

A Survey of Engineering Student's Use of English Language Learning Strategies

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This paper presents a longitudinal comprehensive study on engineering student's use of English language learning strategies. The study aims to investigate student's choices of strategy use, frequency of strategy use and deployment of learning strategies in practice. The survey consists of one close-ended questionnaire distributed in paper and one open-ended questionnaire distributed to a public mailbox accessible to targeted students. The findings of questionnaire one reveal that engineering students have a tendency to use more cognitive strategies than social/affective strategies, and surprisingly, metacognitive strategies are poorly employed. The investigation from questionnaire two shows that engineering students have strong belief on the positive impact of strategy use on English language learning. However, the effective application of English language learning strategy varies from students to students.

Key words: learning strategy, cognitive strategies, social/affective strategies, metacognitive strategies

INTRODUCTION

Since the 1970s, considerable research has been done to study individual differences in language learners. One individual difference variable, L2 learning strategies, has attracted increasing attention from both researchers and teachers in practice. The study presented in this paper is a longitudinal comprehensive study lasting for two academic terms from September 2004 to September 2005. It aims to investigate student's choices of learning strategies, frequency of their deployment and factors affecting the successful and unsuccessful use of learning strategies. Three language teachers are involved in this research project, two of them working in a university in China and one studying in U.K.

RESEARCH CONTEXT AND LITERATURE REVIEW

Research Context

In 2003, the new College English Curriculum Requirement (CECR) was issued in China to address the conflict between the expansion of student enrolment and relatively limited teaching resources. Under the CECR, English language learning aims to be more self-directed and learner-centred. As Oxford (1990) points out, one feature of language learning strategies is to allow students to become more self-directed. To meet the new demands of the curriculum, students at tertiary level need to be adequately aware of learning strategies. Therefore, the researchers design a longitudinal study to investigate university student's use of learning strategies

Definitions of Language Learning Strategy

Research on language learning strategies started in the last half of 1970s when researchers tried to identify characteristics of good language learners

(Rubin, 1975). From then on till now consensus has hardly appeared to emerge over the definition of learning strategy and how to categorize different learning strategies. Andrew Cohen (1998) differentiates language learning strategies and language use strategies. In his view, language learning and language use strategies can be defined as “those processes which are consciously selected by learners and which may result in action taken to enhance the learning or use of a second or foreign language, through the storage, retention, recall, and application of information about that language” (p. 4). Oxford (1989) defines language learning strategies functionally as “behaviors or actions which learners use to make language learning more successful, self-directed, and enjoyable” (pp. 235-247). She categorizes language learning strategies as direct and indirect. O’Malley and Chamot (1990) offer an alternative definition of language learning strategies, according to which strategies involve “special thoughts or behaviors that individuals use to help them comprehend, learn and retain new information” (p. 1). This definition gives more emphasis to the cognitive aspects of strategy use. Despite the different emphases and concerns by the researchers, there is a shared core of the conceptualization of language learning strategies if scrutinized more closely. Language learning strategies are understood as conscious decisions made by learners to facilitate language learning.

Approaches to Investigating Language Learning Strategies

Researchers have used different approaches to investigating language learning strategies. Hosenfeld (1978) used verbal report or “think-aloud” protocols to investigate students’ mental processes and strategies used. Cohen and Aphek (1981) collected anecdotal reports from students on the associations they made while learning vocabulary, and found that students who made associations remembered vocabulary words more effectively than students who did not make associations. Critics of verbal report note that much of the cognitive processing is inaccessible because it is unconscious (Seliger, 1983). Even if the processing is not unconscious, it has been considered either as too

complex to capture in protocols, or as putting too great a burden on learners' memory for them to report mental processing with any accuracy.

Despite the inherent disadvantages of the verbal report method, it can help researchers to explore areas of strategy use that can not be captured by either observation and written questionnaires. Although critics state written questionnaires are biased by researchers' presumption, a well designed one can elicit revealing data. A good example of a structured language strategy questionnaire survey is Oxford's Strategy Inventory for Language Learning (SILL) (Oxford, 1990). Besides verbal report, observation and questionnaires, researchers also employ interviews and diary studies to collect data on use of learning strategies. Many of the most successful studies have employed multiple data collection procedures. Because the present study is only one part of the larger project of training learners for autonomy and developing a learner-friendly corpus, it can not be a large scale study. The researchers have had to relinquish multiple data collection procedures and adopt questionnaire survey as research instrument.

Research Questions

Learners have been found to vary considerably in both the overall frequency with which they employ strategies and also in the particular type of strategies they use (O'Malley, 1987; Chamot et al., 1987; Ehrman, 1990). Our initial research questions are the following:

- What strategies do Engineering students employ to learn English?
- In what ways does student's use of strategies vary?

However, after collecting data of the first questionnaire, the researchers found patterns emerged. In order to investigate those patterns further, the researchers designed an open-ended questionnaire as a follow-up study.

RESEARCH DESIGN

Research Procedure

The study comprised two phases. Phase one involved the design and distribution of questionnaire one, collection of data and analysis of data. Before designing questionnaire one, three teacher researchers consulted literature on the study of strategy and discussed the possible uses of English language learning strategies from their teaching experience. One teacher researcher collected the data and emailed them to another one studying in U.K. The whole process took about one academic term.

Phase two started with the registration of a public mailbox on internet, after which questionnaire two was emailed to it. Because this phase involved voluntary participants, the completion of questionnaire was a lengthier process. It took about 3 weeks for all the 35 students to finish answering the open-ended questions. Most of the respondents emailed their responses to the teacher researcher in U.K., with only a few emailing back to the public mailbox. The teacher researcher in U.K merged the data into one file, followed by an analysis of them.

Participants

The participants are mostly students from the engineering faculty to which the researchers teach, thus they are convenient samples. There are 180 participants for questionnaire one and 35 participants for questionnaire two. All of them are considered having given consent because they have the freedom to opt out. They see it as a chance to understand the nature of language study and hope it will help them achieve better results in English study, which can explain the high return rate of questionnaire one.

Research Instruments: Two Questionnaires

In order to avoid using unfamiliar concepts, the researchers designed a close-ended questionnaire in L1 (Chinese) to make it easier for students to make choices. All students need to do is to tick the choice that best describe their use of learning strategy. The questionnaire is based on O'Malley and Chamot's typology of learning strategies (Chamot, 1987), in which they classify learning strategies into cognitive, metacognitive, and social/affective. Considering that English language learning in high school is largely test-oriented, the researchers believe that the students do not have much chance of using social and affective strategies. The focus of questionnaire one is mainly on cognitive and metacognitive strategies that students have used.

An examination of the results of the first questionnaire showed that patterns were beginning to emerge. We found students were especially weak at deciding when to use strategies and how to test the effectiveness of the strategies, so at the start of the second term, the researchers designed an open-ended questionnaire to shed more light on these weaknesses. Questionnaire two are more about time, conditions, sources, and effectiveness of strategy use. Students can answer questionnaire two in either target language (English) or L1 (Chinese).

Reliability and Validity of the Two Questionnaires

Questionnaire one was distributed to 180 students in paper. Fortunately, the researchers had a high return rate of 97%, with 5 responses missing. When given the questionnaire, students were told no credits would be granted for finishing it. So it guaranteed students would not strive for correct answers, and they were more likely to choose those that echoed their own strategy use. In this way a relatively high validity could be ensured. On the other hand, the large number of respondents could guarantee more of the statistical reliability of the results.

Questionnaire two was distributed on line. Two weeks prior to the survey,

a public mailbox was registered on internet which every student was free to access. Then those open-ended questions were on display in the mailbox for two weeks, and students were encouraged by their teacher to participate. All the participants were volunteers who were assured of the confidentiality of their answers. They had the freedom to choose to use their real name or pseudonym. By this measure the researchers were confident that the students would express their ideas truthfully. The result verified the researchers' expectation. Students were so faithful to truth that researcher read lines that could never be expected to hear in face-to-face communication.

DISCUSSION ON RESEARCH RESULTS

Findings of Questionnaire One

Questionnaire one consists of 15 questions in Likert scale (See Appendix). They cover a variety of learning strategies, e.g. directed attention, self-management, self-evaluation, resource, grouping, translation, elaboration, inferring main idea, and questioning for clarification and cooperation. The findings match some of the researchers' predictions.

Use of Social/Affective Strategies

Engineering students prefer independent and analytic learning style, so the frequency of their choice of social/affective learning strategy is very low. For question 14, "In English study, I _____ ask a teacher or peers to clarify a difficult point", only 22% students choose "often", 78% students choose either "sometimes" or "never". For question 15, "In English study, I _____ work with one or more peers to complete a language learning task", no one chooses "always", 58% students choose "sometimes", and 34% students choose "never". Their learning preferences expand Ellis' typology of factors affecting strategy choices, which confines to individual learner differences

(belief about language learning, learner factors, the learner's personal background) and situational and social factors. The researchers' finding indicates that engineering students have a low tendency to choose social/affective strategy.

Use of Cognitive Strategies

Engineering students use more of the cognitive strategies. For question 7, "In English study, I _____ make use of various resources to facilitate language learning (e.g. dictionary, encyclopedia)", only 7% students choose "never". For question 12, "In English study, I _____ relate new information to other concepts in memory", only 2% students choose "never". For question 8, "In English study, I _____ imitate a language mode, including overt practice and silent rehearsal", 14% students choose "never". The questions designed here to investigate use of cognitive strategies are not related to specific tasks or language skills. The researchers are more interested in getting a general picture of strategy use. Students' choices inform the researchers of their preference of learning English language as a cognitive process rather than a social one.

Use of Metacognitive Strategies

As mentioned above, the findings are not out of the researchers' expectation from their teaching experience. However, the findings of students' choices of metacognitive strategies are somewhat unexpected. For question 5, "In English study, I _____ check the accuracy of a listening or reading comprehension task", only 22% students choose "often". For question 4, "In English study, I _____ set aside some time to practice a language component (e.g. pronunciation or grammar)", only 32% students choose "often". For question 3, "In English study, I _____ decide in advance to attend in general to a learning task and to ignore irrelevant distracters", 40% students choose "often".

Despite all these differences in their choices of strategy use, 93% students believe learning strategy has a positive impact on their English language learning, as it is shown in their answer to question 1 about the impact of strategy use. All these findings make the researchers even more curious. If students believe in the effectiveness of strategy use, why do they vary in the frequency of their uses? Why do metacognitive strategies seem to be so remote from their English language learning? What is their real understanding of learning strategy? Therefore the researchers design questionnaire two.

Findings of Questionnaire Two

Questionnaire two is made up of 10 open-ended questions. It aims to investigate in detail students' use of language learning strategy. Because of the limit of word limit of this paper, only 3 questions will be addressed. Questionnaire two verifies at least one finding of questionnaire one, i.e. nearly all the participants believe that learning strategy facilitates English language learning. They attribute their failure in English study either to lack of knowledge of learning strategy or improper use of learning strategy, e.g. giving up learning strategy easily after a short while. Most of them think they can't learn English well because of their own weakness, e.g. lack of motivation, lack of persistence, etc.

Different from questionnaire one, the researchers take an emic perspective at questionnaire two. The researchers find resonance upon students' remarks from their own experience of learning English as a foreign language or learning a second foreign language. The researchers can understand more of their students' frustration and confusion.

Students' Use of Language Learning Strategies

Nearly all students' descriptions of strategy use are general and vague. Contrary to the researchers' initial worries, students don't just copy the strategies in questionnaire one. They describe their use of learning strategy

from their own learning experience in university. All of them are related to how to learn English better in general rather than a specific aspect of language learning.

Out of 35 student participants, 19 students state clearly the importance of memorization, especially memorizing words and phrases. Reading comes next in importance. 15 students state they read either English newspaper or magazines, or just short passages. 9 students mention they listen to English songs and see English film clips regularly. Also mentioned by a few students are reading English every morning, going to the English corner to practice oral English and doing homework assigned by teacher.

The researchers' finding matches only partly the work of some strategy researchers. O'Malley et al. (1985) found that ESL learners reported using the highest frequency of strategy for vocabulary learning tasks and oral drills. The lowest frequency was for listening comprehension, inferring, making an oral presentation, and engaging in operational communication. Oral drills don't count as a top priority in the researchers' findings. One important reason for students' choices of strategy is they learn English as a foreign language, thus they don't see the immediate need to use it as a tool to communicate. Therefore, their choices of strategies are more related to receptive skills such as reading.

Successful Use of Learning Strategy

In one question students are asked to describe an experience of successful use of learning strategy. Students' responses go in three categories.

a) Meeting the affective needs

Some students associate successful strategy use with affective factors, e.g. sense of achievement, more interest in English and higher confidence. The following are quotations from student's response in relation to affective needs.

"I don't feel bored. The more I listen, the more fluently I can speak. The more passages I read, the more words I know."

“When I read a story, I find myself enjoy it instead of paying attention to words and some good expressions.”

“The teacher asks us to read English newspaper. After a period of practice, I can read faster and learn to express myself in English. I’m getting more interested in English study.”

“No specific successful example. It’s just kind of a feeling of achievement.”

b) Meeting the instrumental needs of score gains

The majority of students relate successful learning strategy with score gains in examination. The following quotations indicate this point.

“I learn some useful oral English from the book Crazy English 900. I scored higher at College Entrance Examination.”

“In Grade 2 the text score is 90. In grade 3 the text score is 120.”

“I keep myself calm. I read grammar and do reading comprehension exercises. At last, I get 126 in the final exam.”

“It helps me save a lot of time in exam when I use strategies like scanning.”

c) Meeting the need of improving a language skill

Lastly, some students connect successful learning strategy use with better skills in reading and speaking. Surprisingly, very few students mention strategies to improve listening and writing. Here are some of the students’ comments.

“I spare some time practicing oral English, now I can express myself better.”

“I read classical novels to improve reading.”

“Sometimes I practice oral English with my friends. I was not able to open mouth for fear of making mistakes. Now I’m more comfortable with speaking.”

Unsuccessful Use of Learning Strategy

a) Failure in employing vocabulary learning strategies

The most frequently stated failure of strategy application happens in vocabulary learning. 10 out of 35 students state they have problem in

deploying strategy in learning vocabulary. Here are some examples.

"I get nervous when I come across new words, thus I fail an exam."

"I memorize five words one day, forget them all the next day, and start to memorize again. This vicious process goes on and on forever."

"I'm stupid when it comes to memorizing words. I keep forgetting them."

"I fail to memorize the words learnt during the term."

b) Failure to applying strategies suggested by others

Some students describe their experience of getting suggestions from teacher and peers about strategy use. But when they employ them personally, they can't use them successfully. For example, one student states, "Some people suggest to me that I can improve reading comprehension by doing exercises. But I can get the correct answer without understanding the passage itself. It's boring." Another student states, "I went to see English movies as someone said it was very helpful for my listening. But I gained nothing from it except for the plot."

c) Failure to applying metacognitive strategies

Many students hardly use metacognitive strategies to regulate and monitor their English learning process. They express frustration and anger for not able to get the expected results. For example, one student says, "For a time, I just memorize words. It's boring and I do worse in exams." Another student says, "I don't know anything of effective use of learning strategy. Although I spend a lot of time studying English, I achieve little. I become less and less confident in English learning." The following statements are typical too. "I'm disappointed that I make no progress after doing a lot of exercises." "I read the textbook for so many times, but I get no benefits."

ETHICAL ISSUES

As Kimmel (1988) points out, an ethical dimension underlines any

research endeavor, even from the start, where the researcher's values play a role in the way a problem is framed. At the beginning of the study, the researchers did not pay special attention to the ethical issues at first. For questionnaire one, the researchers implemented it as a part of normal teaching practice. Students believed it as a part of their homework too. That explains why there was such a high return rate. However, when it came to questionnaire two, the researchers made it part of a research project and decided to do further research afterwards. Therefore, ethical issues surfaced. That is why the researchers asked for volunteer participants. The researchers got their consent, assured them of their anonymity and informed them of their right to opt out. While only 35 students turned up to participate, the researchers did not press on for more. The researchers attempted to maintain mutual reciprocation for both the researcher and students. It is believed by the researcher that after taking part in this study, the students may learn more of learning strategies and apply them into their English language study.

CONCLUSION

In summary, this paper discusses the definitions of learning strategy, approaches to investigating learning strategy and a longitudinal study on engineering student's use of learning strategies. The researchers can make the following conclusions from the present study. Firstly, engineering students have the tendency to choose cognitive strategies rather than metacognitive strategies and social/affective strategies. Their choices of specific learning strategies are largely decided by their learning style, learning preference and social setting of learning English as a foreign language. Secondly, the majority of engineering students in this study don't have a clear idea of the variety of learning strategies and how to apply them. Their aims of deploying learning strategies are limited, i.e. to meet affective needs, to get higher score gains, develop reading and listening skills, and last but not least, to memorize words and phrases.

From the study, the researchers can describe the use of learning strategies by engineering students, and suggest a connection between the strategy use and factors mentioned above. However, the researchers can't claim a causal relationship between them. Because the research instruments used are closed questionnaire and open-ended questionnaire, the researchers have to be cautious of the findings and translate it into strategy-based instruction with context dissimilar to the study. These findings need to be replicated and verified if they are to be generalized to larger context.

From the study of successful and unsuccessful use of learning strategies by engineering student, the researchers find that more in-depth research needs to be carried out. What makes the difference between successful and unsuccessful strategy use? Why does one strategy prove to be successful on one student but turn out to be total failure on another student? The researchers will continue their research on longitudinal case study to find an answer to these questions.

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APPENDIX

Please tick the Choice which best Describes your English Study

A Survey of Engineering Student's Use of Language Learning Strategy									
Questions		Shui Dian (69)		Tu Mu (70)		Re Dong (36)		Total (175)	
1. I think language learning strategies have the following impact on my English study	A. great	30	43.48%	32	45.71%	16	44.44%	78	44.57%
	B. some	34	49.28%	34	48.57%	18	50%	86	49.15%
	C. no	0	0%	2	2.86%	0	0%	2	1.14%
	D. I don't know	5	7.24%	2	2.86%	2	5.56%	9	5.14%
2. In English study, I ____ skim a passage to predict the main idea.	A. always	6	8.70%	1	1.43%	3	8.33%	10	5.72%
	B. often	22	31.89%	33	47.13%	11	30.56%	66	37.71%
	C. sometimes	36	52.17%	32	45.71%	19	52.78%	87	49.71%
	D. don't	5	7.24%	4	5.71%	3	8.33%	12	6.86%
3. I ____ decide in advance to attend to a learning task and to ignore irrelevant distracters.	A. always	4	5.80%	5	7.14%	1	2.78%	10	5.72%
	B. often	25	36.23%	24	34.29%	12	33.33%	61	34.85%
	C. sometimes	29	42.03%	36	51.43%	18	50%	83	47.43%
	D. don't	11	15.94%	5	7.14%	5	13.89%	21	12%
4. I ____ set aside time to rehearse linguistic components (e.g. pronunciation or grammar).	A. always	2	2.90%	2	2.86%	0	0%	4	2.29%
	B. often	19	27.54%	23	32.85%	10	27.78%	52	29.71%
	C. sometimes	41	59.42%	38	54.29%	22	61.11%	101	57.71%
	D. don't	7	10.14%	7	10%	4	11.11%	18	10.29%
5. I ____ check the accuracy of my own listening or reading comprehension.	A. always	1	1.44%	2	2.86%	1	2.78%	4	2.29%
	B. often	13	18.84%	12	17.14%	10	27.78%	35	20%
	C. sometimes	38	55.07%	43	61.43%	16	44.44%	97	55.43%
	D. don't	17	24.64%	13	18.57%	9	25%	39	22.28%
6. I ____ evaluate whether my oral or written English has reached a certain criterion.	A. always	1	1.44%	0	0%	0	0%	1	0.57%
	B. often	2	2.90%	7	10%	1	2.78%	10	5.71%
	C. sometimes	31	44.93%	27	38.57%	17	47.22%	75	42.86%
	D. don't	35	50.73%	36	51.43%	18	50%	89	50.86%
7. I ____ make use of resources (e.g. dictionary or encyclopedia) for my English learning.	A. always	7	10.14%	9	12.86%	2	5.56%	18	10.29%
	B. often	32	46.38%	29	41.43%	18	50%	79	45.14%
	C. sometimes	28	40.59%	26	37.14%	14	38.88%	68	38.86%
	D. don't	2	2.89%	6	8.57%	2	5.56%	10	5.71%
8. I ____ imitate a language model,	A. always	5	7.24%	9	12.86%	1	2.78%	15	8.57%
	B. often	25	36.24%	21	30%	13	36.11%	59	33.72%

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including overt practice and silent rehearsal.	C.sometimes	32	46.38%	29	41.43%	16	44.44%	77	44%
	D. don't	7	10.14%	11	15.71%	6	16.67%	24	13.71%
9. I _____ reorder or reclassify learnt words based on their common attributes.	A. always	1	1.45%	2	2.86%	1	2.78%	4	2.29%
	B. often	10	14.49%	15	21.43%	4	11.11%	29	16.57%
	C.sometimes	29	42.03%	27	38.57%	15	41.67%	71	40.57%
	D. don't	29	42.03%	26	37.14%	16	44.44%	71	40.57%
10. I _____ consciously apply rules to understanding or deduct rules from language materials.	A. always	2	2.90%	2	2.86%	1	2.78%	5	2.86%
	B. often	10	14.49%	11	15.72%	6	16.66%	27	15.43%
	C.sometimes	36	52.17%	33	47.14%	17	47.22%	86	49.14%
	D. don't	21	30.44%	24	34.28%	12	33.34%	57	32.57%
11. I _____ use the first language as a base for understanding and/or producing the target language.	A. always	8	11.59%	5	7.14%	6	16.67%	19	10.86%
	B. often	31	44.93%	35	50%	14	38.89%	80	45.71%
	C.sometimes	17	24.64%	20	28.57%	9	25%	46	26.29%
	D. don't	13	18.84%	10	14.29%	7	19.44%	30	17.14%
12. In English study, I _____ relate new information to other concept in memory.	A. always	12	17.39%	10	14.29%	6	16.67%	28	16%
	B. often	43	62.31%	38	54.29%	24	66.66%	105	60%
	C.sometimes	14	20.30%	18	25.71%	6	16.67%	38	21.71%
	D. don't	0	0%	4	5.71%	0	0%	4	2.29%
13. In English study, I _____ make a summary of what I've read or listened to.	A. always	2	2.90%	1	1.43%	1	2.78%	4	2.29%
	B. often	19	27.53%	20	28.57%	10	27.78%	49	28%
	C.sometimes	30	43.48%	33	47.14%	15	41.66%	78	44.57%
	D. don't	18	26.09%	16	22.86%	10	27.78%	44	25.14%
14. In English study, I _____ ask a teacher or peer to clarify a difficult point.	A. always	4	5.80%	3	4.29%	2	5.56%	9	5.14%
	B. often	32	46.38%	26	37.14%	16	44.44%	74	42.29%
	C.sometimes	28	40.58%	37	52.86%	16	44.44%	81	46.29%
	D. don't	5	7.24%	4	5.71%	2	5.56%	11	6.28%
15. In English study, I _____ work with one or more peers to finish a language learning task.	A. always	0	0%	0	0%	0	0%	0	0%
	B. often	5	7.25%	6	8.57%	2	5.56%	13	7.43%
	C.sometimes	37	53.62%	47	67.14%	20	55.56%	104	59.43%
	D. don't	27	39.13%	17	24.29%	14	38.88%	58	33.14%

Note:

Shui Dian refers to the Department of Hydraulics. Tu Mu refers to the Department of Civil Engineering. Re Dong refers to the Department of Mechanics.