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Role of Interactive Computer Programming Courseware in Facilitating Teaching and Learning Process Based on Perception of Students in Bangi, Selangor, Malaysia

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Abstract—The Computer Programming is a skill that is needed in various fields such as engineering, medicine, environment, education, mathematics, and so forth. Interactive courseware requirements have an important role in teaching and learning programming. This study was conducted to examine the role of interactive courseware to facilitate teaching and learning processes based on students' perceptions. The research instrument used a set of questionnaire which was distributed and answered by 38 students in Bangi, Selangor. The study shows that students have positive perceptions towards the use of interactive courseware. This study suggests an interactive courseware should suit the needs and requirement of students for the original goal to be achieved using the software.

Index Terms— Programming, Courseware, Teaching and Learning, Perception on Computer

1 Introduction

Establishment of Multimedia Super Corridor (MSC) had made Malaysia as one of countries that are ideal for information technology field. Information technology and communication development (ICT) in this globalization era has given impact on national education system. As one of the government machinery which received impact that is large on development ICT, Malaysian Education Ministry which acted as coordinator for the prime application, this MSC has the role to prepare students an educational environment that suitable with technological information age [9]. Internet usage and computer already become common for students now as a source of reference in completing their daily assignments.

Teaching and learning materials which are currently used for schools are combination of traditional learning material such as textbook with modern materials like electronic publications such as videotape, CD-ROM and website. The availability of this technology would enable all schools to exploit various information sources besides making the school more open and easily accessible by the relevant parties whether student or teacher at district level, state or Malaysian Education Ministry. Teaching process and learning could now implement anywhere and unlimited not only in classroom.

Trigger by the rapid development of computer world nowadays, consumer should aware and know the origin and essence behind computer where it is intended as electronic device that programmed to accept data, manipulate data and produce output display. In accordance with that, a needs analysis study on the role of interactive courseware to ease the teaching and learning process and computer programming learning was conducted from students' perspectives.

2 Literature Review

According to Erman & Mohd Jan, among identified issues that are faced by students are such as students cannot describe visually the process which occurred during program implementation, student could not see alterations which occurred on every element in program during its implementation, student fail to presume the description to every line during implementation program, student sometimes don't understand English language term used in program compiler, student unable to undergo the process without the existence of program compiler and student does not have a user-friendly compiler [6].

Based on a several existing literature review, it is found that students' perception on courseware is high. In study carried out by Norazah and Chai find out that form four secondary student students perception on WebQuest (apply hypermedia elements such as animation, sound, graphic, hypertext, and color that make presentation system attractive) that was developed is high [4]. Many related work shows the important of good presentation and creativity teaching in courseware would gain attention from the students [1][2][8][10].

3 Objective

Research done is based on survey which is aim to collect information on students perception on interactive courseware role in easing the programming learning and teaching process in Bangi area. Therefore, researcher chooses to use questionnaire instrument to gauge students' perception involved.

Items used to measure this efficacy level modified from set of questionnaire used by Salina [5].

4 METHODOLOGY

Research Design: The study was conducted by using the survey method.

Population and Sample: The population of this study comprises a group of students who had taken computer programming related subject in Malaysian Secondary school. As researcher had difficulty of getting respondents because insufficient cooperation, thus, population for the study involve 38 respondents who randomly selected from two schools.

Location: The study conducted at two secondary schools in Bangi, Selangor, Malaysia.

Instrument: Research carried is a case study using interview as tool to collect data and information. The questionnaire use instrument which contains 25 items adapted from study by Salina [5]. This instrument fall into four parts, namely part A (demographic profiles), part B (Student's perception on programming learning method used current method), part C (Student's perception on programming learning use courseware) and part D (Courseware features is wanted in programming learning). Data gathered was analyzed by researcher itself.

Data Collection: The data were collected from the samples using the evaluation form which was distributed to the samples during visits to the schools.

Data Analysis Procedure: The survey data were analyzed using the Statistical Packages for the Social Sciences (SPSS) version 13.0

5 DATA ANALYSIS

This study involved 38 respondents that consists students who take programming subject and represent two unit schools. Research sample comprise of 13 male students (34.2%) and 25 female students (65.8%). From race aspect, Malay respondents are 30 persons (78.9%), eight Indian respondents (21.1%). Majority of respondents which is 38 persons have computer knowledge (100%). As many as 36 students (94.7%) students on the other hand have programming basic knowledge and remainder two students (5.3%) has no basis programming. Overall, it is found that respondents have interest to learn programming.

Descriptive statistics analysis in Table 4.3 showed mean distribution of students' perception gathered from respondents. Result of analysis are categorized into three main categories namely students perception on programming learning using existing method; students perception on programming learning using specific courseware; and specific courseware features that is required in programming learning. Results showed that overall students' perception on interactive courseware is high. This based on points achieved to all three categories was high. For first category decision analysis show students perception level on programming learning method used existing method was at high level (M = 4.17, SD = 0.71) based on five scale point used. For students perception on programming learning using courseware also showed high point (M = 4.29, SD = 0.34). In fact, in category of courseware features required in programming learning, point achieved was very high (M = 4.75, SD = 0.13).

Table 4.3 Student perception on interactive courseware

	M	*SD*
Student's perception on programming learning method used current method	4.17	0.71
Student's perception on programming learning use courseware	4.29	0.34
Courseware features is wanted in programming learning	4.75	0.13

For students perception on programming learning using existing method, there are eight item analysed. Students answered every items by giving value between 1 to 5 points. Result analysed on feedback of almost all items in this part achieve high points which namely exceeding four points. Only two items obtained score less than four points.

Based on analysis, item note and instructional material prepared by teacher / teaching staff achieved highest score (M=4.68 ,SD=0.63); and item programming sample given by teacher / teaching staff also achieved highest score (M=4.68 ,SD=0.43). Followed by item following class to understand the programming concept (M=4.53 ,SD=0.48), item learning session more easy to go through classes combination and laboratory session (M=4.47 ,SD=0.66), item sufficient laboratory facility (M=4.37 ,SD=1.09), and item reference material is in English language (M=4.11 ,SD=0.81) which showed respectively high scores.

While item doing written practice, coding and compiling programme during hands on activities showed score that is relatively high (M=3.95 ,SD=0.51). Item reference material to learn programming is limited recorded lowest score (M=2.53;SD=1.58)

Table 4.4 : Students perception on programming learning using existing method

Item	M	SD
Follow class to understand the programming concept	4.53	0.48
Do written practice, coding and compiling programme during hands on activities	3.95	0.51
Learning session more easy to go through classes combination and laboratory session	4.47	0.66
Note, instructional material prepared by teacher / teaching staff	4.68	0.63
Programming sample given by teacher / teaching staff	4.68	0.43
Reference material to learn programming is	2.53	1.58

limited		
Reference material is in English language	4.11	0.81
Sufficient laboratory facility	4.37	1.09

For part of students' perception on programming learning use courseware, there are six items assessed and analysed. From all six items, only one item obtained point score that less than four. Item learning without time constraint scored point that is relatively high (M=3.74 ,SD=0.76). Item internet usage for note search / additional information get highest points score in this section which is (M=4.63 ,SD=0.76). This followed by item courseware generate creative thinking (M=4.58 ,SD=0.43), item courseware enhance interest on programming learning (M=4.42 ,SD=0.66), item courseware increase motivation and students confidence (M=4.32 ,SD=0.50) and item self-learning by using courseware (M=4.05 ,SD=0.77). This showed overall students perception on programming learning using courseware is high.

Table 4.5 : Students perception on programming learning using specific courseware

Item	M	SD
Courseware enhance interest on programming learning	4.42	0.66
Internet usage for note search / additional information	4.63	0.76
Own learning by using courseware	4.05	0.77
Learning without time constraint	3.74	0.76
Courseware increase students' motivation and confidence	4.32	0.50
Courseware generate creative thinking	4.58	0.43

Based on analysis of items courseware features required in programming learning showed points that are very high compared to items in other parts. All item in this section obtained points which exceeded 4.50 and this showed that students acceptance distribution rate on this items are very good.

Item user-friendly, attractive graphic and suitable practice questions recorded highest score (M=4.84 ,SD=0.44). This followed by item music usage and sound effect (M=4.79 ,SD=0.48). While interactive and informative item had lowest eye score in this section however it still comparatively high (M=4.58 ,SD=0.48)

Table 4.6 : Characteristics of specific courseware required in programming learning

Item	M	SD
Interactive	4.58	0.48
Informative	4.58	0.48
User friendly	4.84	0.37
Graphic that is attractive	4.84	0.44
Music usage and sound effect	4.79	0.48
Training questions that is suitable	4.84	0.44

6 Discussion

Based on findings, it showed that students acceptance rate on interactive courseware is high. This leaned on results analysis on all three main parts of items that asked to students. Point which exceeded 4.00 of each part showed that interactive courseware was welcomed among students. This good acceptance giving clear picture to researcher on importance and role of interactive courseware which really given impact to student needs.

When discussing each item in each part, it was closely related to needs or requirements translated by students on marking given. Each item has special significance which showed what their needs are.

For students perception part on programming learning using specific courseware showed high points (M = 4.29, SD = 0.34). In this section, item which obtains highest points score was item note and instructional material prepared by teacher / teaching staff; and item program sample given by teacher / teaching staff. This showed that in daily learning, students are given note or manual by their teacher. Their teachers need to prepare notes for that. With the use of interactive courseware, at least it can reduce student dependence on note or material prepared solely by teacher. Courseware that is complete would minimize dependence.

Student on the other hand showed high interest with this subject. This could be seen from analysis of the result on students' interest which showed high point. This proves that student undeniably have inducement and motivation to learn this subject. Use of courseware is seen as able to give effective effect if this factor taken into consideration. Students also think that learning session is easier through class combination and laboratory session. Therefore, this should be given attention naturally by teachers to make this combination accomplished in their class learning.

Result also indicated that sufficient laboratory facility actually gives implication on interest and their pleasure to learn this programming subject. Facility that is limited would be inhibiting teacher effort to attract students interest and consequently will make uncomfortable situation in class.

Most reference material is in English language. The shortage of Malay language reference actually gives mixed implication, it depend on the acceptance and language ability of the student itself. However, attention should be given by increasing the total number of Malay language references so that students that have problem mastering English does not impact by the weaknesses exist.

Generally, students are quite problematic with programming codes and how to use in completing respective assignment. This proves by lower score recorded compared to other items. Therefore, interactive courseware role seen as has big potential in helping students in this difficulty. Interactive learning mechanism which helps every student's works needs to be pro-

vided.

Result also clarified that reference material not limited in amount. This found by very lowest in assessment of particular item. Furthermore, internet facility promises information exploration opportunity that is more and wider. By that, likewise shows the attitude of student in obtaining reference materials other than material prepared by teachers.

Students' perception on programming learning using specific courseware is also high. Based on analysis, this part also got high point. Specific courseware seen to have momentum that is good in helping students to assist programming learning.
Students are now getting wise in getting material, note and additional information. They seen increasingly adapt in using internet technologies to be doing search on these substances. This development give confidence that student getting independent in effort to get certain material that needed by them in learning. Based on analysis carried out, it also showed interactive courseware also able to generate student creative thinking by adding their interest on this subject. Student also agreed that use of interactive courseware able to enhance their motivation in learning. With the use of interactive courseware, students showed commitment on self-learning by the assistance of interactive courseware.

Based on findings on courseware features that are wanted in programming learning, it showed point that is very high compared to other items in other parts. Student give score that is sufficiently high per items in this section. This is need stated by the student on interactive courseware.

Generally students agree with the user-friendly elements in interactive courseware. Other than interactive, graphic element that attractive is given attention by students in choosing or determines courseware that fit with their need. Courseware also must have practice questions that are suitable to enable them implement self-test according to their respective level.

Students also give priority on music usage and special sound effect in courseware. This could be that they like courseware that has sounds and able encourage their interest to use it. Apart from that, courseware also should own interactive and informative features. This based on assessment from findings study carried out on this item. Courseware should take into account factors preferred by students.

7 IMPLICATION

Result obtained through this research give direct and indirect implication not only to national education system. Interactive courseware viewed as having very big impact based on analysis carried out this duration of the research. It is undeniable that students are very keen with this use of interactive courseware in assisting them to increase their comprehension in learning programming.

As interactive courseware developers, this research results seen as a platform for them to review needs of the students so that it congruent with their acceptance level. Interactive courseware construction that not incompatible with needs and wants of users will would be inhibiting this pure effort in help them to enhance interest and understanding. Furthermore, there precedent studies which showed that this programming learning is complex and need thinking force that are relatively high [3][7].

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