THE EFFECT OF LANGUAGE LEARNING STRATEGIES ON ENGINEERING STUDENTS' LISTENING COMPREHENSION

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Abstract: This ex post facto study examines the correlation and the effectiveness of the language learning strategies on engineering students' listening comprehension. Further, it strives to figure out the most effective learning strategies in improving their listening comprehension. They were asked to answer both Strategy Inventory for Language Learning Questionnaire (Oxford, 1990) and ESP Listening Comprehension Test as the research instruments. The data findings were then classified and analyzed by applying statistical analysis including Correlational Analysis, Analysis of Variance (ANOVA) and Tukey's HSD test. The research findings bring to light the correlation between language learning strategies and engineering students' listening comprehension. The highest correlation can be gained by compensation strategy (with correlation value 0,16) and cognitive strategy group (with correlation value -0,14). Meanwhile, the effectiveness of diverse learning strategies on engineering students' listening comprehension has been proven through ANOVA calculation (F-ratio 2,85 higher than F table 2,00 and p-value 0,007 less than α 0.05). A combined metacognitive and affective strategy is revealed as the most effective learning strategy to improve engineering students' listening comprehension. As a pedagogical implication, English teachers should encourage the development of ESP learners' awareness of learning strategies and affection for L2 listening as the first possible keys to success in ESP learning.

Keywords: *learning strategies; ESP listening comprehension; L2 listening effectiveness.*

INTRODUCTION

The vague notion of the language learning strategies effectiveness on listening comprehension has been debatable matters among researchers. A systematic instruction in the use of strategies has been believed to improve listening comprehension based on the longitudinal study involving students

enrolled in a required third year Russian language course at university conducted by Thompson and Rubin (1996).

This research finding was supported by further studies focusing on the differences between more skilled and less skilled listeners by Goh (2000, 2002a), Mareschal (2002) and Vandergrift (2003b) have produced some useful insights. The findings of Goh, Mareschal, and Vandergrift highlight the importance of the effective use of metacognitive strategies for successful listening comprehension. In a study of adolescent learners of French, Vandergrift (2003b) found significant quantitative differences for four strategies: (1) total metacognitive strategy use, (2) comprehension monitoring, (3) questioning elaboration (flexibility in considering various possibilities before deciding on a framework for interpretation), and (4) online translation (by the less skilled listener).

Given the importance of metacognitive awareness in successful listening, Vandergrift investigated the effect of a strategies-based approach on student awareness of the process of listening. Students completed listening tasks where they also engaged in prediction, monitoring, problem solving, and evaluation (the major groups of metacognitive strategies). These tasks helped students learn or bring to consciousness metacognitive knowledge for self-regulation in listening. Both elementary school students (Vandergrift, 2002) and university students of French (Vandergrift, 2003a) found it motivating to learn to understand rapid, authentic texts, and responded overwhelmingly in favor of this approach. Students commented on the power of predictions for successful listening, the importance of collaboration with a partner for monitoring, and the confidence-building role of this approach for enhancing their ability to comprehend oral texts.

Thus far, the researches on language learning strategy were initiated by Chamot (1986), Oxford (1990), Mendelsohn (1995), Thompson & Rubin (1996) and further developed by some researchers in the field (e.g. Vandergrift & Tafaghodtari, 2010) who support the claim that listening strategy instruction is a key variable in L2 listening development and show positive experimental effects of strategy training on L2 listening comprehension.

Otherwise, in ELT journal Renandya and Farrell (2011) pointed out that listening strategy might not work with lower proficiency learners of English, who still struggle with basic decoding skills or word recognition problems. He proposed an alternative solution dealing with lower English proficiency learners by encouraging extensive listening regarding the importance of comprehensible input in boosting listening skill. In other paper, Renandya and Wang Li (2012) emphasized that enhancing EFL learners' bottom-up processing competence is perhaps an effective approach to teaching listening in order to build students' linguistic foundation before they move on to learning the more advanced listening skills.

In fact at the real ESP classroom, English teachers tend to test students' listening comprehension while they are teaching listening, thus students often feel anxious and confused what to do with the listening tasks. Listening comprehension is found to be among the most difficult tasks for the learners of English as second or foreign language due to several reasons. First, most students are not familiar with the listening material produced by native speakers. Second, the listening section is not only testing students' listening comprehension but also their understanding of spoken language within socio-cultural, discourse,

pragmatic and strategic competence. Third, listening also becomes troublesome encountered by ESP students regarding their lack of knowledge about learning strategy to cope with their listening difficulties. Thus, teacher should explore and guide students to employ learning strategies in listening activities. Students should also be exposed to the comprehensible input within a continuum of spoken texts to process the information from the aural recordings.

Therefore, conducting research on the importance of language learning strategies particularly metacognitive approach to improve listening comprehension is crucial for both teacher and students, thus teacher can develop metacognitive instruction within pedagogical procedures that enable learners to increase awareness of the listening process by developing richer metacognitive knowledge about themselves as listeners, the nature and demands of listening, and strategies for listening (Vandergrift and Goh, 2012: 97).

Christine M. Goh in The Handbook of English for Specific Purposes (2013: 72) highlighted that there is only limited information on how ESP listeners engage in metacognitive processes and how these processes affect their listening comprehension in turn. The fundamental importance of cognitive processing in listening has been well proven, thus she expects that metacognitive processes have the same impact on ESP listening comprehension. Then, this research is required to verify this claim.

This paper was directed to explore the correlation and the effectiveness of the language learning strategies on engineering students' listening comprehension. Further, it was expected to figure out the most effective learning strategies in improving their listening comprehension. Thus, this study was essential to provide students more comprehensible input in aural language and urge them to apply the learning strategies to cope with their listening problems. This research was further expected to encourage students to be independent learners by applying learning strategies in autonomous learning in the real life communication and extensive listening outside English classroom through internet learning resources providing abundant rich English listening exposures dealing with maritime technology study such as youtube.

Research Questions

The study attempted to find out the effect of language learning strategies on engineering students' listening comprehension. The research questions were formulated as follow:

1. Is there correlation between language learning strategies and students' listening comprehension?
2. Do language learning strategies employed by engineering students affect their listening comprehension?
3. Which learning strategies are having the most significant effect on improving engineering students' listening comprehension?

Hypothesis

H1: There is correlation between language learning strategies and students' listening comprehension

H2: Language learning strategies employed by engineering students affect their listening comprehension achievement.

H3: There are significant differences in gaining listening comprehension score among groups of students who applied memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies, social strategies, and other combined strategies.

METHOD

Research Design

The research design of this study was an ex post facto study based on quantitative method by applying statistical analysis including Correlational Analysis, Analysis of Variance (ANOVA) and Tukey's HSD test. The research was conducted at Shipbuilding Institute of Polytechnic Surabaya (SHIPS). Two classes of Design and Construction Engineering were purposefully selected as the samples of the study by using purposive random sampling.

Research Instruments

The survey of learning strategy was conducted by distributing SILL questionnaire (Oxford, 1990). It is used to measure and analyze what kind of learning strategy was employed by the participant of this study. The scores of each strategy were counted and analyze which strategy was the most dominant. This questionnaire is taken into account because it is one of the most commonly used measurements. Since its development, the SILL has been used to assess the learning strategy use of more than 10000 learners world-wide and has been translated so far into a large number of languages such as Arabic, Chinese, French, German, Greek Japanese, Korean, Portuguese, Russian, Serbo-Croatian, Spanish, Swedish, Thai, Ukrainian and in Greek (Oxford 1996).

The other instrument was the ESP listening comprehension test which was designed to measure student's listening comprehension using multiple choice questions. The reliability and validity of the test has been taken into account in order to provide an accurate and reliable test which is relevant to English for Maritime studies.

Procedure of Data Analysis

There are some steps which are used to analyze the data: (1) Collecting and analyzing both result of SILL questionnaire and ESP listening comprehension test, (2) Analyzing the correlation between learning strategies and listening comprehension, (3) Analyzing the effectiveness of learning strategies on students' listening comprehension by using simple Analysis of Variance (ANOVA), (3) Analyzing the magnitude of each learning strategies effect on students' listening comprehension by using Tukey's HSD test to determine the most effective learning strategy.

FINDINGS AND DISCUSSION

Results of SILL Questionnaire and ESP Comprehension Test

Figure 1 presents the learning strategy groups comprising of 6 mainly major strategies and 5 combined strategies.

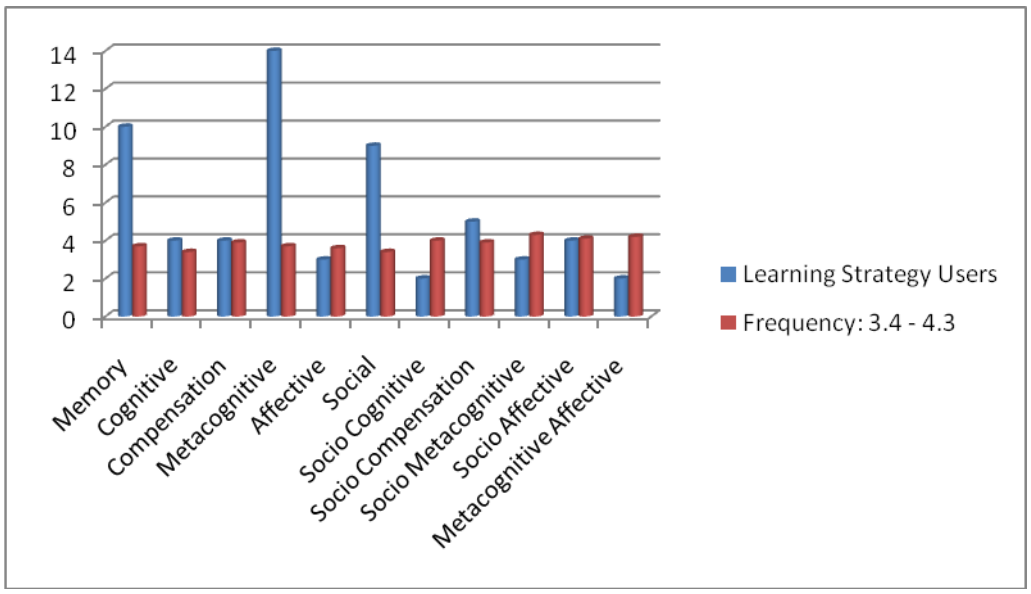

Figure 1. The Types and Frequencies of Engineering Students' Language Learning Strategies

As it is shown in Figure 1, metacognitive strategy was the mostly often strategy used by engineering students, it means that metacognitive has been employed by 14 students from totally 60 sample students. The other two main strategies commonly used by SHIPS students were memory then social. Whereas socio cognitive and metacognitive affective were the least groups which only consists of 2 students in each. The range of learning strategy frequencies among students was revealed in a scale started from 3.4 to 4.3 (in spite of 1-5 Likert Scales). This range of learning strategy reflected the higher a student's average for a given SILL category, the more frequently the student used that particular category of language learning strategies.

Meanwhile, the result of ESP Listening Comprehension Test was gained with range score between 50 and 95 with the mean score was 70. Since the total numbers of students in each strategy groups were varied, thus the means of listening scores were counted from the average listening score for each strategy groups.

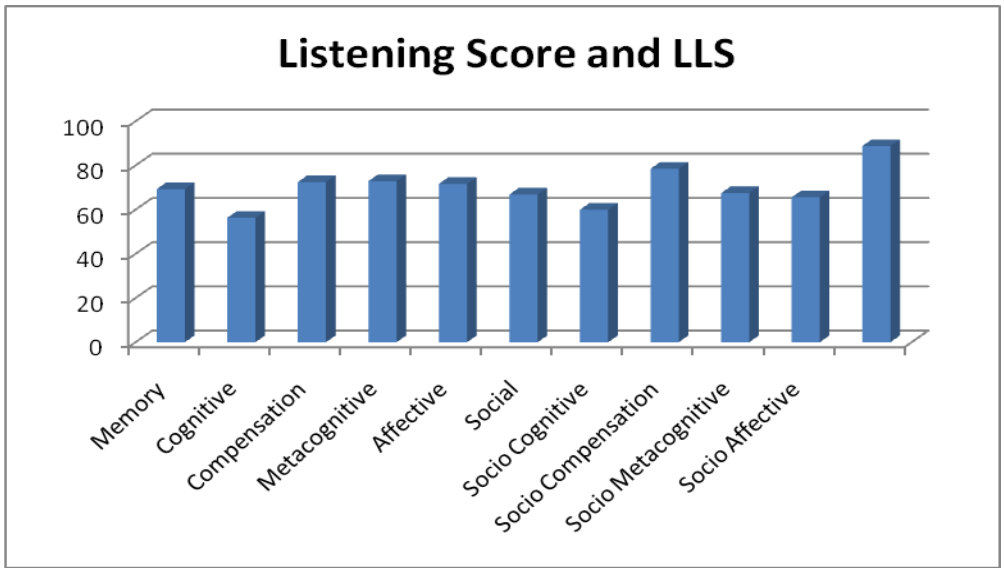

Figure 2. The Engineering Students' Listening Comprehension Scores and their LLS

From the block graph above, the research revealed that the highest mean score i.e. 88.7 can be achieved by metacognitive affective group, whereas the lowest score i.e. 56.3 was obtained by cognitive group. The second mean score i.e. 78.5 can be gained by socio-compensation group, while the next third mean score i.e. 72.1 can be obtained by the three strategy groups namely compensation, metacognitive, and affective groups. Otherwise, the subsequently mean score i.e. 67.3 can be acquired by four strategy groups namely memory, socio metacognitive, social, and socio affective groups.

A. The Correlation between Learning Strategies and Engineering Students' Listening Comprehension

Correlational analysis was furthermore conducted to determine the nature and characteristics of correlation between LLS and students' listening comprehension. The result of Pearson Correlation calculation can be seen as follow:

Table 1. The Correlation Analysis

Memory	Cognitive	Compensation	Metacognitive	Affective	Social
-0.08	-0.14	0.16	0.12	0.01	-0.07

This table illustrated that the highest correlation can be revealed from compensation and cognitive strategy groups. Compensation had positive correlation with listening scores (within correlational value 0.16), otherwise cognitive had negative correlation with listening scores (within correlational value -0.14). At the second rank of positive correlation, metacognitive was revealed as a language learning strategy having positive correlation (within correlational value

0.12). Otherwise, memory and social were found as learning strategy having negative correlation (within correlational value -0.08 and -0.07). While the least positive correlational value 0.01 was gained by a group of students who applied affective strategy.

B. The Effect of Learning Strategies on Engineering Students' Listening Comprehension

Based on the results of students' SILL and listening scores, the statistical computation was carried out by using Minitab 17 to calculate Analysis of Variance (ANOVA) which is a parametric procedure to test the differences between more than two group means (Macmillan, 2008, p. 259-260).

The data normality and variance homogeneity were tested by using computational SPSS. These procedures were very crucial in parametric statistics particularly ANOVA within greater power to detect significant differences. The Kolmogorov-Smirnov analysis was used to determine the normal data distribution. Thus, the normality test was performed on listening comprehension scores from every learning strategy groups. Based on the calculation of p-value within Kolmogorov Smirnov, the result reveals p-value = 0.150 is bigger than α=0.05. Thus, it can be said that the data distribution is normal. Regarding a test is considered normally distributed if the p-value is more than 0.05 and it is not normally distributed if the p-value is less than or equal to 0.05.

Next, the data was also calculated using Levene test to check the data homogeneity. The result of the Levene test can be seen in detail in this following table.

Table 2. The Variance Homogeneity Test

Test		
Method	Statistic	P-Value
Multiple comparisons	—	0.000
Levene	0.54	0.855

with p-value of 0.855. Since p-value is higher than 0.05, it can be concluded that the variances of each strategy groups are equal or homogenous. In other words, it can be inferred that the data is equal variances assumed or the data has been already identikit.

The results of normality and homogeneity test above can be used as the prerequisite of using ANOVA in testing hypothesis in order to know the difference of listening comprehension among various learning strategy groups.

After the data normality and homogeneity are proven, the statistical analysis in term of ANOVA can be done to test hypothesis. The data of hypothesis testing can be perceived in the next table.

Table 3. The Result of ANOVA

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Classification(x)	10	2313	231.34	2.85	0.007
Error	49	3979	81.21		
Total	59	6293			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
9.01176	36.76%	23.86%	0.00%

The result of ANOVA demonstrates that the *F* statistic (or *F* ratio) calculated with ANOVA is **2.85**, whereas the value of *F*-table within 10 - 59 degrees of freedom (*df*) reveals **2.00**, thus the value of *F* ratio (2.85) is higher than *F*-table (2.00) and it can be concluded that the value of *F* ratio >*F*-table. Meanwhile p-value is 0.007 is smaller than α (0.05). Based on the results, the null hypothesis is rejected because *F* ratio >*F*-table and p-value (0.007) <α (0.05). It proves that there is difference of listening comprehension achievement among various learning strategy groups.

C. The Most Effective Learning Strategies in Improving Engineering Students' Listening Comprehension

Table 4. The Result of Tukey Output Analysis

Means

Classification(x)	N	Mean	StDev	95% CI
Affective Group	3	71.67	5.20	(61.21, 82.12)
Cognitive Group	4	56.25	9.46	(47.20, 65.30)
Compensation Group	4	72.50	10.99	(63.45, 81.55)
Memory Group	10	69.25	6.57	(63.52, 74.98)
Metacognitive Affective Group	2	88.75	8.84	(75.94, 101.56)
Metacognitive Group	14	72.32	8.23	(67.48, 77.16)
Social Group	9	66.94	9.82	(60.91, 72.98)
Socio Affective Group	4	65.63	9.87	(56.57, 74.68)
Socio Cognitive Group	2	60.0	14.1	(47.2, 72.8)
Socio Compensation Group	5	78.50	8.59	(70.40, 86.60)
Socio Metacognitive Group	3	67.50	13.92	(57.04, 77.96)

Combined metacognitive and affective strategies were revealed as a group who could obtain the highest listening comprehension score (88.75) within 95% Confidence Interval (CI) value 101.56. Meanwhile in the second rank, a mixed socio compensation group could achieve 78.50 listening comprehension mean score within CI value 86.60. Whereas a group of engineering students who dominantly employ cognitive strategy concerning listening task was found in the lowest rank with 56.25 listening mean score within CI value 65.30.

The statistical analysis of Tukey's HSD test proved the significant differences in gaining listening comprehension score among groups of students who applied memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies, social strategies, and other combined strategies.

DISCUSSION

The findings reveal that there is correlation between language learning strategies and students' listening comprehension. Compensation as an active strategy has the highest positive correlation with listening comprehension achievement. It means that students who activate compensation strategies can improve their listening scores for about 0.16. Thus, the more frequent they activate compensation strategies the higher listening score will be gained. This finding can be logically understood since compensation strategy group tend to guess intelligently when confronted with unknown expressions to overcome the listening difficulties. Because students usually guess the general meaning by using wide variety of clues including linguistic and nonlinguistic knowledge for example, clues from the context or situation to understand unfamiliar second language words they hear to inference and get the point of the message.

Otherwise, cognitive was revealed as an active strategy having the highest negative correlation with listening comprehension achievement. It means that students who activate cognitive strategies can decrease their listening scores for about 0.14. Thus, the more frequent they activate cognitive strategies the lower listening score will be gained. Remarkably, these strategies involved complex cognitive processes. Strategies themselves according to O'Malley and Chamot (1987), for instance, were referred to the basis of information-processing theories of cognition, thereby approaching the concept from a cognitive perspective.

Moreover, such cognitive strategies are a varied lot ranging from repeating to analyzing expressions to summarizing (Oxford, 1990: 43). Cognitive strategies are Practical for language learning, comprising of four cognitive sets: (1) Practicing, (2) Receiving and Sending Messages, (3) Analyzing and Reasoning, and (4) Creating Structure for Input and Output.

In listening, students tend to practice with sounds. Thus, they often focus on perception of sounds (pronunciation and intonation) rather than on comprehension of meaning. No wonder this strategy does not work well since learners do not focus on meaning and generally are not taught to practice note taking well. They also tend to transfer linguistic knowledge from the learners' own language to the second language most of the time when they were applying cognitive strategies. It can lead to inaccuracy if learners transfer irrelevant knowledge across languages.

Concerning on the question whether language learning strategies affect engineering students' listening comprehension, the finding is positive. Based on the statistical analysis of ANOVA, the alternative hypothesis is accepted whereas the null hypothesis is rejected because F ratio >F-table and p-value (0.007) $<\alpha$ (0.05). It proves that there is difference of engineering students' listening comprehension achievement among various learning strategy groups. Thus, diverse language learning strategies affect their listening comprehension.

This finding is pertinent to Chamot's reviews (1999) that in addition to knowledge and skills, L2 listeners also need to engage in meta-cognitive processes that include strategies for facilitating comprehension and coping with listening difficulties. Listening strategies are effortful and conscious behaviors, and they play important roles in facilitating listening comprehension and thoroughly listening development.

However, this research finding supports another previous related study conducted by Sawako Kato (2005) exploring How Language Learning Strategies Affect English Proficiency in Japanese University Students. In spite of different research method and analysis, the previous correlational study within survey involved 195 first to fourth year students from three different Japanese universities reveal almost the same main point with the current study, namely the significant correlation ($p<.01$, $p<.05$) was found among metacognitive-affective strategy, and cognitive strategy, and English proficiency. Meanwhile this research finding directed to illustrate the difference of listening score mean among diverse language learning strategies highlighting metacognitive-affective strategy as the most effectual, and cognitive strategy as the lowest listening comprehension score achievement.

Furthermore, the result of multiple comparison statistical calculation by using Tukey's HSD test showed the significant differences of listening comprehension mean scores among diverse language learning strategies group particularly metacognitive-affective and socio compensation strategies.

This mixed metacognitive and affective strategy was proven as the most effectual due to the power of awareness to plan and center students' learning on listening by involving two modes of directive and selective attention. Both attention modes in listening are the key to success particularly to focus to the task and avoid irrelevant distractors, meanwhile selective attention involves deciding in advance to notice particular details (Oxford, 1990: 153-154). These strategies strengthened by affective strategies which encourage students to control their anxiety and emotional temperature during listening. Both metacognitive and affective strategies will be powerful when they are orchestrated in harmony, since the awareness of learning process within affective variables including high motivation, self-confidence and low anxiety relate to success in second language acquisition (Krashen, 2003: 31).

CONCLUSION AND SUGGESTION

Conclusion

A digest of the research findings highlighting the main point of the study is presented. The present study finds out that there is correlation between language learning strategies and engineering students' listening comprehension which was dominantly achieved by compensation and cognitive strategies. Thus, the first hypothesis was accepted and the null hypothesis was rejected.

To figure out the effectiveness of language learning strategies on engineering students' listening comprehension, the statistical analysis of ANOVA proved that there was difference of engineering students' listening comprehension achievement among various learning strategy groups. Thus, the second hypothesis was accepted and the null hypothesis was rejected. Since the diverse language

learning strategies applied by engineering students affect their listening comprehension.

Meanwhile, the most effective language learning strategies can be revealed from the significant differences of listening comprehension achievement which has been effectively verified and attested by using Tukey's HSD test. The research findings pointed out the collaboration of metacognitive and affective strategies was the most effective strategy followed by a combination of social and compensation strategies.

Suggestion

Based on the result of the present study, several suggestions are made for either practical applications of the study or recommendation for further related study. As pedagogical implication, the research encourages English teachers or lecturers to develop students' listening strategies and encourage them to apply the most effective strategies (i.e. metacognitive affective) in listening comprehension. Thus, teachers should design a well-structured teaching and learning listening activities and guide students to activate the effective listening strategies.

Teachers are also demanded to create conducive learning environment to lower students' anxiety before and during listening, then motivate them to engage in cognitive and metacognitive processes that include strategies for facilitating comprehension and coping with listening difficulties.

The research also provide feedback for English teachers to develop approaches and implement the best and effective learning strategies in teaching listening comprehension at the classrooms. Moreover, the result of this research urge students to apply language learning strategies in the classroom and further develop learning strategies outside English classroom through extensive listening to be autonomous or independent learners.

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