Applying Technology-Mediation to Assist Junior College Students to Learn Japanese as 2nd Language and Improve the Efficiency

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Abstract

This study is based on college students' as study objects and attempting to explore the efficiency of applying technology-mediation method to learn a second foreign language. The research includes two experiments. In the first experiment, students are divided into high score group and low score group who undergo the learning effects test of Japanese language by using the e-smart pen. In the second experiment, which based on the first one, students use e-smart pen plus internet learning to investigate the efficiency of learning Japanese as second language. The result of the first experiment indicates a determining impact. Moreover, In comparison with the results of both experiments, it shows that low score group students are more benefited by the assist of using e-smart pen; the second experiment indicates that the Japanese vocabulary and conversation capability can be enhanced through the use of e-smart pen. However, internet learning is more useful to increase vocabulary ability. These findings indicate that under the technology-mediation, learners can not only complete the learning activities, but also obtain better learning effects.

Keywords： Technology-Mediation, e-smart pen, Japanese learning

I.   Research motive and purpose

In the technology-mediation learning environment is based on the theory of learner-centered, Fu-yun Yu (2003) pointed out that the purpose of the technology-mediation is in order to enrich the students' learning experience, therefore have to rely on teachers utilize different teaching strategies, teaching activities of the message re-engineering and knowledge construction, so that passive learning will be transformed into active learning. Constructivism emphasizes:

1. Individual learning must construct their heredity, experiences, perspectives, backgrounds, talents, interests, capacities, and needs) with a focus on learning.

2. Focus on learning, that is, the best available knowledge about learning and how it occurs and about teaching practices that are most effective in promoting the highest levels of motivation, learning, and achievement for all learners). (McCombs and Whisler, 1997; Chang, 2009b).

By the constructivist view, teaching strategies, development of the technology-mediation, which consider student characteristics and teaching conditions, it is the focus of recent study. For this study one of motivation to explore that is the integration of digital technology into the mode of a second foreign language teaching steps, teaching methods and making a meaningful learning-based study.

Tsai (2006) pointed out that technology-mediation teaching strategies, systematic teaching process to achieve a specific teaching objective, to digital, including teaching methods, teaching media, and teaching activities. The technology-mediation can consider the characteristics and needs of learners, arrange appropriate teaching materials and situational meaningful learning activities to meet the learning theory.

Alavi and Leidner（2001）they think that the effectiveness of learning through an explicit consideration of relationships among technology capabilities, instructional strategy, psychological processes, and contextual factors involved in learning (Yun-pei, Chen, 2006). Empirical research, scholars believe that the use of information technology will enhance the effectiveness of learning（Alavi, 1994; Marki et al., 2000; Alavi, Wheeler and Valacich, 1995; Yun-pei Chen, 2004）Especially the teaching content into the concept of "what students learn?" by the "teachers what to teach?" The role of teachers from imparting knowledge to the role of knowledge provider and subsidiary in accordance with students' personal characteristics; Learning of students from passive recipients of knowledge into an active, positive attitude to autonomous learning. The technology-mediation mechanisms have been integrated into the concern about the learners themselves, to explore the potential and motivation of the learners themselves, from teacher-led to student interaction, and manage teaching methods and means to achieve truly stimulate students' willingness to learn and motivation.

In addition, the technology-mediation deeply affects autonomous learning theories. In digital teaching, students learning to active learning, self-learning, and learners can take the initiative to arrange the learning environment, planning inquiry approach, analyze problems, solve problems, and to monitor the learning progress in a timely

manner and effective regulation of learning methods. Related to motivation, self-planned, self-regulation and self-directed learning space promote learning effectiveness. In other words, the technology-mediation, autonomous learning requirements given the self-directed learning space to go to multiple learning resources from a limited textbooks, educational thought and method of conversion (paradigm shift). Go to the learner center from the Teachers' Centre, learning from a one-way transfer of knowledge to the self-exploration (Zhang, Pan and Peng, 2007).

Another will be the knowledge era learning mode in response to the Information Age, the traditional teaching methods cannot meet the needs of students, combined with the autonomous learning theory redevelopment to based on problem-oriented learning. Second foreign language through digital technology into teaching mode, the effective integration of life science and technology, life and culture information, entertainment expansion of knowledge and cultural horizons, not only between theory and practice in the learning material, and also in the life and culture effective link between language and situations, life experiences can strengthen the learning process, and promote second language learning outcomes.

In this study, experiments in two stages, the first stage of the experiment through technological teaching aids, e-smart pen teaching tool to explore e-learning effect of groups (high and low group) for different learning groups. The second stage of teaching experimental basis in the first stage, to explore learners who used e-smart pen and internet e-learning, that create a digital teaching situation and the effects of the Japanese learning.

Based on the research motive and purpose of the foregoing, the following two issues to be answered:
(1) Learners in Japanese teaching situation, teaching tool (e-smart pen), and integrated into the life and culture courses whether it can effectively improve the learning achievements of the Japanese?
(2) Learners in the Japanese language teaching situation, combined with the Internet learning behavior, and integrated into the life and culture courses, can effectively improve the learning achievements of the Japanese?

II. Experimental Design

Course content will be e-textbooks, living Japanese study as a research subject, the living language, life and culture, and other related information into the curriculum planning; And e-courses on various themes of daily life close, contextual learning experiment, measurement facilities and at the end of the course. Explore whether the e-course can really enhance the Japanese learning effectiveness of different level students.

A. Experiment I
a. This experiment as the sample in accordance with the following experimental course design and teaching, foreign language students in subjects after Pre-experiment survey (tests), divided into treatment and control groups, e-situational experimental courses.

b. Course planning

In this study, the Japanese e-situational learning course content as a research subject, e-smart pen, on the life and culture courses, sightseeing, hotels, and other ("Hotel basic Japanese), includes lodging registration, check-out the registration, a total of two units.

c. Pre-experiment survey
    1. The purpose of:
        a) Confirm the content of textbooks, and to distinguish the level of students in Japanese.
        b) Divided into two groups for the experimental study of high score group and low score group in each class in accordance with the learning ability.
    2. During the period: Two weeks.
    3. Objects: Five-year junior school the department of foreign language students (two classes of 47, a total of 94 people).
    4. Based on midterm results as to distinguish between students' Japanese standard, more than 70 points for the high score group; 60 points or less for the low-scoring group (full score is 100).
    5. Results: foreign language students in (A, B two classes, the high score group with 18 people and the low score group with 21 people)

d. E-teaching experimental design
    An experimental method applied to measured:
    During the period: Two weeks
e. The purpose of: The basis of test results Pre-experiment survey, divided into two groups of high score group and low score group. The department of foreign language students (A, B two classes, the high score group with 18 people and low score group with 21 people).

Material: Daily life in Japan, with range of textbooks "Go! Japanese I, II(Daxin Publisher) ".
Methods: This experimental study method, divided into treatment groups and control group were observed e-smart pen integrated into the course, to explore the department of foreign language students (high / low score group) and their learning effect.

f. The experimental results

To explore the effect of integrating "e-smart pen" into curriculum, the High-score and Low-score group that recognized by pre-experiment survey are used to test whether both vocabulary and conversation disciplinary capability are significant different between treatment group and control group. Since the test result of homogeneity of variance assumption is significant at 0.05, it followed with t-tests for difference discussion on two Japanese capabilities.

From the results of t-tests in Table 1, we can see that neither vocabulary nor conversation capability is significant different for Class A (controlled group) and Class B (treatment group) from High-score group. It means that, for those objects from High-score group, no matter "e-smart pen" is introduced in Japanese learning process or not, two Japanese capabilities improve with no doubt.

TABLE 1. MEAN DIFFERENCE TEST OF VOCABULARY AND CONVERSATION CAPABILITY FOR CLASS A AND B FROM HIGH-SCORE GROUP (EQUAL VARIANCE ASSUMED)

	Class A Mean (variance)	Class B Mean (variance)	Gain	t	Critical Value	p
vocabulary average score	91.73	96.5	4.77	-0.819	2.052	0.419
conversation average score	97.36	94.17	3.19	1.573	2.052	0.127

（**Full score is 100,Seperation point is 70 for high and low group**）

Same mean difference test result of vocabulary and conversation capability for Class A (controlled group) and Class B(treatment group) from Low-score group is summarized in Table 2. As we can see, both t-tests of vocabulary and conversation capabilities are significant due to the corresponding p-values. There's strong evidence to infer that "e-smart pen" plays an important role to help those objects who lack of incentive on language learning from Low-score group.

TABLE 2. MEAN DIFFERENCE TEST OF VOCABULARY AND CONVERSATION CAPABILITY FOR CLASS A AND B FROM LOW-SCORE GROUP (**UNEQUAL** VARIANCE ASSUMED)

	Class A Mean (variance)	Class B Mean (variance)	Gain	t	Critical Value	p
vocabulary average score	33.21	58.45	25.24	-2.481	2.021	0.0174
conversation average score	48.83	83.68	34.85	-4.029	2.048	0.0004

Experiment II

a. Course planning

In course planning through technology-mediation (e-smart pen, internet) to introduce the life and culture of the tourist hotels and other courses ("Hotel basic Japanese), includes lodging registration out registration, idioms and tourist hotels, a total of three units.

b. Pre-experiment survey

(1)The purpose of: To confirm the textbook content is not affected by the experience students have knowledge areas, according to the survey results, distribution of students to each group.

(2)During the period: Two weeks.

(3)Objects: The institute of Technology, department of foreign language students, a total of 187 people.

(4)According to the preliminary findings to develop learning assessment is based, including vocabulary, phrases for conversation, surveying.

(5)Results: elected prior knowledge is not limited by the range of students, a total of 160 people.

c. Teaching experiments and experimental plan

(1) The purpose of: to understand the students who experienced the teaching of technology-mediation before and after the Japanese scores changing circumstances.

(2) Period: 2 months.

(3) Objects: prior findings, were randomly assigned to four groups of A, B, C, D.

(i) Experimental Variables

Independent variables 1 : e-smart pen [with, without]; Independent variables 2 : internet [with, without].

(ii) Groups

On two independent variables (e-smart pen, the internet), and whether the learning tool, composed of four different groups were: Group: A without internet +with e-smart pen group; group B: without internet + without e-smart pen group; C group: internet + e-smart pen group, group D: with internet +without e-smart pen group.

(4) Pretest - Posttest Assessment

The tests are the same in accordance with the kinds of questions, number of questions, the questions range features, facilities measured before and after the course.

(5)Textbooks: tourism textbook "Hotel basic Japanese", the first unit (Accommodation Registration), the second unit (Check-out), and the third unit of the tourist hotels idioms etc. The ranges of teaching contents are including that vocabulary and conversation practice.

(6)Method: in accordance with the foregoing teaching subjects, were introduced into the e-smart pen (with, without) and network learning situation (with, without), e-situated learning and to Japanese vocabulary and conversation of the treatment group and the control group, respectively, before and after the course ability tests (full score 20 points), measured student learning outcomes, investigate two factors, the main effect of the e-smart pen and internet), as well as different teaching methods affect the learning achievement of students of Japanese.

III. The experimental results

1. ANCOVA for "e-smart pen" and pre-test Japanese performance

To see if the covariate significantly interacts with the independent variable, run an ANCOVA model including both the independent variable and the interaction term is the standard conduction. If the interaction is significant, ANCOVA should not be performed. Since the p-values of .255(interaction term of "e-smart pen" and pre-test vocabulary) and .267(interaction term of "e-smart pen" and pre-test conversation) are not significant at the level of .05 (Table 3), the assumption of homogeneity of regression slopes is not rejected and the ANCOVA can be performed.

TABLE 3. TEST RESULT OF HOMOGENIETY OF REGRESSION SLOPES FOR
"E-SMART PEN"
AND PRE-TEST JAPANESE PERFORMANCE

Source	Type III sum of squares	df	Mean Square		Significant
Dependent variables: post-test_vocabulary	R square = 0.184 (adjusted R-square = 0.167)				
pre-test_vocabulary	368.195	1	368.195	10.307	0.002**
e-smart pen	663.598	1	663.598	18.577	0.001**
e-smart pen* pre-test_vocabulary	46.542	1	46.542	1.303	0.255
Error	5393.911	151	35.721		
Total	22611.000	155			
Dependent variables: post-test_conversation	R square = 0.274(adjusted R-squared = 0.260)				
Pre-test_ conversation	845.810	1	845.810	30.533	<0.001**
e-smart pen	778.776	1	778.776	28.113	<0.001**
e-smart pen * pre-test_ conversation	34.313	1	34.313	1.239	0.267
Error	4182.881	151	27.701		
Total	10186.000	155			

*：p<0.05，**：p<0.01

The ANCOVA results are summarized in Table 4. Both pre-test vocabulary and conversation reaches significant by its p-values and this indicates that pre-test vocabulary and conversation contributes to the prediction of post-test vocabulary and conversation. It is worth noting that, after excludes the influence of pre-test vocabulary and conversation separately, F-values of 17.254 (p<.001) and 27.143 (p<.001) provide sufficient evidence to conclude that usage of "e-smart pen" would make significant different on the scores of post-test vocabulary and conversation.

TABLE 4. JAPANESE ACHIEVEMENTS ANCOVA SUMMARY TABLE

Source	Type III sum of squares	df	Mean Square	F	Significant
Dependent variables: post-test_vocabulary			R square = 0.177 (adjusted R-square = 0.166)		
Pre-test_vocabulary	344.014	1	344.014	9.611	0.002**
E-smart pen	617.562	1	617.562	17.254	0.001**
Error	5440.453	152	35.792		
Total	22611.000	155			
Dependent variables: post-test_conversation			R square = 0.268 (adjusted R-square = 0.259)		
Pre-test_conversation	814.521	1	814.521	29.358	0.001**
E-smart pen	753.061	1	753.061	27.143	0.001**
Error	4217.194	152	27.745		
Total	10186.000	155			

*: $p<0.05$, **: $p<0.01$

2. ANCOVA for internet and pre-test Japanese performance

From Table 5, the interaction between Internet (independent variable) and pre-test conversation (covariate) is not significant at the 5% significant level (p=0.397). There is insufficient evidence to infer that the correlation between pre-test conversation and post-test conversation (dependent variable) would be affected by different level of Internet. In other words, the slope of regression equation of post-test conversation on Internet is no difference. Therefore, the analysis of covariance can be proceeded.

TABLE 5. TEST RESULT OF HOMOGENIETY OF REGRESSION SLOPES FOR INTERNET AND PRE-TEST JAPANESE PERFORMANCE

Source	Type III sum of squares	df	Mean Square	F	Significant
Dependent variables: post-test_vocabulary			R square = 0.150 (adjusted R-square = 0.133)		
Pre-test_vocabulary	574.968	1	574.968	15.460	0.001**
Internet	394.669	1	394.669	10.612	0.001**

Internet * Pre-test_vocabulary	149.581	1	149.581	4.022	0.047[*]
Error	5615.704	151	37.190		
Total	22611.000	155			
Dependent variables: post-test_ conversation			R square = 0.153 (adjusted R-square = 0.136)		
Pre-test_conversation	228.599	1	228.599	7.071	0.009[**]
Internet	79.703	1	79.703	2.465	0.118
Internet*Pre-test_conversation	23.285	1	23.285	0.720	0.397
Error	4881.953	151	32.331		
Total	10186.000	155			

*: $p < 0.05$，**: $p < 0.01$

To elaborate the influence of internet on conversation capability, the insignificant p-value of .158 in Table 6 tells the truth that whether usage of internet or not doesn't make any difference on conversation test after excluding pre-test conversation and total score.

Table 8 shows the effect of pre-test conversation application (covariate) is significant F = 26.556 (P <0.001), indicated that pre-test conversation application (covariate) on the post-test conversation application (dependent variable) which have a high explanatory power. And exclude the pre-test conversation applications with the influence of the total score, the use of the internet or not there was no significant difference. The internet has failed to effectively enhance students' conversation application capabilities.

TABLE 6.   JAPANESE ACHIEVEMENTS ANCOVA SUMMARY TABLE

Source	Type III sum of squares	df	Mean Square	F	Significant
Dependent variables: post-test conversation			R squared = 0.149 (adjusted R-square = 0.138)		
Pre-test_conversation	857.002	1	857.002	26.556	0.001[**]
Internet	65.017	1	65.017	2.015	0.158
Error	4905.238	152	32.271		
Total	10186.000	155			

*: $p < 0.05$，**: $p < 0.001$

IV. Conclusion

In this study the experiment 1 attempts to explore the effectiveness of learning into the curriculum of the e-smart pen, and experimental result from the experiment 1 is that:

(1) The course of the import of e-smart pen will certainly help enhance the learning effect, the students' learning abilities showed positive learning outcomes.

(2) Whether the high score group or the low score group in the twice of vocabulary and conversation Attainment Tests, the two groups were compared test scores showed a positive effect. When in the experiment, the high score group grades although no statistically significant differences, but the two groups carried out the tests. The vocabulary average score of treatment group is 96.5. The vocabulary average score of control group is 91.73, The results showed the average scores of both groups improved. The high score group treatment group have a conversation average score of 94.17 points, the control group average score 97.36, high scores in both groups, no significant differences in the statistical, possible reasons is: 1). The high score students with strong learning willingness are more likely to take the initiative to learn. 2). They have the ambition to achieve their goals, easily an interest in things around, will take the initiative to gather relevant information relatively their best to achieve the pre-set target. Therefore, regardless of the "e-smart pen" presence or absence of aid could render positive learning outcomes. Relative to the low-scoring group, whether the vocabulary or the conversation statistically reached significant difference in the average scores of the treatment group were significantly greater than the average scores of the control group, proves "e-smart pen learning efficacy in low presents a great role, and the low score group effect greater than the high score group effect represents the integration into the e-smart pen courses teaching methods to achieve the expected goals to improve learning outcomes. Analysis of possible causes: in low score group they general are lack of willingness and their learning are weak, the majority of which type of inspiring learning, the course import e-smart pen timely learning context can induce their motivation to learn.

The results of experimentⅡ shows that 1) the Japanese vocabulary and conversation overall performance can enhance a teaching tool through e-smart pen, e-smart pen instant Tap effective link "stimulus - response" through information processing model to produce language chain reaction, so it can effectively enhance the Japanese Language Proficiency. 2) Internet can enhance the vocabulary ability, but the conversation score cannot achieve a significant difference, whether the possible reasons for the amount of internet time in contact with students, or restrictions of syllable recognition links, or pages interesting, that can be further explored.

Overall, the technology-mediation into teaching, whether it is e-smart pen teaching or internet teaching are to enhance Japanese learning achievement, and regardless of the high score group or the low-scoring group in the test scores of vocabulary and conversation twice showed a positive effect. Although the two groups of high scores statistically is not a significant difference, but the results are positive growth, reached statistical significant difference relative to the low-scoring group vocabulary or conversation, "e-smart pen" learning efficacy in the low-scoring group presents a great effect, the problem of this study are supported.

It's displayed that under the technology-mediation, learners can not only complete the learning activities, but also obtain better learning effects. Particularly, in the "usefulness" of the cognitive aspects of e-smart pen, and internet information systems can strengthen the performance of the Japanese learning achievement.

V. References

[1] Yu, Fu-yun（2003）. *Mode with the use of the Internet learning strategies.* March 3, 2007, retrieved from http://edtech.ntu.edu.tw/epaper/

[2] Chang, S. H. (2009a). *The Application of Technology Mediated Learning's Teaching and Strategy on the Junior High School History Subject. e-CASE* 2009 Singapore (January 8-10, 2009).

[3] Chang, S. H. (2009b, January). *Exploration of Modern Instructional Technology and Reformation from the Perspectives of E-Learning.* Paper presented at the e-CASE 2009 Singapore (January 8-10, 2009).

[4] McCombs, B. L., and Whisler, J. S. (Eds) (1997). *The learner-centered classroom and school.* San Francisco: Jossey-Bass.

[5] Tsai, Y.-C.（2006）. *Preliminary Study of digital learning teaching strategies.* March 2, 2007, retrieved from http://yang.nhlue.edu.tw/tanet2006/N.htm

[6] Alavi, M., & Leidner, D. E. (2001).Research Commentary: Technology-mediated Learning – A Call for Greater Depth and Breadth of Research. *Information Systems Researh, 12*(1), 1-10.

[7] Alavi, M., Wheeler, B. C., & Valacich, J. S. (1995). Using IT to Reengineer Business Education: An Exporatory Investigation of Collaborative Tele-learning. *MIS Quarterly, 19*(3), 293-313.

[8] Alavi, M. (1994).Computer-Mediated Collaborative Learning: An Empirical Evaluation MIS Quarterly(1 8:2), June 1994, 159-174.

[9] Marki, R. H., Marki, W. S., Patterson, M., & Whittaker, P. D. (2000). Evaluation of a Web-based Introductory Psychology Course: I. Learing and Satisfaction in On-line Versus Lecture Course, Behavior Research Methods. *Instruments and Computers, 32*, 230-239.

[10]Chen, Y.-P. (2004). *Decision rules dynamically constructed from log files of the learning process of the original adaptive learning.* Thesis, Institute of Information Management, National Sun Yat-sen University, Unpublished, Kaohsiung.

[11]Zhang, D., Pan, G.-W. and Peng, L. D.（2007）. *Analysis of self-initiative to learn from the evaluation perspective,* Leshan Teachers College Paper, 20(10), 118-121.

[12]Shih, H. C., Feng, D. P. and Han, C. T. (2010). *Incorporate digital technology to examine the effect of learning Japanese language-by using e-learning pen.* The 2010 International Conference on e-Commerce, e-Administration, e-Society, e-Education, and e-Technology: Macao.