



**IMPLEMENTATION OF CONTEXTUAL  
SYSTEM IN MALAYSIAN FIRST YEAR  
MATHEMATICS COURSE**

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# IMPLEMENTATION OF CONTEXTUAL SYSTEM IN MALAYSIAN FIRST YEAR MATHEMATICS COURSE

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### *Abstract*

Many higher learning institutions in Malaysia are adopting several methods of teaching and learning. Students-centered learning is seemed to be the focus. In the Mathematics Department in Universiti Tun Hussein Onn Malaysia, contextual teaching and learning (CTL) system is adopted. Contextual teaching and learning (CTL) is a system of instruction that allow students to find the meaning in their lesson. Then they connect the new lesson to the real world. This study examined the implementation of contextual system in the teaching and learning mathematics. A survey was used to collect the perceptions of the first year technical education students. The data was analyzed to obtain the mean, and standard deviation. Research finding showed that students agreed that the eight components in the contextual system are being implemented in the teaching and learning mathematics. However, they agreed that the teaching and learning is also focusing on the manipulation data. In the test and exams, a lot of imaginative questions are still used. Thus, this showed that the last component of the system, which is authentic assessment, is not properly implemented.

### **Introduction**

The challenge in mathematics education is finding the best way to teach mathematics. When students learn the reasoning and proving in mathematics, they will be proficient in mathematics. Students must know mathematics concepts before they can apply it. Symbolism and logic is the key to both the learning of mathematics and its effective application to problem situations. Above all, the use of appropriate language is the key in making mathematics intelligible. Actually, mathematics is a language. Proficiency in this language can be acquired only by long and carefully supervised experience in using it in situations involving argument and proof. Mathematics is essentially a structured hierarchy of proposition forged by logic on a postulation base.

Many higher learning institutions in Malaysia are adopting several methods of teaching and learning. Students-centered learning is seemed to be the focus. In the Mathematics Department in Universiti Tun Hussein Onn Malaysia, contextual teaching and learning (CTL) system is adopted. In 1997, the Technical Education Department under the Ministry of Education, Malaysia, introduced the contextual approach where they got the concept from Waco, Texas, America, in the teaching and learning mathematics and additional mathematics in all Malaysian technical secondary schools. (Md. Kamaruddin, N., 2007). The students were able to understand abstract concepts through concrete experiences. A good student commented that she would still understand the concept by either method but she understood faster with the contextual approach (Md. Kamaruddin, N., Dec 2007). Students prefer this method because usually they learn mathematics very mechanistic, which is, memorizing the formula and solving problems using the formula. (Nafisah, November 2007). Not only the students are able to learn faster but the workplace and lab activities help students to develop critical thinking skills (Md. Kamaruddin, N., July 2007). Besides using concrete experiences, the use of video clips can help students know how mathematics is used in the real world. The illustration with video attracted their attention during the lesson and this approach was able to motivate them to focus on the lessons (Md. Kamaruddin, N., 2005). This method of teaching mathematics is good for technical students (Md. Kamaruddin, N., 2006). In Problem-Based Learning, the contextual concept is used as this method of learning is

built around the delivery of the real-world learning experience (Nafisah, June 2007). From the research done in Universiti Tun Hussein Onn Malaysia, students preferred to learn statistics using the contextual concept and they scored better than the group who did not use this concept (Md. Kamaruddin, N., May 2007)..

*Purpose of the Study*

Researches done previously were focusing on the use of contextual video, lab and class activities, and not on the contextual system. Thus this research was done to survey on the implementation of the contextual system in the teaching and learning mathematics.

*Conceptual Framework*

The research conceptual framework is adapted from Johnson, E. B. (2002) and is shown below:

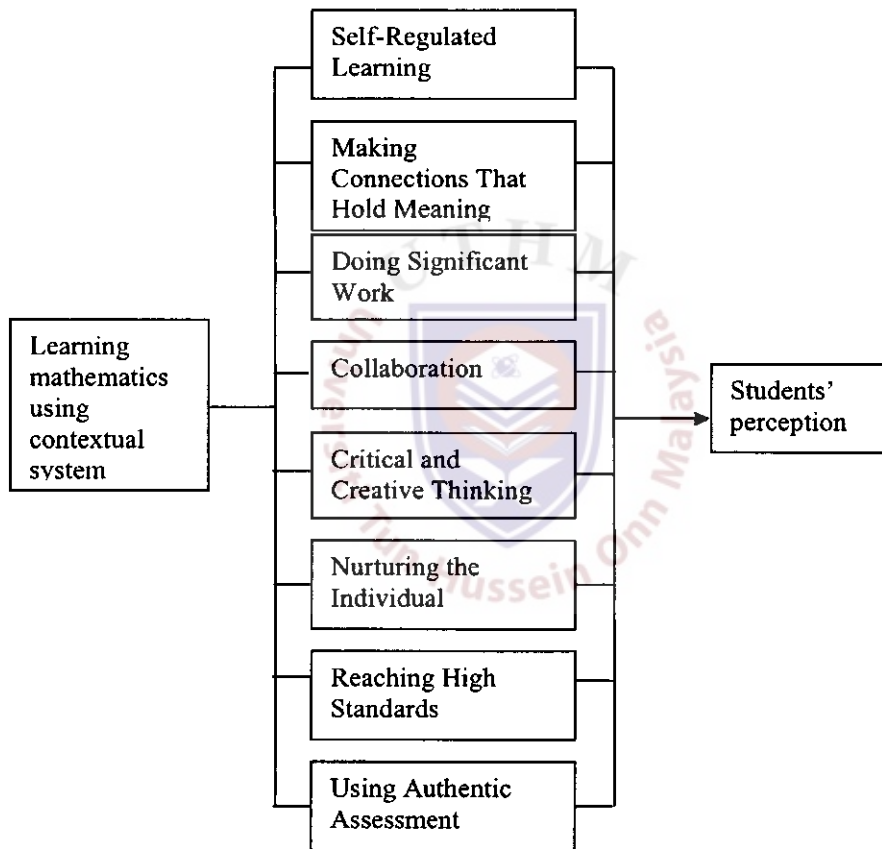


Figure 1: Conceptual Framework

**Literature Review**

There are many definitions of the contextual learning. The definition that the Technical Education Department uses is the one that was given by the Center for Occupational Research and Development (First Malaysian Tech Prep National Convention, 1997):

*The Contextual learning means learning that incorporates examples which are drawn from everyday experiences in the personal, societal and occupational life and which provide concrete hands-on applications of material to be learned.*

Contextual Approach was introduced for the students' technical and career preparation or Tech Prep by the Center for Occupational Research and Development, Texas, USA. Contextual approach is one of the Tech Prep elements According to Kolb's Experiential Learning Theory, the students learn best by thinking and doing (Kolb, 1985). In the contextual approach, the lab activities or mathematical experiments help students to study by this method. According to CORD, one of the key elements in the contextual approach is to carry out learning in workplace setting, where possible (First Malaysian Tech Prep National Convention, 1997).

It will be great if the students can relate the formulas and theories that are taught in the classroom to their everyday lives or their future jobs. Is not easy to bring students to the real life atmosphere, let say a company. Thus if we cannot bring them to the companies, we need to simulate the workplace. In the lab practical, besides making them understand the concept, the students also work in environment or group projects that simulate the workplace. In the contextual approach, students engage in problem-solving investigation that integrate skills and concept from many content areas, students works autonomously to construct their own learning, and culminate in realistic products (Berns et al, 2001). By using the lab activities or mathematical lab in the contextual approach, it helps them to understand the concept better as the concept of experiential learning explores the cyclical pattern of all learning from Experience through Reflection and Conceptualizing to Action and on further Experience (Kolb, 1985).

In the first project by the Ohio State University College of Education and Bowling Green State University, the definition of contextual teaching and learning was developed. The conception of teaching and learning that helps teachers relate subject matter content to real world situations and motivates students to make connection between knowledge and its applications to their lives as family members, citizens, and workers; and engage in the hard work that learning requires (National Conference on Teacher Quality, 2000).

### **Methodology**

This study examined the implementation of contextual system in the teaching and learning mathematics in one of the public university in Malaysia. A survey was used to collect the perceptions of the students.

#### *Subjects*

Technical education students from the Technical Education Faculty from the Universiti Tun Hussein Onn Malaysia were invited to participate in this survey. The technical students will take 4 mathematics subjects : Algebra and Calculus in their first year, Differential Equation and Statistics in their second year. Respondents were drawn from the following subject areas: civil engineering, electrical engineering, and mechanical engineering. A total of 89 questionnaires were given out to the first year technical education students. Of these, 58 (65.17 %) questionnaires were completed and returned.

#### *Instrument*

The questionnaire developed for the survey was based on the book "Contextual Teaching and Learning" written by Elaine B. Johnson and Teaching Mathematics Contextually by the Cornerstone of Tech Prep, Cord. The questionnaire consisted of ten parts. Subjects were asked to assess the contextual system in the teaching and learning mathematics, using a five-point Likert-type scale (from '5' = 'Strongly Agree' to '1' = 'Strongly disagree'). The ten main sections of the questionnaires are shown in Table 1.

**Table 1***Main Sections*

Section	Item No	Data Analysis Method
A : Background	1 – 3	Percentage
B : General	1 – 5	Score mean and std dev
C : Making Connections That Hold Meaninful	1 – 5	Score mean and std dev
D : Doing Significant Work	1 – 5	Score mean and std dev
E : Self-regulated Learning	1 – 5	Score mean and std dev
F : Colloboration	1 – 5	Score mean and std dev
G : Critical and Creative Thinking	1 – 5	Score mean and std dev
H : Nurturing the Individual	1 – 5	Score mean and std dev
I : Reaching High Standard	1 – 5	Score mean and std dev
J : Using Authentic Assesment	1 – 5	Score mean and std dev

**Results***Respondents Background*

The background of the respondents is shown in Table 2.

**Table 2***Respondents Background*

Category		No of respondents	Percent (%)
Gender	Male	23	39.7
	Female	35	60.3
Course	Civil	17	29.3
	Electrical	21	36.2
	Mechanical	25	43.1
CGPA	< 1.99	1	1.7
	2.00 – 2.49	1	1.7
	2.50 – 2.99	2	3.4
	3.00 – 3.49	44	75.9
	> 3.	10	17.3

In section B, the researchers want to survey on the general perception of the students of the implementation of the contextual system. There are 5 items in this section as shown in Table 3.

**Table 3***General*

Section B	Mean Score	Standard deviation
The teaching and learning is		
1. focusing on doing mathematics exercises	4.24	0.73
2. focusing on manipulation of data	4.10	0.58
3. focusing on memorizing the formula	3.67	0.89
4. not holistic	3.24	0.98
5. separating the thinkng and doing	3.34	1.00

In section C – J the researchers want to survey on the implementation of the contextual system in the teaching and learning mathematics. The results shown in Table 4 is the overall mean for each section.

**Table 4**  
*Contextual System*

Section	Mean Score	Standard deviation
C : Making Connections That Hold Meaningful	3.48	1.08
D : Doing Significant Work	3.31	1.02
E : Self-regulated Learning	3.58	0.96
F : Colloboration	3.76	0.97
G : Critical and Creative Thinking	3.76	0.90
H : Nurturing the Individual	3.62	0.91
I : Reaching High Standard	3.65	0.98
J : Using Authentic Assesment	3.36	1.02

In one of the item in Section J, students agreed that a lot of imaginative questions were given in the test or final with the mean of 3.55 and standard deviation 1.16.

#### Conclusion

This study set out to survey on the implementation of the contextual system in the teaching and learning mathematics. Although they agreed that the eight components in the contextual system are being implemented, a lot the questions in the test and examination is still imaginative questions. Thus, the last component in the contextual system, which is authentic assessment, is not properly implemented. Steps should be taken so as the questions that relate to the application of the topics in the real world should be asked in the teast and final examination.

#### References:

- Berns, R. G. & Erikson, P.(2001). *Contextual teaching and learning*. The Hilight Zone : Research @ Work No . 5. The National Centers for Career and Technical Education, USA.
- First Tech Prep National Convention (1997) Organized by Technical Education Department, Malaysian Ministry of Education.
- Kolb, D. A. (1985). *Experiential learning : Experience as the source of learning and development*. Englewood: Prentice Hall.
- Md Kamaruddin, N. & Md Amin, Z. (2008). *Dillema in teaching mathematics*. Seminar Kebangsaan Matematik & Masyarakat 2008. UMT, Terengganu, Malaysia.
- Md Kamaruddin, N. & Wan Ahmad, W. M. R. (Dec, 2007). *A study of the effectiveness of the contextual approach to the teaching and learning statistics in the Universiti Tun Hussein Onn Malaysia*. The 12th Asian Technology Conference in Mathematics (ATCM 2007). Taipei, Taiwan.
- Md Kamaruddin, N. & Md Amin, Z. (Nov, 2007). *A Contextual Approach to The Teaching and Learning*. *International Conference on Science and Mathematics*. SEAMEO-Recsam, Malaysia.



Md Kamaruddin, N. & Wan Ahmad, W. M. R. (July, 2007). *A contextual approach using problem-based, to teaching and learning differential equations in The Universiti Tun Hussein Malaysia*. SEAMS 2007. Yogyakarta, Indonesia.

Md Kamaruddin, N. & Wan Ahmad, W. M. R. (June, 2007). *A Contextual Approach, Using Problem-Based, to Teaching And Learning Statistics in KUiTTHO*. 4<sup>th</sup> East Asia Regional Conference on Mathematics Education (EARCOME 4). Penang, Malaysia.

Md Kamaruddin, N. & Wan Ahmad, W. M. R. (May, 2007). *A Contextual Approach to Teaching and Learning Statistics in UTHM*. International Conference On Research And Education on Mathematics (ICREM3). Kuala Lumpur, Malaysia.

Md Kamaruddin, N. & Wan Ahmad, W. M. R. (2006). *The Effectiveness of Learning Mathematics Using Contextual Approach in KUiTTHO*. 3<sup>rd</sup> International Conference on the Teaching of Mathematics at the Undergraduate Level. Istanbul, Turkey.

Md Kamaruddin, N. & Abdul Hamid, Z. (2005). *A Survey Of The Application of Multimedia in The Process of Teaching and Learning in KUiTTHO, Malaysia*. 4th International Conference on Technology In Teaching And Learning In Higher Education. Beijing, China.

National Conference on Teacher Quality (Jan, 2000). Department of Education. Washington DC., USA in January.

