

The Development of Online Lessons in Integration Model

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Abstract—The objectives of this research were to develop and find the efficiency of integrated online lessons by investigating the usage of online lessons, the relationship between learners' background knowledge, and the achievement after learning with online lessons. The sample group in this study consisted of 97 students randomly selected from 121 students registering in 1/2012 at Trimitwittayaram Learning Center. The sample technique employed stratified sample technique of 4 groups according to their proficiency, i.e. high, moderate, low, and non-knowledge. The research instrument included online lessons in integration model on the topic of Java Programming, test after each lesson, the achievement test at the end of the course, and the questionnaires to find learners' satisfaction. The results showed that the efficiency of online lessons was 90.20/89.18 with the achievement of after learning with the lessons higher than that before the lessons at the statistically significant level of 0.05. Moreover, the background knowledge of the learners on the programming showed the positive relationship with the achievement learning at the statistically significant level at 0.05. Learners with high background knowledge employed less exercises and samples than those with lower background knowledge. While learners with different background in the group of moderate and low did not show the significant difference in employing samples and exercises.

Keywords—Integration model, Online lessons.

I. INTRODUCTION

At the present, most educational institutes face a similar problem which is too excessive number of students per teacher resulting in low learning achievement especially the subjects with practical requirement. This problem of excessive number of students in class makes it difficult for teacher to explain and take care of students. The difference in background knowledge makes students achieve lower scores and get bore with the class.

Several researchers and psychologists such as Joyce, Bruce R., Weil, Marsha, Bloom, S. Benjamin, Hergenbahn, B. R., Olson, M. H., Lundin, W. Robert, and Tisana Kamanee conducted researches and presented several theories about teaching and learning management which could be concluded as follows: [1]-[5]

Efficiency teaching will not make learners uneasy or fell that they are forced to learn. Good teaching should give freedom to learners in choosing their own lessons and teaching technique suitable to their background knowledge. With the systematic teaching, learners know their own requirements and needs and their own difference. So, they can choose the

proper lesson type for them to get proper knowledge and skill. The learning method that can reflect students' needs is the integration model because this model aims at developing learners in every factor, i.e. knowledge, practical skill, and good attitude to learning. A good lesson should be systematic starting from objective defining, content, clear steps of practice, with extra facilitating for learners who need help. The content should guide learners on analytical skill and give chances for communication with other learners in the form of group learning. Psychological aspect should be added, for example, compliments to the learner's success for their motivation. Five steps of learning lesson are:

- 1st Step:** Introduction: This step consists of lesson objectives relating to the content and the background knowledge of the learners. This part should indicate learners about the learning process and their responsibility.
- 2nd Step:** Content presentation: This step presents the content, information or clear concept with suitable samples to make learners understand easily and can conclude the definition of each concept. There should be a step to evaluate learners' understanding. If they do not understand as mentioned in the objectives, there should be a remedial lesson before going to the next lessons.
- 3rd Step:** Structured practice: This step guides learners how to practice with teacher as a facilitator to suggest any mistake. The teacher should also give feedback and provide motivation to develop learners.
- 4th Step:** Guided practice: This step encourages learners to work on their own while the teacher is taking care aside to observe learners' competency and giving feedback or suggestion to them. Learners should be able to work by themselves correctly at 85-90% before stepping to the next parts.
- 5th Step:** Independent practice: When the learners are competent to work on their own, they can practice independently without a teacher's guidance.

Though there have been several researches on online lesson development, but very few researches mention about integration model. So, the researcher had an idea to develop integrated online lessons based on learner center, so, they can process the lesson by themselves, choose the topics, exercises, repeated parts, or communication with other learners. The integrated online lessons should combine systematic content with clear objective and the employment of psychological principles to motivate learners. Since the online lessons helps to reduce teachers' work, teacher should have free time to pay attention to students who have low grades. Moreover, the online lessons are suitable for poor learners or learners who

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are in the remote areas to learn by themselves which is lifelong education.

II. OBJECTIVE

There are five objectives of this research:

- Objective 1:** To develop online lessons in integration model.
- Objective 2:** To compare the learning achievement of learners before and after learning with the developed online lessons.
- Objective 3:** To investigate the learning styles of learners who learn with online lessons.
- Objective 4:** To study the relationship between the background knowledge of learners and their learning achievement.
- Objective 5:** To study the learners' satisfaction on the developed online lessons.

III. RESEARCH PROCEDURE

This research has been designed as a one group pretest posttest semi-experimental research with the steps as follows:

A. Research Tool Preparation

Tool 1: The online lessons in the integration model on the topic of Java Programming consist of 12 lessons with exercises at the end of each lesson. Each lesson consists of 5 steps: 1) introduction 2) content presentation 3) structure practice 4) guided practice and 5) independent practice. The lessons were validated by 3 specialists on the content validity, index of congruency (IOC), and were trial with the 30 students to find reliability analyzed by KR-20.

Tool 2: The achievement test and the test after each lesson were in the form of 4 multiple choices with 200 items and 120 items respectively. The lessons were validated by 3 specialists on the content validity, index of congruency (IOC), and were trial with the 30 students to find difficulty and discrimination values and revise according to the specialists' suggestions.

Tool 3: Questionnaires to find learners' satisfaction in the form of 5 rating scales were validated by 3 specialists and trial with 30 students to find reliability, alpha coefficient of Cronbach.

B. Preparing Research Target Group

The information of the registration of 121 students was analyzed for the stratified random sampling to divide students into 4 groups. The group who never learns programming subject, the group who has learned programming subject and get low grade (lower than 1.34), the group who has learned programming subject and get medium grade (1.34-2.67), and the group who has learned programming subject and get high grade (higher than 2.67). They were selected by simple random sampling from each group to get the sample of 97 students who were explained about the research procedure.

C. Data Collection

Before learning with the online lessons, the samples were

asked to do the pretest to get their knowledge ability. During the lessons, the learners could choose the topic and do the exercise by themselves. The exercise scores of each student were collected and at the end of the whole lesson the learners were asked to do the achievement test and complete the satisfied questionnaires.

D. Data Analysis

There are five steps in data analysis :

- 1st Step:** Check the efficiency of the online lessons by comparing the average exercise score and the average achievement score of the learners.
- 2nd Step:** Compare the achievement between before and after learning with the online lessons by using basic statistics such as mean, standard deviation, etc. The hypothesis was tested using paired samples t-test.
- 3rd Step:** Compare the difference of Samples and Exercises Usage between learners' background knowledge by using mean, SD, one-way ANOVA by Scheffe, etc.
- 4th Step:** Compare the relationship between learners' background knowledge and their learning achievement using mean, SD, and Pearson Product Moment Correlation.
- 5th Step:** Find the learners' satisfaction using mean and SD.

IV. RESULTS OF THE STUDY

The results of the study can be divided into 5 topics.

A. Efficiency of Online Lessons

The learners gained the average exercise score at 90.20% and the average achievement score at 89.18%, so, the efficiency of the integrated online lessons was 90.20/89.18.

B. Comparison of Learning Achievement

As can be seen in Table I, The comparison of learning achievement before and after with online lessons revealed that the average achievement before learning was 43.32 with the SD = 18.69 while the average achievement score after learning with the online lessons was 89.18 with the SD = 6.88.

TABLE I
 PAIRED SAMPLES STATISTICS

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	43.32	97	18.686	1.897
	POSTTEST	89.18	97	6.878	.698

The hypothesis can be written as:

$H_0: \mu_1 = \mu_2$ There is no difference between pretest and posttest.

$H_1: \mu_1 \neq \mu_2$ There is significant difference between pretest and posttest.

As can be seen in Table II, Paired sample t-test of the achievement score before and after learning with the online lessons with SPSS Program, P value = .000 less than α 0.05; so, reject the H_0 hypothesis.

TABLE II
 PAIRED SAMPLES TEST

Paired Differences	t	df	Sig.(2-tailed)	95% Confidence Interval of the Difference				
				Lower	Upper			
				Std. Deviation	Std. Error Mean			
Pair 1 PRETEST- POSTTES T	- 45.86	17.126	1.739	-49.31	-42.40	-26.370	96	.000

C. Samples and Exercises Usage

The result showed that learners with different background knowledge on the program used samples and exercises in the online lessons differently as can be shown in Tables III-V.

TABLE III
 SAMPLES AND EXERCISES IN THE ONLINE LESSONS USED BY LEARNERS WITH DIFFERENT BACKGROUND KNOWLEDGE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
Samples	1	17	2.0667	.34400	.08343	1.8898	2.2435	2.87	1.67
	2	8	2.2500	.38832	.13729	1.9254	2.5746	2.80	1.73
	3	49	2.0054	.26382	.03769	1.9297	2.0812	2.80	1.60
	4	23	1.7507	.18556	.03869	1.6705	1.8310	2.13	1.40
	Total	97	1.9759	.30614	.03108	1.9142	2.0376	2.87	1.40
Exercises	1	17	2.0118	.40636	.09856	1.8028	2.2207	2.80	1.40
	2	8	2.0750	.24543	.08677	1.8698	2.2802	2.47	1.73
	3	49	1.9388	.26557	.03794	1.8625	2.0151	2.80	1.53
	4	23	1.7420	.17900	.03732	1.6646	1.8194	2.07	1.40
	Total	97	1.9162	.29286	.02974	1.8571	1.9752	2.80	1.40
Samples + Exercises	1	17	4.0784	.71423	.17323	3.7112	4.4457	5.67	3.33
	2	8	4.3250	.54794	.19373	3.8669	4.7831	5.07	3.47
Exercises	3	49	3.9442	.48138	.06877	3.8059	4.0825	5.60	3.27
	4	23	3.4928	.23332	.04865	3.3919	3.5937	3.93	3.00
Total	97	3.8921	.54462	.05530	3.7823	4.0019	5.67	3.00	

TABLE IV
 ONE-WAY ANOVA STATISTICS

		Sum of Squares	df	Mean Square	F	Sig.
Samples	Between Groups	1.950	3	.650	8.578	.000
	Within Groups	7.047	93	.076		
	Total	8.997	96			
Exercises	Between Groups	1.080	3	.360	4.679	.004
	Within Groups	7.154	93	.077		
	Total	8.234	96			
Samples + Exercises	Between Groups	5.891	3	1.964	8.085	.000
	Within Groups	22.585	93	.243		
Exercises	Total	28.475	96			

TABLE V
THE COMPARISON OF PAIRED DIFFERENCE BY SCHEFFE

Dependent Variable	background knowledge		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
	(I)	(J)				Lower Bound	Upper Bound
	Samples	1				2	-.1833
		3	.0612	.07748	.891	-.1594	.2819
		4	.3159(*)	.08805	.007	.0652	.5666
	2	1	.1833	.11802	.495	-.1527	.5194
		3	.2446	.10497	.151	-.0543	.5434
		4	.4993(*)	.11299	.000	.1776	.8210
	3	1	-.0612	.07748	.891	-.2819	.1594
		2	-.2446	.10497	.151	-.5434	.0543
		4	.2547(*)	.06958	.006	.0566	.4528
	4	1	-.3159(*)	.08805	.007	-.5666	-.0652
		2	-.4993(*)	.11299	.000	-.8210	-.1776
		3	-.2547(*)	.06958	.006	-.4528	-.0566
Exercises	1	2	-.0632	.11891	.963	-.4018	.2754
		3	.0730	.07807	.832	-.1493	.2953
		4	.2697(*)	.08871	.031	.0171	.5223
	2	1	.0632	.11891	.963	-.2754	.4018
		3	.1362	.10576	.647	-.1649	.4374
		4	.3330(*)	.11384	.042	.0088	.6571
	3	1	-.0730	.07807	.832	-.2953	.1493
		2	-.1362	.10576	.647	-.4374	.1649
		4	.1967	.07010	.055	-.0029	.3964
	4	1	-.2697(*)	.08871	.031	-.5223	-.0171
		2	-.3330(*)	.11384	.042	-.6571	-.0088
		3	-.1967	.07010	.055	-.3964	.0029
Samples + Exercises	1	2	-.2466	.21128	.715	-.8482	.3550
		3	.1342	.13871	.817	-.2608	.5292
		4	.5857(*)	.15762	.005	.1369	1.0345
	2	1	.2466	.21128	.715	-.3550	.8482
		3	.3808	.18791	.257	-.1543	.9158
		4	.8322(*)	.20227	.001	.2563	1.4082
	3	1	-.1342	.13871	.817	-.5292	.2608
		2	-.3808	.18791	.257	-.9158	.1543
		4	.4515(*)	.12456	.006	.0968	.8061
	4	1	-.5857(*)	.15762	.005	-1.0345	-.1369
		2	-.8322(*)	.20227	.001	-1.4082	-.2563
		3	-.4515(*)	.12456	.006	-.8061	-.0968

* The mean difference is significant at the .05 level.

D. Background Knowledge Level and Learning Achievement

The relationship between learners' background knowledge level and the learning achievement is presented in Table VI.

E. Learners' Satisfaction

Learners' satisfaction on the online lessons is presented in Table VII.

TABLE VI
PEARSON PRODUCT MOMENT CORRELATION

		background knowledge	POSTTEST
background knowledge	Pearson Correlation	1	.327(**)
	Sig. (2-tailed)	.	.001
	N	97	97
POSTTEST	Pearson Correlation	.327(**)	1
	Sig. (2-tailed)	.001	.
	N	97	97

** Correlation is significant at the 0.01 level (2-tailed).

TABLE VII
LEARNERS' SATISFACTION ON THE ONLINE LESSONS

Evaluation	Mean	SD	Level of satisfaction
1. Overall characteristics of online lessons	3.91	0.72	High
1.1 Letter font	4.12	0.78	High
1.2 Letter size	3.98	0.60	High
1.3 Color of the letter	3.68	0.66	High
1.4 Color of the background	3.85	0.74	High
2. General usage	4.22	0.75	High
2.1 Convenience in accessing the lessons	4.64	0.68	Highest
2.2 Lesson response speed	3.96	0.65	High
2.3 Communication through chat board	4.15	0.78	High
2.4 Email communication	4.11	0.78	High
3. Learning process	4.19	0.74	High
3.1 Clear objectives of each lesson	4.18	0.60	High
3.2 The content of each lesson	3.99	0.62	High
3.3 Clear content presented in each lesson	4.00	0.78	High
3.4 Format of the response and help	4.24	0.79	High
3.5 Interesting lesson process	4.14	0.78	High
3.6 Format and practice steps	4.58	0.69	Highest
4. Test	3.93	0.66	High
4.1 Clear questions and clear multiple choices	3.72	0.76	High
4.2 Number of testing items	3.95	0.65	High
4.3 Number of achievement test	3.94	0.65	High
4.4 Testing duration of each exercise	3.93	0.64	High
4.5 Duration of the achievement test	3.64	0.66	High
4.6 IOC of the test questions	4.16	0.78	High
4.7 Report format	4.15	0.78	High

V. CONCLUSION AND DISCUSSION

The efficiency of online integrated lessons is high at 90.20/89.18 showing that the developed online lessons can help learners understand the content effectively.

The learning achievement after learning with the developed online lessons was higher than that of before learning at 89.18 and 43.32 respectively with the different percentage of 45.86.

Learners with different background knowledge on online lessons employed the exercise in the lessons differently at the significant level of 0.05 with the conclusion as follows.

- 1) Learners with high background knowledge used less number of examples than learners with less background knowledge.
- 2) Learners with high background knowledge used less number of exercises than learners with low background knowledge and never learns.

There is a positive relationship between the level of background knowledge and the learning achievement.

Learners reported high satisfaction in both overall level and on each aspect with the 3 highest levels were 'Convenience in accessing the lessons', 'Format and practice steps', and 'Format of the response and help' with the average range at 4.64, 4.58, and 4.24 respectively while the aspects with the least satisfaction were 'Duration of the achievement test', 'Color of the letter', and 'Clear questions and clear multiple choices' at the average of 3.64, 3.68, and 3.72 respectively.

The results showed that the efficiency of the online lessons was 90.20/89.18 revealing that every learner no matter their different level of background knowledge was able to learn with the developed online lessons and could achieve their learning as target. The results supported the work by Bloom, S. Benjamin and Others, 1971 [1] mentioning viewpoint and the belief of other researches such as Carroll (1963), Atkinson

(1967), Glaser (1968) and Congreve (1965). This can be concluded that when learners pay enough attention to the lessons and with under the teacher's facilitating, the learners can achieve 95% of the content and can be further their study into the advanced level.

Learners reported high satisfaction on the online lessons in 3 levels, i.e. 'Convenience in accessing the lessons', 'Format and practice steps', and 'Format of the response and help'. This can assume that the lesson management should concentrate on providing learners with clear objectives, content, concept, and skill practice by dividing them in suitable steps. The online lessons suggest learners and give them independence to learn at their interest and suitable time making them feel relax when learning. This supports the study by Tisana Kamanee [5] and Joyce, Weil and Calhoun, 2004 [3] that though learners have different background knowledge, they are able to achieve the lesson objectives if they pay enough attention. The content and the style of instruction should be suitable to learners by dividing content into equal lesson with related objectives. Moreover, the results of the background knowledge showed that good online lessons should prepare enough exercises and examples suitable for the learners.

VI. SUGGESTIONS

The results of this research showed that there are several factors affecting the achievement of online lesson learning. Apart from the content and teaching styles, test is also playing important role in effective learning. That is to say good testing items can help learners evaluate their knowledge in each lesson with more accuracy. Learners can search for the unknown parts and understand their weakness directly. So, to make effective online lessons, teachers should add new examples exercises and test items to develop learners. Test items should be in good quality and can be kept in test bank for other achievement test.

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