Vocabulary learning strategies and language games: Reporting on a Taiwan-based study

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Abstract
This study investigates the effectiveness of games as a vocabulary learning strategy. Forty-six students of English as a foreign language (EFL) voluntarily joined a vocabulary extension training program, using games created by the author, for a total period of 20 hours in the summer of 2008. Oxford's (1990) Strategies Inventory for Language Learning (SILL) was used before and after the program to detect learning strategies and any changes in learning strategies before and after the program and Statistical Package for the Social Sciences (SPSS) was used for data analysis. In terms of strategy use, there were significant differences between pretest and post-test results, particularly in the area of memory strategies. This suggests that further research in the area of games-based vocabulary enhancement, particularly in the area of strategy use and development, would be likely to be of value.

Keywords: Language learning strategies, vocabulary learning strategies, educational games

Introduction and background of the study

In Taiwan, English is a compulsory subject from the third grade of elementary school to the end of high school. Excluding time spent in attending supplementary classes at cram schools, Taiwanese students will have spent approximately 1,080 hours learning English (that is, an average of 3 hours each week for 360 school weeks - 20 semesters over 10 years). It therefore seems reasonable to assume that the majority of them will have achieved a proficiency level at least equivalent to the Common Reference Level (CRL) B1 (Threshold level) as outlined in the Common European Framework of Reference for Languages (CEFR) whose general descriptor is as follows (Council of Europe, 2001, p. 24):

> Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.

Unfortunately, what is known about Taiwanese scores on proficiency tests suggests that the majority of learners do not achieve the level of achievement outlined in the above proficiency descriptor at the end of their high school studies. Although the average score of Taiwanese test takers on the TOEFL-iBT test increased one point (from 71 to 72 out of a possible 120) between 2006 and 2007 (www.toefl.org), Taiwan still ranked a considerable distance behind both Chinese and South Korean test takers (with an average score of 78 and 77 respectively). Furthermore, although it is widely accepted that most university students should be able to achieve at intermediate

Chen, M. (2009). Vocabulary learning strategies and language games: Reporting on a Taiwan-based study. *He Puna Kōrero: Journal of Māori and Pacific Development.* 10(1), 52–73. https://doi.org/10.15663/K10.14174

level on the national General English Proficiency Test (GEPT) test, the reality is that many fall short of this expectation. The Department of Technological and Vocational Education of the Taiwan Ministry of Education (MOE) tested the English language proficiency of 11,205 students in technological and vocational colleges and universities over three consecutive annual tests from 2001 to 2003. These tests revealed that only 18.1% (2026 students) achieved the basic level of the GEPT. Furthermore, a study reported in 2004 revealed that over 80% of student test takers from the technological and vocational system were not even able to comprehend or use commonly occurring simple English phrases that appear in the tests designed by the Language Training and Testing Center (LTTC, 2004). A year later, data collected by the Integrated Higher Education Database System in Taiwan (2005) indicated that only 35.94% of the 71,104 university and technological and vocational freshmen tested passed the basic level of the GEPT. All of these indicators are of considerable concern, particularly as, in a test-oriented country such as Taiwan, the objectives of English courses are heavily influenced by testing. Most of the English taught in schools is for test purposes and not for communication or for career preparation. This is evidenced in the English curriculum for schools in which most of the objectives are related to teaching content rather than learning strategies (Her, 2007, pp. 92 - 143). In Taiwan, there is a need for further research in the area of learning strategies and teaching strategies. A critical issue is how we can help students to become 'good language learners'.

Critical review of selected literature on learning strategies

General

A number of trends can be detected in research in the area of learning strategies from the 1970s onwards. Rubin (1975) and Stern (1975) initiated research in this area by investigating how 'good' language learners approach the task of learning (Naiman, Frohlich, Stern & Todesco, 1978). From the 1980s onwards, while some researchers began to focus on the identification and classification of learning strategies in a general sense (O'Malley, Chamot, Stewner-Manazares, Kupper, & Russo, 1985; O'Malley & Chamot, 1990; Oxford, Nyikos, & Crookall, 1987; Rubin, 1981, 1987), others focused on language learning techniques associated with specific language skills and tasks (Naiman, et al, 1978; Rubin & Thompson, 1994). Inventories of language learning strategies for both ESL and EFL learners began to be compiled (Brown, 2002; Chamot, Barnhardt, El-Dinary & Robbins, 1999; Cohen & Chi, 2001; Cohen & Oxford, 200l; Ehrman, 1998; Oxford, 1986, 1990; Pintrich, Smith, Garcia, & McKeachie, 1993). Initially, the primary focus was on the identification of effective strategies for language learning. More recently, however, more attention has been directed towards exploring those factors that affect the choices made by learners (Oxford & Bury-Stock, 1995; Oxford & Nyikos, 1989), with increased attention being paid to the variety of strategies employed (Cohen, 1990; O'Malley & Chamot, 1990; O'Malley, Chamot, Stewner-Manzanares, Russo, & Kupper, 1985; Oxford, 1989, 1990, 1992; Wenden & Rubin, 1987) and the frequency with which different strategies occur (Chamot & Kupper, 1989; Chamot & O'Malley, 1987; Oxford & Ehrman, 1995) and their variety (Cohen, 1990; O'Malley, Chamot, Stewner-Manzanares, Russo, & Kupper, 1985; O'Malley & Chamot, 1990; Oxford, 1989, 1990, 1992; Wenden & Rubin, 1987). This has led to developing interest in the correlation between language proficiency achievements and the effectiveness of language learning strategies among different groups (Green, 1991; Green & Oxford,

1995; Ho, 1999; Mangubhai, 1991; Okada, Oxford & Abo, 1996; Park, 1997; Politzer & McGroarty, 1985; Purpura, 1998).

Language learning strategy research in Asian countries (including Taiwan)
In the context of globalization, competence in English has become increasingly important in Asian countries and there has been growing interest among Asian researchers in the area of language learning strategies. Researchers in, for example, China, Hong Kong, Korea, and Japan have adopted approaches to language learning strategy research that are similar to those to which I have already referred (Gan, 2004; Gan, Humphreys & Lyons, 2004; F. Kato, 2002; S. Kato, 2005; Ko, 2005; Lam, 2008; Lee & Oxford, 2008; Li & Qin, 2006; Olah, 2006; Takeuchi, 1993; Wakamoto, 2000, 2007; Watanabe, 1990; Yamato, 2001). In Taiwan, learning strategy research has often focused on frequency of use of particular strategies (Chang, 2002; Y. C. Chen, 2005; M. Chen, 2007; Chiang & Liao, 2002; Huang, 2002; Teng, 2000; N. D. Yang, 1993; S. C. Yang, 1997). Another area of interest in Taiwan is the investigation of factors that affect the use of language learning strategies. Thus, for example, researchers have investigated the correlation between strategy use and language proficiency level (Y. C. Chen, 2005; M. Chen, , 2007; Chiang & Liao, 2002; Fan, 2003; Ho, 1999; Ku, 2003; Teng, 2000; N. D. Yang, 1996; S. C. Yang, 1997, 1999), strategy use and motivation (Hsu, 2004; N. D. Yang, 1996), gender (M. Chen, 2007; Chang & Chang, 1998; Sy, 1996; Teng, 2000; N. D. Yang, 1996; S. C. Yang, 1997, 1999), and strategy use and (a) students' major area of study and (b) the number of years they have been learning English (M. Chen, 2007; N. D. Yang, 1996; S. C. Yang, 1997, 1999). In a major study conducted in 1999, S. C. Yang investigated the interaction between language learning strategies, learning type and psychological types in the areas of vocabulary acquisition and listening and reading skills. N.D Yang (1996) carried out a research project that investigated the factors affecting the use of language learning strategies. She then moved to a focus on the implementation of strategy-based learning in the language classroom (N. D. Yang, 2003, 2005), using both paper and web-based portfolios that were intended to promote independent learning through tailor-made programs for each individual learner. Huang (2001) also implemented an English learning strategy training course, assessing its impact on college-level students in terms of learning achievement, attitudes, anxiety, and proficiency. The findings indicated that the program appeared to have a significant positive impact on strategy use and on proficiency and motivation, with a significant decrease in anxiety associated with the learning of English.

Vocabulary learning strategies
Research relating to 'good learners' (Schmitt, 1997), led, from the 1970s, to the development of one of the major sub-fields of research in the area of language learning strategies, that of vocabulary learning strategies (see, for example, Atkinson & Raugh, 1975; Pressley, Levin, Hall, Miller & Berry, 1980). Notable among researchers in this area were Pressely, Levin and Miller (1981) who investigated keyword vocabulary learning methods. Most studies in the area of language learning strategies have focused on specific aspects of vocabulary acquisition in relation to particular groups of learners, such as contextual guessing, association, note-taking, dictionary use, and rote repetition. Thus, for example, O'Malley et al. (1985) found that repetition as a strategy was much more frequently used than were strategies requiring complex manipulation of information. Nation (1982) noted that tools involving rote memory, such as word lists, were considered effective in enhancing the

acquisition of a great deal of vocabulary in a short period of time, Gu and Johnson (1996) reported that learners' vocabulary size and overall language proficiency were related to their ability to make skilful use of a dictionary and to their willingness to invest time on practicing newly learned words and Cohen and Aphek (1980) found that there was a link between proficiency and association skills, with higher levels of proficiency being associated with greater capacity to apply association skills.

Vocabulary learning strategy training

Fan (2003) studied the strategies employed by 1,067 Hong Kong-based ESL students in learning high- and low-frequency words (in terms of actual and perceived usefulness and frequency of application), finding that the students involved in the study tended to use guessing strategies in the case of high-frequency words and source strategies (such as referring to known words) in the case of low-frequency words. However, that study, in common with other similar studies, did not incorporate a structured strategy training course. Thus, although many studies have shed light on learners' vocabulary learning strategies, there remains a need for research that focuses on vocabulary strategy training. One example of research of this type is a study by Yen and Chuo (2007) who incorporated into reading classes, using Oxford's (1990) *Strategy Inventory for Language Learning* (SILL), *Memory Trigger Instruction* (MTI) techniques, including mnemonic devices (association, the keyword method, and mnemonic strategies involving discourse and music). Yen and Chuo concluded that MTI significantly enhanced learners' use of memory strategies (and overall English proficiency) but had no impact on other language learning strategies. Furthermore, although MTI mainly focuses on vocabulary learning strategies, this study did not measure the learners' vocabulary gains.

Although the concept of integrating strategy training into language programs is not new, O'Malley, et al. (1985), Oxford and Burry-Stock (1995), and many Taiwanese researchers (Chiang & Liao, 2002; I. J. Ku, 2003; P. Y. Ku, 1998; Teng, 2000; N. D. Yang, 1996; S. C. Yang, 1999) have stressed the need for in-depth research on its effectiveness in view of the fact that (as indicated above) the focus to date has been on identifying and classifying language learning strategies and exploring the contexts in which they are used. There is therefore a need for research that relates to ways of improving language learning strategies, including research that explores the potential of games in this area.

Background to the study reported here

The research reported here represents a further development of the approach adopted by M. Chen (2007) and Chen and Hsu (2006). Chen and Hsu (2006) explored the learning strategies employed by 77 students (divided into two groups). In terms of English proficiency scores, some of these students made significant progress between 2004 and 2005; others had actually regressed. The aim of the study was to identify the language learning strategies these students employed and to determine whether there was any relationship between the use of strategies and proficiency gains/ losses. In the event, it was found that, irrespective of proficiency, the strategies that were least frequently used were memory strategies that help learners to store and retrieve new information (including creating mental links, applying images and sounds, reviewing well, and employing action (e.g. using body language to express/ reinforce word meanings)). It was also found that there was a positive relationship between proficiency gains and strategy use. In a later study, making reference to the *Strategy*

Inventory of Language Learning (SILL) (Oxford, 1990), Chen (2007) surveyed the use of language learning strategies by 1,090 students. Once again, there was found to be a positive correlation between proficiency and strategy use. Once again, over the whole group, memory strategies were found to be used the least frequently in comparison with cognitive, compensation, meta-cognitive, affective, and social strategies.

Introduction to the study

A 20 hour vocabulary game training program was designed to explore the effectiveness of one approach to strategy training, particularly the impact of vocabulary games on memory-based strategies. Central to that program were vocabulary games designed by the author as strategy training tools, the intention being to encourage students to develop or enhance a range of vocabulary learning strategies (particularly memory-based strategies) in the context of the stimulation, challenge and fun associated with game playing.

Purpose of study

The purpose of the study was to test the following two hypotheses:

1. Playing the vocabulary learning games for 20 hours will lead to an overall increase in participants' use of language learning strategies.
2. There will be a particularly marked increase in participants' use of direct strategies, especially memory and compensation strategies.

Details of the study

Participants

The participants in the study were 46 students from a language college in Kaohsiung, Taiwan, Republic of China. All of them joined the training program voluntarily. All of them took the College Students English Proficiency Test (CSEPT) which was administered by the Language Training and Testing Center (LTTC) in September, 2007. Their average score in that test was 143.65 (regarded as being equivalent to level A1 of the CEFR). Because the program was offered on a voluntary basis, there were differences among the participants in relation to educational context. One third of the participants were from the 4-year college, the other 29 were from the 5-year junior college. Although all of them were studying English, only 9 were majoring in English. The other majors were: French (3); German (10); Spanish (2); Japanese (14); Applied Chinese (1); Foreign Language Instruction (1); Translation and Interpreting (2); International Affairs (1); International Business (1); and Communication Arts (2).

Throughout the study, participants were divided into groups according to the nature of the games. However, in order to make the learning process equally competitive and challenging, the grouping criteria were based on their proficiency scores.

The program was conducted at the Language Diagnostic & Consulting Center (LDCC) of the institution referred to above. Four female research assistants and three student tutors (all of whom had experience in English or Foreign Language Instruction) were recruited to be game dealers in addition to one college student from another educational institution in Southern Taiwan who was doing an internship in the LDCC at the time the study was conducted.

Instruments

In this study, two instruments were used. First, three types of vocabulary game invented by the author[1]: Poker cards, Chinese Chess and Gobang. These involved 153 single words (all nouns) which could be matched in different ways to create up to 454 compound nouns. The game rules were adapted from three well-known games PickRed[2], Chinese Blind Chess[3] and Gobang[4]. The SILL (1990) was employed before and after the program. Details of the vocabulary games are provided below.

Poker cards. Two sets of Poker cards (each containing 54 cards) were created for the training program. The first set of cards has 42 illustrated nouns, the other set has 45 illustrated nouns. In each case, the illustrations are accompanied by an English word and, in much smaller script, its Chinese translation. The overall aim of the game is to match cards from the two sets to create compound nouns in English (e.g. 'land' can be matched with 'mark' to produce 'landmark'; 'head' and 'line' can be matched to produce 'headline'). Some of the nouns, those that can occur in the highest number of different combinations to produce compounds, occur on more than one card. By matching two cards from the first set, players can generate 159 compound nouns; by matching cards from the second set, they can generate 147 compound nouns. If the two sets of cards are used together in the same game, there is a potential to generate at least 306 compound nouns. However, because some of the words (21) on each of the two sets of cards are the same, 61 of these compound nouns may be repetitions. Some of the cards used in the game are illustrated in *Figures 1* and *2* below.

***Figure 1**: Samples from one set of poker cards created by the author*

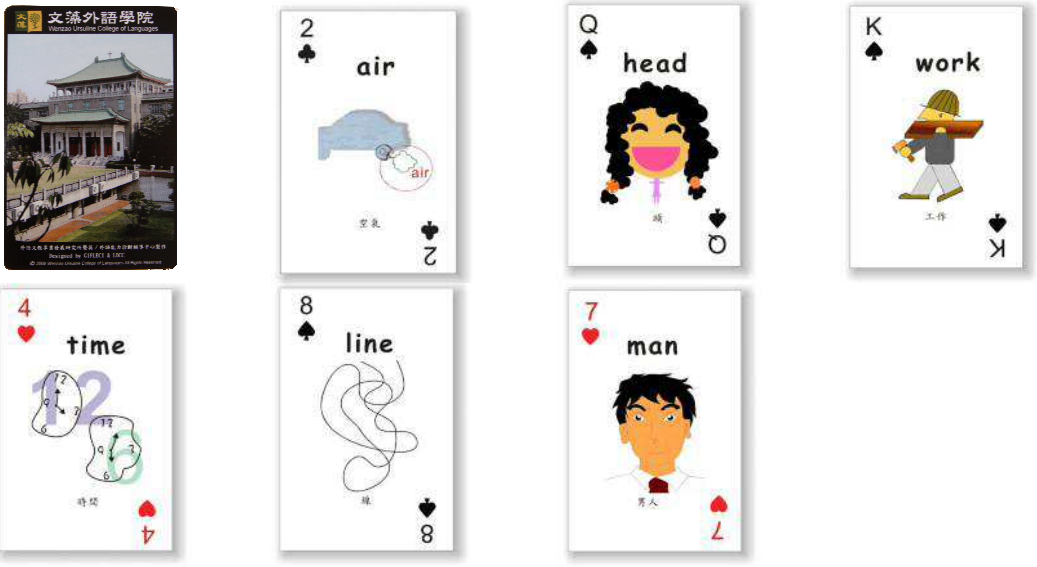

***Figure 2**: Samples from the other set of poker cards created by the author*

All of the words on these cards are considered appropriate to Levels A1 and A2 of the DEFR and most of them also appear in Taiwanese elementary and junior high school English textbooks. The poker game outlined and illustrated above was played by participants in the first four and a half to five hours of the program.

Chinese Chess (Xiangqi). Unlike the Poker cards (which include illustrations to indicate the meaning of words), the Chinese Chess set has no illustrations. There are 32 word pieces, eight of which are red (containing core words) and 24 of which are black. Players match red and black pieces to form compound nouns. Each of the core words on the red pieces can be matched with at least three of the words on the black pieces, allowing for the construction of between 33 and 58 compound nouns in the case of each game set. Four sets of chess pieces were used in the program. Some of the compound words that can be created are common to more than one game set. The total number of different compound nouns that can be created using all four game sets is 161. *Figure 3* below indicates the appearance of the game pieces.

Figure 3: *Samples from one set of Chinese Chess game pieces created by the author*

Gobang. Gobang is a popular game in Asian countries. In this version of the game, created by the author, 60 nouns can be matched to create up to 222 compound nouns. This game can be played by two individual players or by two groups of players. Each player/team has a bowl containing 60 pieces, on each of which an English word (a noun) is written. Although the words written on each player's/ team's pieces are the same, the colour of the pieces is different in each case. The first player/ team to line up five pieces (horizontally, vertically or diagonally) of the same color with all juxtaposed pieces creating compound words wins the game.

Figure 4: *The Gobang-based game created by the author*

Taking all three games together and excluding repetitions, there are 153 nouns from which it is possible to create approximately 454 compound nouns (see *Table 1* below). Although the nouns that appear on the cards would generally be introduced at beginner or low intermediate level, many of the compound nouns that can be created would be unlikely to be introduced into most language learning programs until the students had reached a higher level of proficiency.

***Table 1*:** *Nouns involved in all three games*

Game type	Coding	Original word count	Unrepeated original word count	Compound noun count	Unrepeated compound noun count
Poker Cards	P1	42	18	159	88
	P2	45	19	147	67
Chinese Chess	C1	31	4	58	7
	C2	31	14	38	17
	C3	32	18	34	26
	C4	32	20	33	28
Gobang	G	60	60	221	221
Total		273	153	690	454

Strategies Inventory for Language Learning (SILL)

In order to determine whether the participants' use of language learning strategies increased, version 7 (50 items), of the *Strategies Inventory for Language Leaning* (Oxford, 1990), designed for ESL/EFL learners, was used for data collection. It includes six language learning strategy types: memory strategies; cognitive strategies; compensation strategies; meta-cognitive strategies; affective strategies; and social strategies. The first three of these are direct strategies; the others as indirect strategies.

CSEPT scores.

All of the participants in the study took a *College Students English Proficiency Test* (CSEPT) in 2007. The test, designed and administered by the Language Testing and Training Center (LTTC) in Taipei, has three sections: listening, reading

comprehension and grammatical usage, a possible score of 120 being associated with each component (i.e, a total possible overall score of 360). Participants were assigned to game play groups according to their score in the CSEPT, with groups being made up of students with similar overall scores. Scores in the 2007 CSEPT were also used for quantitative data analysis purposes.

Procedures

Setting up the procedures and administering the SILL

The study was conducted in two parts, the first part (involving one of the two groups) took place in July 2008, the second (involving the other group) in August 2008. Participants took part in the program for two hours a day for ten days, a total of 20 hours. On the first day of the program, they were administered SILL and given an outline of the program that provided information about the order in which the games would be played, the number of rounds of each set of each game that would be played, and the game length. Also outlined were the ways in which participants would be grouped and the role of the dealers (who would introduce the game types and explain the rules at the beginning of each session). Participants were urged to arrive punctually for each session and were told that they would receive a certificate on completion of the course. The procedures followed are outlined in *Figure 5* below.

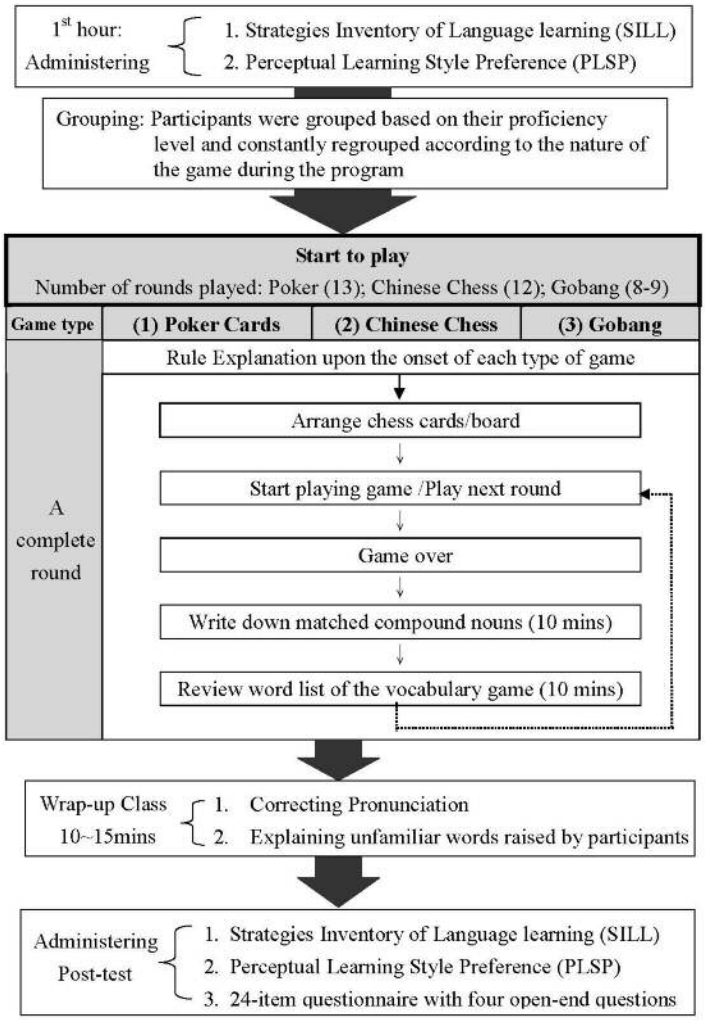

Figure 5*: *Procedures followed

Game length and rounds

Each type of game was assigned approximately four and a half to six hours of playing time. The number of rounds that could be played in that time was therefore determined by the type of game being played. Participants generally played at least two or three rounds a day, depending on their progress.[5] *Table 2* indicates the actual number of rounds of each game played and the time taken.

***Table 2*:** *Time used and the rounds played in the program*

Game type	**(1) Poker**			**(2) Chess**				**(3) Gobang**		
Game set	P1	P2	P1+P2	C1	C2	C3	C4	G	Contest	
Time taken (hr)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2	2
No. of rounds played	5	5	3	3	3	3	3	3	5-6	

After each type of the game, participants were given ten minutes to review the words that had been encountered in the game by exposure to a word list. The word list contained all of the possible compound nouns with Chinese translations. The students could make use of these lists in a variety of different ways. They might, for example, search only for the words that had been successfully matched during the game or they might review other words on the list. They might ask for some of the words to be expressed in sentences or they might draw pictures to match the word meanings. Whatever approach they took, the expectation was that they would be able to create a greater number of successful matches in the next round of the game.

Game grouping

Due to the nature of the games, participants were required to play with a different number of people for each of the three game types. Thus, a Poker game requires three to four participants; a Chinese Chess game requires two to three participants; a game of Gobang is played by two participants. Participants were grouped and regrouped for different games and different game rounds in the hope that this would not only create a sense of novelty but also help to foster cooperative learning. In the last four hours of the program, a Gobang tournament was held, the intention being to increase motivation and encourage competition. Prizes were given to the overall champion and the group winners.

Game dealer

The series of vocabulary games outlined here requires well-trained dealers to lead and monitor the pace of learning. Each group had a dealer to supervise the game flow and regulations. All game dealers received approximately five hours' training relating to the conduct of the experiment and the game rules.

During each new game round, the dealers encouraged payers to attempt to match words that they had not matched in previous rounds and kept records of each player's score. Where a wrong match occurred, the dealer would point it out so that everyone would be informed about the error. At this point, s/he would not answer any questions relating to correct word combinations. However, after each iteration of the game, in breaks between game rounds, players were encouraged to ask questions, to make a written list of the words encountered during the round and to match these against the word list. In addition, dealers were expected, at the end of each day's session, to hand in observation sheets in which they reported on, for example, comments made by players that they had overheard, issues relating to the composition

of groups, the types of question that players had asked during game breaks, etc. This could lead to changes being made in relation to, for example, the composition of groups.

Game rules
The game rules were intended to facilitate the learning of vocabulary in a variety of ways. Players were requested to say out loud the words they tried to match, and also to say out loud the resulting word combination. This was intended to help the players to associate the pronunciation of words with word forms. Since oral repetition has been shown to be positively correlated with vocabulary growth (Gu & Johnson, 1996), the repetition involved, particularly after several iterations of a game, providing an aid to retention. During the process of the game, players were encouraged to guess the possible combinations, but a word list was not presented until the end of each round. Players could learn the meanings of compound words they had not encountered before from observations made during the game by other players or, at the end of each game round, from reviewing and asking questions about the word list.

Data Collection
Participants completed SILL Questionnaire online at the beginning and end of the program (referred to later as the pre-test and post-test). Qualitative data included classroom observations by dealers (see above), minutes of meetings held by the researcher with dealers at the end of each day, players' records of the vocabulary matched, and dealers' records relating to the length of time taken for each iteration of a game time, game scores etc.

Data Analysis
Quantitative data were processed using SPSS to calculate the overall means and standard deviation. Players were then further grouped in relation to CSEPT scores in order to determine whether their proficiency correlated with their use of particular language learning strategies. *One-way ANOVA and paired-sample t-testing* were used to investigate whether there was any detectable relationship between proficiency and use of particular vocabulary learning strategies.

Results and Discussion
The two hypotheses were:

1. Playing the vocabulary learning games for 20 hours will lead to an overall increase in participants' use of language learning strategies.
2. There will be a particularly marked increase in participants' use of direct strategies, especially memory and compensation strategies.

The results appear to confirm the first of the two hypotheses. Applying a *paired-sample t-test* to strategy uses as a whole (as indicated in the pre-test and post-test) yielded the results indicated in ***Table 3*** below.

Table 3**:** *Participants' use of strategies before and after the program (Paired-sample t-test)*

	Overall	*Memory*	*Cognitive*	*Compensation*	*Meta-cognitive*	*Affective*	*Social*
Pre-mean	3.09	2.86	3.16	3.29	3.18	2.79	3.19
Post-mean	3.31	3.22	3.34	3.49	3.39	3.03	3.37
t	-5.801	-6.475	-4.324	-2.895	-3.408	-3.013	-2.225
p	.000***	.000***	.000***	.006**	.001***	.004**	.031*

Note: *= p<.05, **= p<.01, ***=p<.001

As indicated in the table above, participants' language learning strategy use had increased after the 20-hour training program, a significant difference being found in each strategy use area, with the most significant difference being seen in the area of memory strategies (followed, in order, by cognitive, meta-cognitive, affective, compensation and social strategies). For the whole group of 46 participants, the mean of their overall language learning strategy use *before attending the program* was 3.09 (*SD*=.64) out of a possible score of 5, within the range (2.5 – 3.4) which, according to Oxford's (1990) SILL Result Profile, indicates that participants believed that they "sometimes apply [these] language learning [strategies] in the process of learning". The mean of their individual language learning strategies use is shown in *Table 3* as well. *After attending the program*, the overall mean had increased to 3.31 (*SD*=.63), still within the same range but nevertheless significantly higher than the pre-test mean. Furthermore, the means for each strategy type increased[6]. However, the order of frequency of use of each strategy type remained almost the same, affective strategies being reportedly used least frequently and compensation strategies being reportedly used most frequently.

A number of studies have reported a positive correlation between proficiency and frequency of use of learning strategies (see, for example, Chamot & Kupper, 1989; Chamot & O'Malley, 1987; Y. C. Chen, 2005; M. Chen, 2007; Chiang & Liao, 2002; O'Malley, et. al., 1985; S. C. Yang, 1997). Thus, the second hypothesis. The average CSEPT score (all 46 participants was 143.65 (*SD*=29.82)). In order to determine whether this was the case here, the 46 participants were divided into three proficiency groups based on their CSEPT scores. Group 1 (7 students) included those with the lowest proficiency scores (below 114); Group 3 (9 students) included those with the highest proficiency scores (above 173); Group 2 (30 students) included those with proficiency scores between 114 and 173. Each group was then compared in terms of reported strategy use. *Table 4* presents the findings.

Table 4**:** P*articipants' strategy use in relation to proficiency groupings*

Group	**No. of subjects**	**CSEPT Range**	**Avg. CSEPT of each group**	**SD**	**Pretest Overall strategy Means**
Group 1	7	114	96.86	8.84	3.07
Group 2	30	115~172	142.43	17.37	2.95
Group 3	9	173	184.11	9.31	3.57
Overall	46	86~198	143.65	29.82	3.09

In the SILL pretest, Group 3 recorded the highest overall frequency of strategy use. However, the next highest reported overall strategy use was Group 3 rather than Group 2. This may simply be a reflection of the fact that Group 2 had the largest number of participants and the standard deviation of the proficiency scores occupied a wide range (*SD*=17.37).

In order to determine whether there were significant differences in pretest and post-test scores within different proficient groups (Groups 1, 2 & 3), *one-way ANOVA* and *post-hoc* analysis were applied within the three proficiency groups. The results are provided in *Tables 5* and *6.*

Table 5**:** *Use of language learning strategies prior to the program – Comparison in terms of proficiency grouping (one-way ANOVA)*

Pretest	*Overall*		*Memory*		*Cognitive*		*Compensation*		*Meta-cognitive*		*Affective*		*Social*	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Group 1	3.07	.57	2.80	.64	3.10	.60	3.23	.71	3.27	.66	2.96	.67	3.13	.78
Group 2	2.95	.62	2.67	.67	3.04	.65	3.16	.69	3.03	.83	2.66	.72	3.04	.75
Group 3	3.57	.55	3.52	.55	3.63	.50	3.74	.56	3.63	.59	3.09	.68	3.72	.87
p.	.033*		.005**		.048*		.081		.121		.228		.082	
f-ratio	3.69		6.05		3.26		2.66		2.22		1.53		2.65	
Post-hoc	G3>G2*		G3>G2**		G3>G2*									

Note: *= p<.05, **= p<.01, ***=p<.001

Table 6: *Use of language learning strategies after the program – Comparison in terms of proficiency grouping (one-way ANOVA)*

Post-test	*Overall*		*Memory*		*Cognitive*		*Compensation*		*Meta-cognitive*		*Affective*		*Social*	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Group 1	3.30	.37	3.17	.61	3.33	.53	3.49	.58	3.39	.45	3.26	.40	3.17	.73
Group 2	3.17	.66	3.08	.67	3.21	.64	3.32	.68	3.27	.88	2.82	.75	3.26	.93
Group 3	3.79	.48	3.72	.45	3.78	.59	4.06	.44	3.80	.65	3.53	.45	3.89	.75
p.	.033*		.033*		.061		.014*		.232		.016*		.145	
f-ratio	3.71		3.7		3.0		4.76		1.51		4.53		2.01	
Post-hoc	G3>G2*		G3>G2*				G3>G2*				G3>G2*			

Note: *= p<.05, **= p<.01, ***=p<.001

As indicated in *Table 5*, the most significant difference in pre-test results related to memory strategies, with a slight difference also being detected in overall strategy use and use of cognitive strategies. Group 3 reported using memory strategies more frequently than the other two groups, and there was also a slight difference in memory strategy use between Group 2 and Group 3. No significant difference was found between Group 1 and Group 2.

As indicated in *Table 6*, significant differences were found in overall, memory, compensation and affective strategy use. However, when the results of both tests are taken into account, the difference in the area of memory strategy use among the groups becomes smaller. Even so, what is clear is the fact that the differences in terms of direct strategy use (memory and cognitive strategy) narrowed after completion of the program, suggesting that the program was effective in reducing the gap between proficient learners and less proficient learners in this respect.

Paired-sample t-test was applied to investigate differences between the pretest and posttest within each proficiency group. The results are recorded on *Table 7*.

Table 7**:** *Comparison of participants' pre-test and post-test scores in relation to proficiency groupings*

Mean	*Overall*	*Memory*	*Cognitive*	*Compensation*	*Meta-cognitive*	*Affective*	*Social*
Group 1 Pretest	3.07	2.80	3.10	3.23	3.27	2.96	3.13
Group 1 Posttest	3.30	3.17	3.33	3.49	3.39	3.26	3.17
t	-1.96	-3.83	-3.20	-.938	-.868	-1.76	-.206
p	.098	.009**	.019*	.385	.419	.129	.844
Group 2 Pretest	2.95	2.67	3.04	3.16	3.03	2.66	3.04
Group 2 Posttest	3.17	3.08	3.21	3.32	3.27	2.82	3.26
t	-4.67	-5.14	-3.14	-1.95	-3.16	-1.65	-2.18
p	.000***	.000***	.004**	.060	.004**	.109	.037*
Group 3 Pretest	3.57	3.52	3.63	3.74	3.63	3.09	3.72
Group 3 Posttest	3.79	3.72	3.78	4.06	3.80	3.53	3.89
t	-2.63	-3.32	-1.64	-2.44	-1.06	-2.29	-.811
p	.030*	.010**	.141	.040*	.320	.051	.441

Note: *= p<.05, **= p<.01, ***=p<.001

As indicated in *Table 7*, there was a significant difference in reported overall strategy use before and after the program in the case of Group 2, a slight difference in the case of Group 3, and no detectable difference in the case of Group 1. This suggests that that participants in Groups 2 and 3 applied language learning strategies more often after the training program.

Observation of p-values in *Table 7* indicates that the participants with the lowest proficiency level showed an increase in the use of memory and cognitive strategies after the program, whereas participants in Group 2 showed an increased use of all strategy types except compensation and affective strategies. Those in the group with the highest proficiency level showed an increase in strategy use overall and in memory and compensation strategies.

Examination of the recorded use of specific strategies before and after the program indicates a significant difference in memory strategy application for all groups (Group 1, p=.009, Group 2, p=.000, Group 3, p=.010), suggesting that participants applied memory strategies more frequently after the training program. Although there was an overall increase in reported strategy use among participants in the highest proficiency group (Group 3) before and after the program, there was no significant difference in the area of cognitive strategy use and only a slight difference in compensation strategy use. However, in the case of participants in Groups 1 and 2, there were significant differences between the pretest and the post-test in terms of cognitive strategy use, but no difference in terms of compensation strategy use. This suggests that programs such as the one outlined here could be effective in reducing the gap between more proficient and less proficient students in terms of cognitive strategy use. The fact that students in the highest proficiency group (Group 3) reported using compensation strategies and affective strategies slightly more often after the program than they did before it, whereas participants in other groups did not (see *Table 7*) suggests that the program was effective in encouraging the use of such strategies (e.g. guessing, referring to resources and using linguistic clues) only in cases where students had already achieved a certain level of proficiency.

So far as indirect strategies are concerned, only in the case of Group 2 was there a reported increase after the program – a slight one – in the use of meta-cognitive strategies. Furthermore, although there was a slight difference among the groups in reported use of affective strategies before the program (see *Table 6*), there were no significant differences among the groups in terms of degree of increase in reported strategy use after the program (see *Table 7*). However, the fact that there was a reported increase in the use of affective strategies in the case of all groups suggests that the program had some positive impact on their anxiety levels.

Only in the case of Group 2 participants was there a recorded increase – a slight one – in the use of social strategies. This may be a reflection of the fact that all of the participants in the program were already familiar with co-operative approaches to learning, being members of a college community in which discussion and pair and group activities are encouraged.

Overall, then, in spite of some differences among groups and in spite of some differences relating to different strategy types, the results show some increase in the reported use of every language learning strategy type after the 20-hour training program, an increase that is significant in the case of direct strategies and also in the case of some indirect strategies. This supports the two hypotheses. There is, however, further evidence that supports the second hypothesis, that is, that there would be a particularly marked increase in participants' use of direct strategies, especially memory and compensation strategies. As indicated in *Table 8*, application of the *paired-sample t-test* and *one-way ANOVA* indicates a significant difference between pre-test and post-test results in terms of reported use of memory strategies. Although an overall significant increase in the area of reported use of cognitive strategies is also evident, there is no such significant increase in the case of the highest proficiency group (Group 3). There was, however, a significant increase in the reported use of compensation strategies among members of that group.

Table 8: *Comparison of reported direct strategy use between the pretest and post-test (paired-sample t-test)*

	Memory		*Cognitive*		*Compensation*	
paired t-test:Whole	***Mean***	***p-value***	***Mean***	***p-value***	***Mean***	***p-value***
pretest	2.86	.000***	3.16	.000***	3.29	.006**
posttest	3.22		3.34		3.49	
paired t-test:Group	***Mean***	***p-value***	***Mean***	***p-value***	***Mean***	***p-value***
Group 1-pre	2.80	.009**	3.10	.019*	3.23	.385
Group 1-post	3.17		3.33		3.49	
Group 2-pre	2.67	.000***	3.04	.004**	3.16	.060
Group 2-post	3.08		3.21		3.32	
Group 3-pre	3.52	.010*	3.63	.141	3.74	.040*
Group 3-post	3.72		3.78		4.06	

Note: *= p<.05, **= p<.01, ***=p<.001

In terms of reported use of indirect strategies, there was a significant overall difference between the pre-test and the post-test results and, in the case of Group 2 participants, a significant reported increase in relation to meta-cognitive and social strategies (see *Table 9*).

Table 9: *Comparison of reported indirect strategy use between pretest and post-test (paired-sample t-test)*

	Meta-cognitive		*Affective*		*Social*	
paired t-test:Whole	***Mean***	***p-value***	***Mean***	***p-value***	***Mean***	***p-value***
pretest	3.18	.001***	2.79	.004**	3.19	.031*
posttest	3.39		3.03		3.37	
paired t-test:Group	***Mean***	***p-value***	***Mean***	***p-value***	***Mean***	***p-value***
Group 1-pre	3.27	.419	2.96	.129	3.13	.844
Group 1-post	3.39		3.26		3.17	
Group 2-pre	3.03	.004**	2.66	.109	3.04	.037*
Group 2-post	3.27		2.82		3.26	
Group 3-pre	3.63	.320	3.09	.051	3.72	.441
Group 3-post	3.80		3.53		3.89	

Note: *= p<.05, **= p<.01, ***=p<.001

Conclusion and recommendations

This study supports the contention that participation in vocabulary games of the type referred to here can lead to an increase in reported use of a range of language learning strategies, particularly memory-based strategies. Although it seems likely that the strategy use enhancement detected in this study is transferred to other skill areas, such as reading, further research would be required to determine whether this is actually

the case. Other considerations that could be taken into account in constructing further studies in this general area are **(a)** the possibility of developing other games of a similar type, some of which do not involve the creation of compound nouns, **(b)** the desirability of including a roughly equal number of male and female students and students from different institutions[7], **(c)** the desirability of having a control group whose members are involved in different approaches to vocabulary learning, **(d)** the potential value of introducing the games in different sequences[8], and **(e)** the desirability of finding ways of detecting short-term and longer-term vocabulary gains and the longer-term impact of studies of this kind on strategy use. It would also be interesting to design similar types of game for use in the case of different languages. Thus, for example, in the case of Māori, a member of the Polynesian language group that makes extensive use of compound nouns, game cards could include compounds such as the following: *wharekai* (dining room) and *wharepaku* (toilet), from *whare* (place/ building); *kai* (food/ eat) and *paku* (small); *papatuhituhi* (blackboard) and *papamā* (whiteboard), from *papa* (board), *mā* (be white) and *tuhituhi* (write/ draw); *ipupara* (rubbish bin) from *ipu* (container) and *para* (rubbish/ trash).

Perhaps most important of all is the possibility of making use of technology in order to provide participants with immediate feedback in terms of meaning and use. If the games were redesigned for Internet-based use, the selection of a combination that produced a compound noun, could be immediately followed by a pop-up that provided a definition, an example of contextualized use and, where feasible, an illustration. Individual and group scores could also be recorded more easily.

Endnotes

1. 2008, Patent Application No. 097101167

2. PickRed is a game in which players are given up to six cards, depending on the number of players. The rest of the cards are put aside and four cards are placed face-up on the table. Players aim to match cards (from their hands or the cards on the table), producing pairs of red cards (hearts and diamonds) that add up to ten. In the version of the game designed by the author, the cards have pictures and words on them and paired cards must combine to create compound nouns.

3. Blind Chess is played with all pieces upside down on one half of the board. There are 16 red pieces and 16 black pieces which, depending on type, may move horizontally, vertically and/or diagonally. Pieces can leap over one another to capture their target or capture their target directly by moving in any direction except diagonally. In the version of the game designed by the author, the pieces have words written on them and players gain points by lining up pieces to form compound nouns. The game ends when one player successfully takes the general, or checkmates the other player.

4. Gobang, also known as 5-in-a-Row, is a traditional oriental game played with black and white pieces on a 19x19 go board. The pieces can be lined vertically, horizontally and diagonally. It can be played by two individuals or two teams. In the version of the game designed by the author, each piece has a word written on it and players need to line up the pieces so that each juxtaposed pair makes up a compound noun.

5. Some groups might spend longer on a round than others but all groups needed to complete the minimum number of game rounds specified for the program.

6. Note that the strategies used by players included guessing, observing the links made by other players, etc.

7. All of the students in this study came from the same institution and there was only one male participant.
8. Game order might have some impact on the results.

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