A Study of Learner Strategies Used by Students of Architecture

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Abstract

This paper presents the findings of a study on how the students learnt architectural terms in English. The sample consisted of 23 students in the first year reading for their degree in Architecture. The issues related to learning architectural technical terms, inherent methodological issues in teaching those terms, their application in architecture and how the students learnt unfamiliar terms in architecture were investigated. The study aimed at developing practical and less time-consuming techniques to teach terms in architecture. Classifying the type of strategies used by the students, identifying what techniques work best in teaching architectural terms and reporting the type of difficulties faced by the students were the objectives. The data were collected through a researcher-administered data collection instrument. The instrument consisted of 63 Likert scale questions and the instrument was adapted to suit the study. Quantitative analyses were run on the data to obtain descriptive statistics. The results showed that the difference between female and male students, was significant (p<.05). The research insight indicated that the students incorporated a variety of strategies to learn terms related to architecture. More digital strategies are used by female students (m=3.57, SD=0.51) than male students (m=2.83, SD=0.41). Cognitive strategies are the least frequently used type of strategies by the female (m=3.19, SD=0.43) and male students (m=2.66, SD=0.29). Digital strategies are the most used type of strategies while the second most widely used strategies are determination strategies.

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Another statistical measure run on the data showed that there was a difference between female and male students in the frequency of use of architectural terms. Based on the findings, some techniques to teach the terms were suggested as part of recommendations.

Keywords: Architecture, digital, strategies, techniques, terms, vocabulary

Introduction

Vocabulary learning strategies[2] (VLSs) used in learning architectural terms are part of language learning strategies (LLSs), and Schmitt (1997) & Oxford (1990) have proposed vocabulary learning strategy inventories (VLSIs). Out of these two scholars, Schmitt's VLSI is the most widely used (and modified) inventory[3] used to count the VLSs of the second language (L2) learners. In it, Schmitt (1997) has proposed 56 strategies: (a) 9 *determination strategies*, (b) 8 *social strategies*, (c) 27 *memory strategies*, (d) 7 *cognitive strategies*, and (e) 5 *metacognitive strategies.* It contained (f) 7 *digital strategies*. Digital strategies are the new strategies I added to Schmitt's (1997) original inventory. The modified inventory consisted of 63 strategies under six (6) categories as described above.

Background

Learning technical terms in architecture requires technical term learning strategies. Without a sufficient repertoire of architectural terms, students cannot read academic texts or express their ideas in architecture. Terms relate to active reading and writing, and understanding contents in lectures. Terms in architecture are necessary and useful to the students reading for degrees in architecture. By having several words at the students' disposal, they can communicate complex ideas objectively. Architectural terms, for example, help students grasp abstract and concrete concepts. Terms are the foundation for the comprehension of more abstract complex architectural concepts. Having a repertoire of architectural

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[2] For the students reading for their architecture degree, vocabulary is architectural terms.

[3] This inventory has also been critiqued for its apparent weaknesses but without success.

terms, helps students communicate engagingly — much of architectural academic communication necessitates expressing complex technical concepts.

As part of LLSs, VLSs used in architecture remain unresearched and no empirical studies are available in Sri Lanka. Quantitatively, vocabulary items such as the *lexis* in architecture tend to equal in number to the terms in other fields. What strategies the students can use in learning architectural terms and the best practices the teacher may employ in teaching the specific lexis in architecture need to be researched.

Hence, this research study considers the unsolved questions: (1) what traditional strategies[4] are used by the students, (2) what type of digital strategies should be taught to them, and (3) what may be the best way to teach the often-used terms in architecture.

Rationale

A lacuna exists in research in Sri Lanka on the strategies used in learning technical terms, and empirical studies are required. Hence, this study was conducted to document the strategies used in learning term in architecture.

Research Problem

As the pilot study showed, the students do not use modern strategies to learn architectural terms. A closer initial examination showed that they did not know the availability of the VLSI of Schmitt (1997) that could be used to learn the architectural terms. Their limited repertoire of architectural terms negatively impacts their education. They face difficulties when they do not have the required number[5] of architectural terms in their academic work particularly, in reading as they are required to read and understand texts in architecture. Besides, the type of strategies that may be used to teach terms has not been documented. The kind of digital strategies the students may use in reading academic texts is unclear,

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[4] The strategies such as asking the teacher or using a dictionary to learn the meaning of a word is a traditional vocabulary learning strategy.

[5] This is a subjective statement, however at least 5000 terms are required as Coxhead's (2000) Academic Word List.

undocumented and not investigated. Some students failed to learn technical terms but it was not clear why they failed to learn the terms used often in architecture. Furthermore, the type of techniques that may be used by the teacher to teach the required number of architectural terms remains as primary concerns to be addressed with research insight.

As no studies are available in Sri Lanka on the strategies used by the students to learn architectural terms in English, this study fills the current gap which exists in the field of English Language teaching. How technical terms in architecture are learnt and the strategies that may be used to learn architectural terms remain unexamined. This study presents the findings that are useful for teachers to teach terms in architecture effectively. The teachers may incorporate the techniques suggested under recommendations.

Objectives

This research aimed at developing workable and less time-consuming techniques to teach terms in architecture. Based on the findings, the Academic Word List of Coxhead (2000) will be proposed to be incorporated into the course contents of the Academic English Course. The classification of the type of strategies used by the students and identification of what techniques work best were the objectives that guided this study.

Research Questions

In this research study, the guiding research questions are:
1. *What are the most suitable strategies the students may use to learn architectural terms?*
2. *Do female students use more strategies than male students?*
3. *What are the commonest (if any) strategies used by the students?*
4. *What techniques can the teacher use to teach the architectural terms?*

Research Method

A non-experimental research design was used in conducting the study. The data analysis is quantitative. 5 voluntary students took a pilot-test. After the pilot-test, the questionnaire was adjusted and administered to the sample selected.

The sample consisted of 23 undergraduates reading for their degree in architecture. They are between 20-23 years of age. Socio-economically, they belong to the middle and upper-middle class. The students have sat the Ordinary and Advanced Level Examination in the Sinhala medium. The sample represents male as well as female students.

A questionnaire that consisted of 63 strategies was used to collect data from the students. The questionnaire was a modified version of Schmitt (1997). It was pilot-tested with 5 students and its accuracy was verified by subjecting the instrument to a Cronbach's Alpha coefficient measure. The instrument was researcher-administered. The data was subjected to statistical analysis.

Review of Literature

VLSs that can be used to learn terms in architecture can be considered as part of (or under) general LLSs in L2 learning[6]. Developments in VLS research began approximately around the 1970s with empirical research to recognize the characteristics of good language learners (See Rubin: 1975 & Stern: 1975). Learner strategies used to learn terms can be identified as processes by which information is obtained, stored, retrieved and used by students — the strategies are also considered *deliberate processes*. Those deliberate processes, for example, are strategies learners use to learn terms such as '***ergonomics***', '**enfilade**', '*fenestration*', '*pastiche*', '*gentrification*' etc. in architecture.

Low-frequency technical terms are subject-specific terms and the field of architecture uses them. "High-frequency words are generally learned earlier and easier than low-frequency terms" (Ellis & Beaton, 1993). Ahour & Abdi (2015) reported that "good learners not only used more vocabulary learning strategies but also relied more on different strategies than did poor learners".

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[6] The terms learning and acquisition have interchangeably been used in this article. No distinctions whatsoever are made between the two terms.

Learning low-frequency terms[7] presupposes effort, time and use of different strategies. Nation (1990) claims that 'teaching learners' strategies is essential when it comes to learning low-frequency words' (p.7). Low-frequency terms are conceptually complex and special training is needed to learn them. Illangakoon (2012), Kumara (2009) & Perera (2006) confirmed the power of vocabulary[8] in their studies and further elaborating on, they remarked that "… in the university system, vocabulary can be of paramount importance for students to acquire the essential technical knowledge" (p. 2).

Beck, McKeown & McCaslin (1983) concluded that "technical vocabulary and general vocabulary have some degrees of overlap" (pp. 177-181). This variation is due to polysemy and what a word means in one field of specialization may have a different meaning in another specialization. In an academic English class, learners encounter unavoidably different texts — particularly texts in specific contexts and they find technical terms which they must understand to comprehend such texts — lexical density in such texts may pose difficulties and in those situations, VLSs are helpful.

Unlike the common words used, low-frequency architectural terms are not usually used by ordinary people[9] in their ordinary communication. Why the students should learn technical terms is that it is a requirement as they read their degrees in English.

Researchers have attempted to document how good and poor learners learn vocabulary. The use of strategies by these two types of learners varies, and 'good' and 'poor' learners employ different VLSs when they find unfamiliar words. Two of the earliest VLSs researchers are Stern (1975) & Rubin (1975). They reported different strategies used by 'good' and 'poor' learners and some observations were made. Stern (1975) & Rubin (1975) define a good learner as:

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[7] Low frequency terms are the everyday words such as table, book, read, write etc.

[8] In this example, vocabulary is the specific lexis in the subjects they conducted research in.

[9] 'Ordinary people' refers to those who are out of architecture.

Stern (1975)
1. It is a personal learning style or positive learning strategies
2. An active approach to the learning task
3. A tolerant and practical approach to the target language and empathy with its speakers
4. Technical know-how about how to handle a language
5. Strategies of experimentation and planning
6. Constantly searching for meaning
7. Willingness to practice
8. Willingness to use language in real-life communication
9. Self-monitoring and critical sensitivity
10. Developing the target language more as a separate reference system.

Rubin (1975)
1. Willing and accurate guesser
2. Strong drive to communicate
3. Uninhibited
4. Attends to form
5. Practices / seeks out conversations
6. Monitors speech and speech of others
7. Attends to meaning

(*Source: Brown, 2013, p. 11*)

The modern classroom is full of smart electronic devices. In a study conducted by Boyd (2011), he reported that "digital device skills are not taught in many classrooms and many teachers are not adept at the use of technology, leaving strategies for their [*sic*] use up to the student" (p. 27). In another study conducted by Gu (2002), some factors specific to gender and academic aptitude were investigated and the study reported results on VLSs used by the participants. Chamot & Kupper (1989) concluded that "successful learners tend to select strategies that work together well, tailored to the requirement of the language task" (pp. 13-22). Skehan (1991) maintains "that the influence of this wide range of personal characteristics on the efficiency of language learning strategies means that no single strategy can be perfect for everyone, as each person will find some strategies to be more efficient man than others" (p. 276).

Strategy researchers such as Moir & Nation (2002) believe that "deeper strategies requiring extensive engagement with strategies like memorization (parroting or rote) or even relatively non-deeper strategies if applied appropriately, can be useful strategies" (p. 3). Schmitt (2000) claims that "intentional learning of vocabulary generally leads to more robust and faster learning" (pp. 329-363). In selecting VLSs by learners, the frequency of occurrence of a term is also relevant. Nation (1990) claims that "teaching learners' strategies is essential when it comes to learning low-frequency words" (p. 7). He says that vocabulary can be viewed from a cost-benefit perspective (p. 7). According to him, high-frequency words are so essential that the cost of teaching them is justified by the resultant benefit, but low-frequency words will not be met often enough to require individual and explicit teaching. It is evident that an L2 learner does not initially have full control over all the aspects listed and as such, her or his overall knowledge of a word is likely to develop being exposed to that word "5-16 times" (Nation, 1990, p. 32). Vocabulary learning is gradual and lexicon grows over time as a result of a conscious effort in learning an L2.

In another article, Muir & Dörnyei (2013) brought into motivation a fresh idea, *vision*. They argue that learners with vision succeed in L2 learning. They concluded that "vision is understood as the highest order motivational force" and relates to a long-term endeavour, which is able to override … fluctuations" (p. 361). In viewing L2 learner motivation in that away, vision is seen as "one of the most reliable predictors of their long term intended effort" (Dörnyei & Kubanyiova, 2014, p. 371). They concluded that "vision occupies a firm and increasingly prominent place within the landscape of L2 motivation research" (p. 359) and vision, according to them, is seminal.

Senevirathna, Jayakody & Peiris (2016) emphasized the importance of vocabulary stating that "the most prominent language problem of both native[10] and non-native learners in their academic learning and writing is the vocabulary" (p. 2).

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[10] Native speakers as well may experience difficulties in understanding texts due to limited vocabulary.

Zhou (2010) maintains that "effective use of vocabulary instruction may be devised, and it is usually dependent on distinguishing the various types of difficulties that different terms pose for learners" (p. 15). A review of one study on vocabulary instruction done by Anderson, et al. (1987) concluded that "… struggling readers learn vocabulary when teachers encourage independent learning by allowing them to self-correct terms to be studied" (p. 324).

Lewis (2012) criticized the idea that "we have already seen that language teaching has traditionally developed an unhelpful dichotomy between the generalizable, pattern-generating quality of grammar and the apparently arbitrary nature of individual vocabulary items" (p. 89). In another investigation by Folse (2014), he observed a class of 50 hour intensive academic English course. In it, he noted three things: "there was no overall plan for vocabulary instruction in the syllabus and grammar was predominantly taught, but words were taught as they needed" (pp. 141-148). He, further, elaborated that "daily class activities did not improve learners' language" (Folse, 2014, p. 9). Though information technology has revolutionized and transformed the way learners traditionally learn technical terms, many teachers still have a high regard for classroom English for specific purposes teacher and "they consider their teachers and lecturers as the most readily available sources to look up for vocabulary" (Gu, 2003, pp. 24-35).

Analysis

In table 1, a comparison[11] of the research findings obtained through statistical analysis has been presented. Question number 5 received the highest number of responses while question number 10 received the lowest number of responses. Question number 2, 7 and 9 received an equal number of responses. Question number 3 and 6 received 40 marks each. A gender-wise analysis of the use of six (6) strategy types is been presented.

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[11] A full discussion is presented in table 2 where a gender-wise analysis with other statistical analysis can be seen.
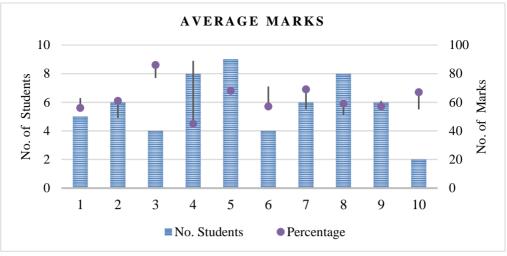
AVERAGE MARKS

Table 1: Analysis of Responses

No.	Type of Strategy	Female		Male		Female vs. Male		
		Mean	SD	Mean	SD	t	p	r
1	Determination	2.26	.49	3.56	.68	3.96	0.00*	0.41
2	Social	3.51	.71	2.75	.77	4.53	0.00*	0.46
3	Memory	3.41	.56	2.99	.06	4.19	0.00*	0.43
4	Cognitive	3.19	.43	2.66	.29	3.93	0.00*	0.41
5	Metacognitive	3.57	.78	2.79	.90	4.04	0.00*	0.42
6	Digital	3.57	.51	2.83	.41	5.00	0.00*	0.50

Table 2: Gender -Wise Analysis of the Use of Six Strategy Types

*indicates that they are statistically significant p values

The mean value of determination strategies for female students is 2.26 while it is 3.56 for male students. This implies that female students use more determination strategies than male students. In social strategies, female students have a high mean value (3.51) and male students have (2.75). The mean of memory strategies of female students is 3.41 while it is 2.99 for male students. Female students are the best users of cognitive and metacognitive strategies. The means cognitive strategies of female and male students stand at 3.19 and 2.66 respectively. The mean value of metacognitive strategies of female students is 3.57 which is a

higher value than that of male students (2.79). The mean of digital strategies of female students is 3.57 while it is 2.83 for male students.

Discussion: Gender-Wise

Gender - wise, it was noted that female students used more strategies than male students in the study. Particularly in digital strategies, female students used 6 digital strategies than male students. Male students used 3 software programmes: the electronic version of the Oxford Advanced Learner's Dictionary, Google Translate and language translators more than female students. When considering all the strategies, it is very clear that all strategy variables have a high value for female students when compared with male students. Regarding the mean scores, both male and female students' most preferred strategy type is 'determination' and the least preferred strategy type is 'cognitive'. Among the six strategy types, digital strategies (0.5) have the highest positive correlation between female and male students. Therefore, there is a significant difference between male and female students over the 6 strategy groups.

Recommendations

Techniques to teach terms in architecture have been presented based on the research findings. Brainstorming can be done in pairs, groups or as a whole class technique. For example, a brainstorming session on 'how many types of memory[12] do you know? may be conducted. Match the word to the picture, the definition, its synonym or antonym, etc. may also be used as a technique. These add cognitive depth and get learners experimenting with the meaning of terms. Mind-mapping is like brainstorming, but it gives students a visual diagram of how words relate to each other. Categorizing terms adds cognitive depth. Collocations as a technique in teaching architectural terms may also be used as a technique: Many words do not stand alone. They interact with other words in sentences; ex. cache memory, temporary memory, permanent memory etc. Contextualizing of terms may be done and the teacher may use terms in context, ex. 'cryptography' is used in user authentication. Recycling of terms may also be

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[12] This memory is the memory in the computer such as 'cache memory', 'non-volatile memory' and 'Intel Optane memory' etc.

considered as a technique. The teacher may try to ensure that the terms she or he has taught will come up repeatedly in the lesson or use them repeatedly.

Techniques for Teaching Architectural Terms

The teacher may demonstrate to students how to use dictionaries (paper and digital / with much emphasis on digital dictionaries). In class, the teacher may teach students how to use structural analysis to learn the meaning of new terms. Students can examine the structure of the word (analyze part of speech), such as affixes (prefixes and suffixes) and commonly used Greek and Latin roots as in *centripetal* (moving + toward the centre), *mechatronics* (mechanics + electronics) etc. The teacher may train students to use digital devices such as smartphones to search online glossaries of technical terms, thesauri, translators, etc. She or he can choose the technical terms that students most need to learn and plan for repeated exposures to ensure that students learn them. Moreover, she may provide multiple opportunities to expose students to many opportunities, application and independent reading. Teaching students new terms through direct instruction (where it is practical) involving defining terms, using the terms and providing repeated exposure to the terms over an extended duration of time (if possible) is also practical. The teacher can select terms that are important and useful for understanding the concepts and encourage students to make connections between new terms and new concepts. Training students to identify the meaning of a term by listening to or looking for context clues is also a good technique.

Conclusion

In this article, the students' use of strategies in learning terms in architecture was analyzed. The data showed that the female participants used more strategies (See table 2.) than male students. The analysis endorsed that the students used 63 strategies to learn the terms in architecture. Furthermore, digital strategies are the most prefered strategy type (mean=2.26, SD=0.49 and mean=3.56, SD=0.68), respectively, for female and male students.

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