

The Effects of Drill and Practice Courseware on Students' Achievement and Motivation in Learning English

Y. T. Gee, I. N. Umar

Abstract—Students' achievement and motivation in learning English in Malaysia is a worrying trend as it is lagging behind several other countries in Asia. Thus, necessary actions have to be taken by the parties concerned to overcome this problem. The purpose of this research was to study the effects of drill and practice courseware on students' achievement and motivation in learning English language. A multimedia courseware was developed for this purpose. The independent variable was the drill and practice courseware while the dependent variables were the students' achievement and motivation. Their achievement was measured using pre-test and post-test scores, while motivation was measured using a questionnaire. A total of 60 students from three vernacular primary schools in a northern state in Malaysia were randomly selected in this study. The findings indicate: (1) a significant difference between the students' pre-test and post-test scores after using the courseware, (2) no significant difference in the achievement score between male and female students after using the courseware, (3) a significant difference in motivation score between the female and the male students, and (4) while the female students scored significantly higher than the male students in the aspects of relevance, confidence and satisfaction, no significant difference in terms of attention was observed between them. Overall, the findings clearly indicate that although the female students are significantly more motivated than their male students, they are equally good in terms of achievement after learning from the courseware. Through this study, the drill and practice courseware is proven to influence the students' learning and motivation.

Keywords—Courseware, drill and practice, English learning, motivation.

I. INTRODUCTION

ENGLISH acts as a lingua franca for Malaysians to communicate with the global community [1]. Although the Ministry of Education has promoted variety of programs to increase Malaysian students' interest in learning English language, unfortunately their proficiency level is much lower as compared to several other countries in Asia such as Singapore, Philippines and Hong Kong. Reference [2] has outlined several problems with regards to learning English among vernacular school students. These problems include motivation, aptitude, age and social-culture background [3]. In addition, the students in vernacular primary schools have to study three different types of languages as compared to their peers in national schools. They have to learn their mother-tongue (Mandarin or Tamil language), second language

(Malay language) and third language (English language). Another fundamental reason for the rapid decline of English language is lack of exposure and the usage of the language beyond the classroom [4].

Rapid growth of new technology has increased the interaction and mobility among the people around the world. It also creates an interactive and collaborative virtual learning environment for students to interact to each other [5], [6] anywhere which would not exist in the traditional classroom. With the penetration of information communication and technologies, ICT in education, it has also transformed the classroom from the teacher-centred to student-centred learning environment. Researchers such as [7] have claimed that the integration of multimedia technology not only making the teaching and learning English language more interesting, it also provides a more flexible and efficient content delivery to students. Hence, the students have the power to control their own learning pace and monitoring their own academic progress [8]. It also motivates and cultivates the students' interest in language learning [9]. The purpose of the study is to develop a drill and practice multimedia courseware to motivate the students in learning English and improve their academic achievement.

II. THEORETICAL FRAMEWORK

According to [10], motivation is one of the key factors for the students to use the language efficiently. Therefore, in order to motivate them, a flexible, interactive, systematic and authentic learning environment is needed [6]. Meanwhile, [11] has introduced a motivation model – the Attention, Relevance, Confidence and Satisfaction (ARCS) model - to make the instructional material more interesting and indirectly increase the students' motivation in learning. This motivation model has four main components - attention, relevance, confidence and satisfaction - that need to be embedded in any instructional material to motivate the students.

In this study, attention measures the arousing and sustaining curiosity and interest of the students in using the multimedia drill and practice courseware based upon their needs. In addition, the instruction should be relevant to them so that they will continue focusing on the instruction. They will also need to feel confident when learning from the courseware. The students will also feel motivated if the instruction is able to satisfy their needs and expectations. According to [12], when the students are satisfied that the instructional content was relevant and that they are confident to learn, they will actively

Y.T. Gee and I.N. Umar are with the Centre for Instructional Technology & Multimedia, Universiti Sains Malaysia (e-mail: gyting@hotmail.com, irfan@usm.my).

participate in the learning activities. In analyzing the effect of possible gender differences in motivation on learning, several studies had found a strong positive relationship between initial interest in a subject and the gender difference.

The drill and practice multimedia courseware developed in this study was guided by the Instructional Design Model proposed by [13]. It provides repetitive drill with immediate feedback and presents the materials at the learner's pace [14]. Researchers (for example; [15]) have found that drill and practice materials directly benefit students' learning, and indirectly motivate them to learn.

The Cognitive Theory of Multimedia Learning proposed by [16] has proven that multimedia courseware consisting of words and pictures is able to foster effective learning rather than words alone. It processes separate channel of information to reduce cognitive overload, free working memory capacity and increase the students' interest and motivation during language learning. Therefore, the students will learn better when they select the relevant information from what they learn, organize and relate it with their existing prior knowledge in long term memory. In multimedia principle, making connections and building relationships between the information received and the prior knowledge are preliminary steps for the students in acquiring new knowledge [16].

This study using a quantitative research design that aims to seek answers to the following research questions:

- i. Is there any significant difference between the pre-test and post-test scores of the students who use drill and practice courseware?
- ii. Is there any significant difference in terms of performance between the male and female students who use drill and practice courseware?
- iii. Is there any significant difference in terms of motivation between the male and female students who use drill and practice courseware?
- iv. Are there any significant differences in motivation in terms of Attention, Relevance, Confidence and Satisfaction between male and female students after using the drill and practice courseware?

III. RESEARCH METHODOLOGY

A. Design

The study employed a quantitative method approach which involved only one group of respondents. The method used to gather data for this research was based on the One-Group Pre-test and Post-test design.

B. Research Sample

A total of 60 samples age ranged from 10 to 12 years old were randomly selected from three rural area vernacular primary schools in a northern state of Malaysia. They consist of students with different races and gender.

C. Instructional Material and Research Instruments

A multimedia courseware was developed by the researchers using Articulate Storyline as the authoring tool. The topic chosen was English grammar with the focus on Preposition.

This multimedia courseware applied drill and practice method proposed by [13] in learning preposition. In this courseware, the students will be first introduced with the concept and examples of preposition (Figs. 1 (a) and (b)). Then, they have to answer to the drill-and-practice questions (Figs. 2 (a)-(c)). The results of the drill and practice activity will be presented to the student (Fig. 3). The student is also allowed to review the drill and practice activities.

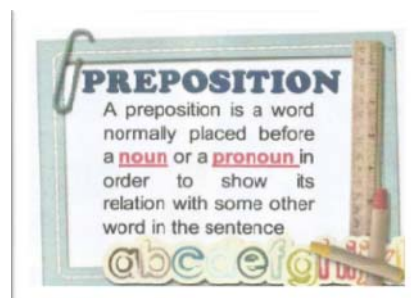


Fig. 1 (a) Introduction to preposition

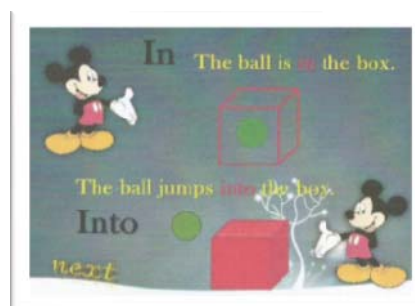


Fig. 1 (b) Example of preposition

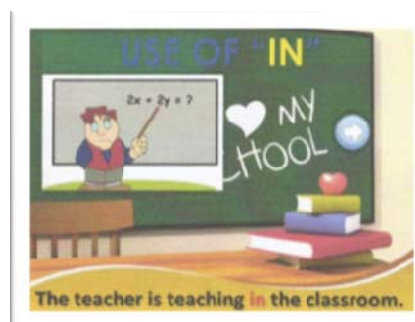


Fig. 1 (c) Another example of preposition



Fig. 2 (a) Example of drill and practice item



Fig. 2 (b) Second example of drill and practice item



Fig. 2 (c) Third example of drill and practice item



Fig. 3 Drill and practice result

A questionnaire adapted from the IMMS instrument [11] that consists of the attention, relevance, confidence and satisfaction dimensions, was used to measure the students' motivation after using the drill and practice courseware. It contained a demographics section followed by a 36 closed-ended items in a five point rating scale, ranging from 1: Strongly Disagree to 5: Strongly Agree. Ten of the 36 questions were negatively worded to increase the strength of the questionnaires. The adapted questionnaire which uses simple Malay and Chinese languages was validated by a language expert.

A pilot test was conducted to observe the validity and reliability of this questionnaire and the courseware. Both the courseware and the questionnaire were first piloted to a sample of 15 students. The Cronbach's Alpha reliability value for the four dimensions of questionnaire is found to be greater than 0.90 – indicating a highly reliable instrument. A self-learning pre-test in multiple-choice-question format embedded in the multimedia courseware was administered to the students in order to determine their prior knowledge in learning English grammar. After that, the students were allocated 30 minutes to learn the content, which was then followed by the written

post-test session. Finally, the questionnaire was distributed to measure their motivation after learning the courseware.

D. Data Analysis

The quantitative data collected through the IMMS instrument were analysed using SPSS version 20 and presented as descriptive and inferential statistics. The number of students who used the drill and practice courseware were expressed in mean score table. The differences of students' performance after using the drill and practice courseware was displayed in mean score value. Next, the students' motivation regarding the effect of the drill and practice courseware in improving their English language is displayed in tabular form. A t-test was applied to investigate whether there are significant differences in achievement and motivation between the groups after using the courseware. For this purpose, an alpha value of .05 was used as the significant level.

IV. FINDINGS

As depicted in Table I, majority of the respondents are Chinese (36 students or 60%), Malay (17 students or 28.3%), followed by Indian (3.3% or 2 students) and Siam (8.3% or 5 students). The percentage of male respondents was slightly lower (46.7% or 28 students) compared to the female respondents (32 students or 53.3%). Most of the respondents have more than three years of learning English language and have basic computer knowledge.

TABLE I
 PARTICIPANTS' DEMOGRAPHIC BACKGROUND

Gender		Year			Race			
Male	Female	4	5	6	Malay	Chinese	Indian	Other
28	32	19	20	21	17	36	2	5

Meanwhile, the students' pre-test, post-test and gain scores are shown in Table II. Their motivation scores which include the attention, relevance, confidence and satisfaction are also shown in this table.

TABLE II
 DESCRIPTIVE STATISTICS FOR THE VARIABLES

	N	Mean	Std. Deviation
Pretest	60	56.08	21.01
Posttest	60	61.92	22.29
Gain score	60	5.83	12.01
Attention	60	3.55	0.55
Relevance	60	3.76	0.53
Confidence	60	3.54	0.56
Satisfaction	60	3.87	0.69
Motivation	60	14.72	1.98
Valid N (list wise)	60		

Is there any significant difference between the pre-test and post-test scores of the students who use drill and practice courseware?

In this study, the students' pre-test score was used to compare with the written-based post-test score. Based on the descriptive statistics in Table II, the mean of the pre-test score

is 56.08 (SD: 21.01), while the mean for the post-test is 61.92 (SD: 22.29). To examine whether the difference is significant, paired sample t-test was carried out. The result in Table III indicates a significant difference in the score between the pre-test and the post-test (t: 3.76; p: .00). In other words, the results indicate a significant improvement on the students' achievement from their pre-test and post-test score after using the drill and practice courseware. This meant that the students have improved their knowledge after using the courseware.

TABLE III
T-TEST RESULT TO COMPARE THE PRE-TEST AND POST-TEST SCORES

	N	Mean	SD	t-value	p-value	Result
Pre-test	60	56.08	21.01			
Post-test	60	61.92	22.29	3.763	.000	Significant Difference

Is there any significant difference in terms of achievement between male and female students who use drill and practice courseware?

An independent samples t-test was carried out to determine whether there is a significant difference in terms of the gain score between the male and female students after using the courseware. Based on the result of the t-test (Table IV), no significant difference was observed (t: 1.12; p: .269). In other words, the male students performed equally as good as their female friends, indicating that this drill and practice courseware benefit both genders.

TABLE IV
T-TEST RESULT OF THE GAIN SCORE BETWEEN MALE AND FEMALE STUDENTS

Gain Score	Gender	N	Mean	SD	t-value	P-value	Result
	Male	28	7.68	10.317	1.116	.269	No Significant Difference
Female	32	4.22	13.266				

Is there any significant difference in terms of motivation between male and female students who use drill and practice courseware?

Based on the t-test result in Table V, it indicates a significant difference in terms of motivation between the male and female students (t: 3.20; p: .002). The descriptive statistics shows that the female students scored 15.43 (SD: 1.61) in motivation as compared to the male students who scored 13.91 (SD: 2.08). Thus, the female students obtained significantly higher motivation score as compared to the male students.

TABLE V
T-TEST RESULT BETWEEN MALE AND FEMALE STUDENTS' MOTIVATION SCORE

Motivation Score	Gender	N	Mean	SD	t-value	P-value	Result
	Male	28	13.91	2.08	3.20	0.002	Significant Difference
Female	32	15.43	1.61				

Are there any significant differences in motivation in terms of attention, relevance, confidence and satisfaction between the male and female students after using the drill and practice courseware?

As reported in the previous discussion, the analysis concerning the overall motivation score indicates a statistically significant difference between the male and female students after using the drill and practice courseware. The next analyses attempted to compare whether there are significant differences between the male and female students in terms of the four subcomponents of motivation – attention, relevance, confidence and satisfaction. Table VI highlights the findings.

TABLE VI
DESCRIPTIVE AND INFERENTIAL STATISTICS ON THE DIFFERENCES BETWEEN MALE AND FEMALE STUDENTS IN THE COMPONENTS OF MOTIVATION

	Gender	N	Mean	SD	t-value	p-value	Result
Attention	Male	28	3.44	0.62	1.506	.138	No Significant Difference
	Female	32	3.65	0.47			
Relevance	Male	28	3.53	0.54	3.280	.002	Significant Difference
	Female	32	3.95	0.45			
Confidence	Male	28	3.38	0.59	2.244	.029	Significant Difference
	Female	32	3.69	0.49			
Satisfaction	Male	28	3.56	0.72	3.508	.001	Significant Difference
	Female	32	4.14	0.55			

In terms of **Attention**, there is no significant difference in attention between the male and female students (t: 1.51; p: .138). Although insignificant, the female students' perception on the attention component provided by the courseware is slightly higher than that of the male students (mean attention score for female: 3.44; mean score for male: 3.65). The insignificant difference in attention between male and female students showed that the drill and practice courseware was able to attract the students' attention - regardless of their gender. It also has created a learning environment that can guide them to involve actively in the learning activities.

In terms of **Relevance**, there is a significant difference in the relevance score between the female and male students (t: 3.28, p: .002). The descriptive statistics indicate that the female students scored 3.95; while the male students obtained 3.53 points. In other words, the female students who learned from the multimedia courseware perceived that the courseware is significantly more relevant than that of the male students.

Meanwhile, in terms of **Confidence**, there is also a significant difference in confidence score between the female and male students (t: 2.24; p: .029). The descriptive and inferential statistics indicate that the female students (mean: 3.69) felt that the courseware provide significantly more confidence in their learning as compared to the male students (mean: 3.38). The finding shows that the drill and practice courseware has provided a more flexible self-study and self-assessment environment to the female students and they used it with confidence. The students in the study agreed that courseware has encouraged them to build up their self-confidence in learning English grammar.

Finally, in terms of **Satisfaction**, the result of the t-test revealed a significant difference between the female and the male students (t: 3.51; p: .001). The descriptive statistics indicate that the female scored 4.14 (SD: .55) while the male students scored 3.56 (SD: .72). Therefore, this finding shows

that the female students felt that the courseware provides significantly greater satisfaction to them compared to the male students. Also, as the female students found that the courseware to be of relevance to them, and are confidence in using it, these factors have positively affected their satisfaction level.

V. DISCUSSION

The findings indicate that the drill and practice activities as well as the immediate feedback offered in the courseware have helped the students to learn and understand better. The integration of interactive multimedia elements in learning the English grammar has transformed the teacher-centered teaching environment to student-centered learning environment and motivates them to learn better by self-evaluating via active engagement in the learning process [17].

This study is in contrast with the reports from [18] where female students score higher than male students in language learning and English-speaking Literacy Test. Reference [19] indicated that the problems of the male students are mainly related to the learning difficulties, negative attitude, socio-academic outcomes and motivation or frustration with extended reading or rewriting and indirectly impact on their achievement. However, with the use of this courseware, such problems did not seem to affect the male students.

Previous researchers have also reported a significant difference in motivation between both genders (for example: [20], [21]). Female students are found to be more motivated, more independent in their own learning process, and did not object to repeat the learning session numerous times as compared to the male students in learning second language [10]. Also, [22] indicated that the girls were more motivated and interested in study English language than the boys if the language learning is fun and easier to learn [23].

The drill and practice courseware used in this study is believed to create a friendly multimedia learning environment that stimulates the rural area students' attention in learning English grammar. In addition, the courseware had aroused both female and male students' enthusiasm and attention for study, it has improved their attitude and abilities with which both genders can master and apply the knowledge into their real life.

Moreover, the female students are more motivated and performed better when the instructions given are relevant to them and the content perceived to be helpful in their learning. Reference [17] argue that the personal motivation will be increased when relevant content fulfill the students' individual needs thus subsequently enhance their performance. Therefore, with the integration of multimedia elements such as video clips, animated pictures, and the freedom to access anytime at their own pace without time limit, the female students are willing to spend more time and engage in the courseware.

In this study, the drill and practice courseware has significantly provided a more flexible self-study and self-assessment environment to the female students and boost their confidence in using it. According to [24] and [25], the students

who possess high motivation and self-confidence are easier to master in second-language acquisition.

The findings of this study indicated that the students were motivated to study the material and satisfied with the exercises provided and felt suitable to be used in their learning. This study found that the students are satisfied with the use of multimedia drill and practice in learning grammar because they felt comfortable and easier to use. As emphasized by [26], a well-designed and properly structured on-line learning environment leads to the development of higher-order thinking skills and motivate the students to learn.

VI. CONCLUSION

The drill and practice courseware offers an ideal environment for the students to improve their English language interactively. Through the use of the courseware, the students can repeatedly practice their English grammar without time restriction and embarrassment. From the findings in the study, the use of the drill and practice courseware not only improved students' motivation, but also their confidence and satisfaction in learning English grammar. In addition, female students scored significantly higher in relevance, confidence and satisfaction as compared to male students. These factors need to be considered in designing and developing more multimedia instructional courseware.

REFERENCES

- [1] L.H. Phan, K. Joyce, and C. Brendan, "Nation Building, English as an International Language, Medium of Instruction, and Language Debate : Malaysia and Possible Ways Forward". *Journal of International and Comparative Education*, vol. 2, no. 2, 58-71, 2013.
- [2] L.A. Mohd Nazri, "Multilingualism and personality traits among Malay primary school students in vernacular schools". *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 8 (3), 24-31, 2013.
- [3] M.V. Balderrama, and L.T. Diaz-Rico, *Teaching Performance Expectations for Educating English Learners*. Boston: Pearson Education, 2006.
- [4] H.D. Pillay, *Fragments of a Vision : A Case Study of the Implementation of an English Language Curriculum Programme in Five Malaysian Secondary Schools*. University of East Anglia, 1995.
- [5] L. Tan, *Literacy for the 21st Century*. Singapore: Educational Technology Division, Ministry of Education, 2006.
- [6] S. Nallaya, "The Measurement of Change in English Language Proficiency". *Education Research*, vol. 22, no. 2, 2012.
- [7] S.D. Solanki, and M. Phil, "Use of technology in English language teaching and learning : An analysis". *International Conference on Language, Media and Culture, IPEDR.33*. Singapore: IACSIT Press, 2012.
- [8] A.B. Nadzrah, "English Language Activities in Computer-Based Learning Environment : A Case Study in ESL Malaysian Classroom". *GEMA Online Journal of Language Studies*, vol. 7, no. 1, 2007.
- [9] BECTA. (2001). *Primary Schools of the Future - Achieving Today*. DfEE.
- [10] R.C. Gardner, and W.E. Lambert, *Attitudes and Motivation in Second Language Learning*. Newbury House, 1972.
- [11] J.M. Keller, "Motivation and Instructional Design: A Theoretical Perspective". *Journal of Instructional Development*, vol.2, no.4, 26-34, 1979.
- [12] D.M. Gabrielle, *The Effects of Technology-Mediated Instructional Strategies on Motivation, Performance and Self-Directed Learning*. U.S. Military Academy Center for Teaching Excellence, 2002.
- [13] M.S. Alessi, and R.S. Trollip, *Computer-based Instruction: Methods and Development. 2nd Edition*. New Jersey: Prentice Hall, 2001.

- [14] L. Hsu, and C.M. Sheu, "A study of low English proficiency students' attitude toward online learning". *Electronic Journal of Foreign Language Teaching*, vol.5, no. 2, 240-264., 2008.
- [15] R. Bangert-Browns, J. Kulik, and C.L. Kulik, "Effectiveness of computer-based education in secondary schools. *Journal of Computer-Based Instruction*, vol. 12, 59-68, 1985.
- [16] R.E. Mayer, *Multimedia Learning*. Cambridge: Cambridge Press, 2001.
- [17] M.M. Chang, and J.D. Lehman, "Learning Foreign Language Through an Interactive Multimedia Program : An Experimental Study on the Effects of the Relevance Component of the ARCS Model". *CALICO Journal*, vol. 20, no. 1, 81-98, 2002.
- [18] PISA, 2. (2006). *Science Competencies for Tomorrow's World Volume 1: Analysis*. Organisation for Economic Co-operation and Development.
- [19] M. Meiers, S.T. Khoo, K. Rowe, A. Stephanou, P. Anderson, and K. Nolan, "Growth in Literacy and Numeracy in the First Three Years of School". *ACER Research Monograph (Australian Council for Educational Research)*, 61, 2006.
- [20] R.C. Gardner, A.M. Masgoret, J. Tennat, and L. Mihic, "Integrative motivation : Changes during a year-long intermediate-level language course". *Language Learning*, vol. 54, no. 1, 1-34, 2004.
- [21] Z. Dörnyei, and K. Csizér, "The Internal Structure of Language Learning Motivation and Its Relationship with Language Choice and Learning Effort". *The Modern Language Journal*, vol. 89, no.1, 19-36, 2005.
- [22] X. Xiong, "A comparative study of boys' and girls' English study differences". *Journal of Language Teaching and Research*, vol. 1, no. 3, 2010.
- [23] J.E. Ormrod, *Educational Psychology Developing Learners (Vol. 10)*. Prentice Hall., 2008.
- [24] S.D. Krashen, "Formal and informal linguistic environments in language acquisition and language learning". *TESOL Quarterly*, vol. 10, no. 2, 1976.
- [25] M.M. Chang, "Applying self-regulated learning strategies in a web-based instruction - An investigation of motivation perception". *Computer Assisted Language Learning*, vol. 18, no. 3, 217-230, 2005.
- [26] I.J. Quitadamo, and A. Brown, *Effective Teaching Styles and Instructional Design for Online Learning Environments*. ERIC Document Reproduction Service, 2001.