 2009), and that a learner must be able to use a great number of words productively in order to achieve high levels of language proficiency (Gu and Johnson 1996; Nation 2001; Wei 2007). In addition, instructors should supply students with more information on how to use monolingual dictionaries (see Nation 2001), highlight the positive effects of vocabulary notebooks (see Allen 1983; Gairns and Redman 1986; McCarthy 1990; Woolard 2000), and remind learners that prefix and suffix knowledge can also assist advanced learners in learning unknown words (Nation 2001). Nonetheless, owing to numerous limitations that could have affected the outcomes of this study, teacher educators should always conduct an appraisal of which strategy categories their students tend to neglect. To this end, they might, for example, decide to construct or adopt a questionnaire that could be distributed occasionally during regular classes to help students assess their own vocabulary studying patterns. Such a tool would raise their awareness about their own vocabulary learning strategies and their frequency of use. Moreover, diagnostic procedures of this kind could assist lecturers in identifying strategies that students apply and do not apply in order to detect and select areas in need of improvement. The aim taking up such steps is to acquaint students, teachers,

and teachers-to-be with a whole gamut of vocabulary learning strategies so that they can choose those that are appropriate for them. Once they notice that the application of VLS has a considerable bearing on lexicon expansion, their pertinence will be substantially elevated. This, in turn, is likely to bring into existence a cadre of professionals who will be aware of the fact that, besides the ability to teach the target language, it is also important to know that one of the priorities of language instruction is to create a study environment in which good studying habits are inculcated in learners.

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