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## **A STUDY OF PERCEIVED ICT LEARNING ENVIRONMENTS IN MALAYSIAN SECONDARY SCHOOLS**

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### **Abstract**

*This study seeks to investigate the extent to which the teaching and learning practices of a discrete Information and Communication Technology (ICT) subject are in accordance with the constructivist nature of ICT as perceived by Malaysian secondary school students. A survey methodology was employed such that modified items from the Constructivist Learning Environment Survey (CLES) questionnaire were adopted. It comprised five components of constructivist learning: Personal Relevance, Uncertainty of ICT, Shared Control, Critical Voice and Student Negotiation. Data were gathered from 440 participants. Findings from the present study indicate that three out of five components are sufficiently present in the ICT learning environment (Personal Relevance, Uncertainty of ICT and Student Negotiation). The other two components (Shared Control and Critical Voice), however, were not encouragingly present despite the positive intentions of the ICT curriculum.*

**Keywords :** *Learning environment, ICT, Constructivist, Secondary school students*

### **Introduction**

Realising the importance of Information and Communication Technology (ICT) in education, the Malaysian Ministry of Education (MMOE) introduced a new elective subject, "Information and Communication Technology" for secondary school students in 2001. The introduction of this subject was seen as one of the initiatives by the MMOE to help Malaysia fulfill the need for an ICT literate population. The purpose of introducing the ICT subject in Malaysian secondary schools is assumed to facilitate students to become creative members of society with some basic ICT literacy. Indeed, it is hoped that the ICT literate work force will be able to compete in the ever-changing global economy in the 21<sup>st</sup> century (Centre of Curriculum Development, 2006).

As the ICT subject places major emphases on the software applications and hardware, it is the aim of the curriculum to provide adequate level of knowledge and skills in ICT to

enable students to solve problems and make informed decisions in everyday life based on positive attitudes and noble values, and to develop concerned, dynamic and progressive individuals with an ICT culture that values knowledge and ethics towards the technological advancement of the nation.

(Centre of Curriculum Development, 2006; p.1)

With this aim, there is surely a need to move from conventional practice-recall teaching methods to methods where teachers engage students in activities that create opportunities to construct new knowledge and skills (Shelly, Cashman, Gunter & Gunter, 2004). For this reason, The Malaysian Ministry of Education strongly encourages the application of the self directed, self-accessed, self-assessed and self-paced (SeDAAP) approaches. That is, students become more active and independent learners and teachers merely act as facilitators and guides in the learning environments. This SeDAAP approach stems from the constructivist theory, which postulates that the learner goes through a process of constant adaptation to his/her surrounding environment. In other words, constructivist approaches have been reflected in the ICT curriculum and teachers are expected to apply these approaches in the teaching-learning process. Students, therefore, are expected to learn about and comprehend basic ICT concepts through student centred learning activities and negotiation. Authentic learning activities are also organized in such a way that it relates to familiar and actual problems that students face in their daily lives.

### **Purpose of Study**

The purpose of this study was to investigate the extent to which the teaching and learning practices of this new ICT subject in secondary school are in accordance with the constructivist nature of ICT as perceived by the secondary school students. The researchers used a modified version of the actual form of Constructivist Learning Environment Survey (CLES) (Taylor, Fraser and Fisher (1997) which was renamed the Constructivist Learning Environment for ICT (CLES-ICT). The specific objectives of this study were

1. To investigate the degree of personal relevance in secondary school students' studies (Personal Relevance);
2. To investigate the extent to which secondary school students view ICT as ever changing (Uncertainty of ICT);
3. To investigate whether secondary school students have shared control over their learning (Shared Control);
4. To investigate the degree to which secondary school students feel free to express concerns about their learning (Critical Voice);
5. To investigate the degree to which secondary school students are able to interact with each other to improve their understanding (Student Negotiation).

### **Methodology**

#### **Subjects and procedures**

Participants of this study were secondary school students in Malaysia. A total of completed 440 questionnaires were received from 243 female and 197 male students. They had an average of 4.90 years of computer experience (S.D.= 3.03) and their mean age was 15.99 years old (S.D.= 0.257). The majority of the students owned a personal computer (79.8%) at home.

### **Instrumentation**

Because it was the aim of the present study to assess if the teaching and learning of ICT are practiced in accordance with the constructivist perspective, the actual form of CLES was used. The items were adapted from the CLES and translated into the Malay Language with permission from Dr Peter Taylor. For CLES, Taylor proposed the following five subscales of personal relevance, uncertainty, critical voice, shared control and student negotiation which made of 25 items for CLES. The items developed in this study were based on these items. The researchers changed the term 'Science' into 'ICT'. This means that each item in CLES was modified to measure students' perceptions toward the constructivist learning environments specifically for ICT instead of science. This questionnaire was called the Constructivist Learning Environment Survey for ICT (CLES-ICT). The items were measured by a five point Likert-type scale, ranging from almost never (1), seldom (2), sometimes (3), often (4) to almost always (5). Hence the numerical responses indicate the secondary school students' perceptions about the degree or frequency that the stated practices occur or are experienced.

The definitions of the five subscales in CLES-ICT stem from the original definitions proposed by Taylor, Fraser and Fisher (1997) but minor changes were made, in particular to the subscale, uncertainty, in accordance to the Malaysian ICT syllabus. A detailed description of the five subscales is presented below:

1. Personal Relevance (extent to which secondary school students are able to relate ICT with their out of school experiences);
2. Uncertainty of ICT (extent to which opportunities are created for secondary school students to experience ICT knowledge involving human experience and values, and as evolving, non-foundational, and culturally and socially determined);
3. Critical Voice (extent to which a social climate has been established in which secondary school students feel that it is legitimate and beneficial to question the teachers' pedagogical plans and methods and to express concerns about any impediments to their learning);
4. Shared Control (extent to which secondary school students are invited to share with their teacher control of the learning environment, including the articulation of their own learning goals, design and management of their learning activities and determining and applying assessment criteria);
5. Student Negotiation (extent to which opportunities exist for secondary school students to explain and justify to other students their newly developing ideas and to listen and reflect on the viability of other students' ideas).

### **Data analysis**

#### **Internal Consistency**

The internal consistency of each scale was determined through Cronbach's alpha coefficient using the individual student as the unit of analysis. Table 1 shows that the reliability estimate for each scale ranged from .64 to .86. This suggests that all scales of CLES-ICT possess satisfactory internal consistency. It is important to highlight here that the value range of the present study, and the fact that the Uncertainty scale recorded the lowest reliability, is almost similar as those reported by Taylor et al. (1997) and Kim, Fisher and Fraser (1999).

Table 1. Internal consistency reliability

Scale	Cronbach's alpha
Personal Relevance	.79
Uncertainty	.64
Critical Voice	.76
Shared Control	.86
Student Negotiation	.73

### Students' scores on the scale

Table 2 presents the participants' means scores with the standard deviations of the five subscales. The participants scored the lowest on the shared control subscale (an average of 2.49 per item) followed by the critical voice subscale (an average of 3.02 per item). This means that the students perceive the scales of shared control and critical voice as occurring as less frequently. The extent that students are invited to share control with their teacher over the design and management of their learning activities, the determining and application of assessment criteria as well as the articulation of their own learning goals is perceived as low by the students. This is an indication that the teachers dominate the learning process more where students follow what has been planned by their teachers prior to the start of their learning activities.

The degree where students are able to question the teachers' pedagogical plans and methods as well as voice their concerns about impediments to their learning is also considered low by the students. In other words, these students were less prepared to approach their teacher about problems or obstacles that they encountered during their ICT learning process.

The mean scores for personal relevance, student negotiation and uncertainty of ICT subscales were slightly above 3.50. These were above the value of three, the mean of 1-5 Likert scale. This suggests that the personal relevance, student negotiation and uncertainty of ICT of the constructivist components measured by CLES-ICT occur quite often. The results imply that students perceive that their teachers make the effort of making the ICT subject personally relevant to them; thus, students are able to relate the subject matter to their daily lives. It could be assumed that such authentic learning environments make students understand the contents of their lesson better. That is, the authentic learning environment enabled them to relate to their own experiences and this made it possible for them to further appreciate the contents of the ICT lessons (Wong, Abu Bakar & Tang, 2006).

The results also suggest that the students perceive that opportunities exist to a certain extent for them to explain and justify to other students their newly developing ideas and to reflect on the viability of their own and their peers' ideas. Lastly, the results indicate that students also perceive that quite often, opportunities exist for them to experience ICT knowledge involving human experience and values, and as evolving, non-foundational, and culturally and socially determined. This means that students learn about the uncertainty of ICT concepts, which evolve over time from the influence of human's values, opinions and culture.

Table 2. Descriptive data of sub-scales in CLES-ICT

Scale	Number of items	Possible range	Actual range	Mean per item	S.D.
Personal Relevance	5	5-25	6-25	3.51	0.70
Uncertainty of ICT	5	5-25	5-25	3.56	0.63
Critical Voice	5	5-25	5-25	3.02	0.87
Shared Control	5	5-25	5-25	2.49	0.91
Student Negotiation	5	5-25	7-25	3.52	0.72

## Discussion and conclusion

The participating students had comparable scores for three (personal relevance, uncertainty and students negotiation) out of the five subscales. Students perceived that their ICT learning environment had elements of personal relevance embedded in the subject matter. Their ICT lessons were quite often relevant to their everyday lives. At the same time, these students felt that their teachers emphasized the concepts of ICT as being dynamic as well. Students also indicated that, quite often in their ICT lesson, they were exposed to the fact that ICT was influenced by people's values, opinions and cultures.

Apart from that, the students' responses suggested that they had opportunities to discuss, explain and talk about their learning with other students. The element of collaborative learning was somewhat evident in the ICT learning environments. It could be argued that Malaysia's education system suffers from an examination-driven curriculum like in Taiwan (Aldridge, Fraser & Taylor, 2000). This can lead to a higher level of competitiveness among students, thus allowing lesser opportunities for students to negotiate (Aldridge et al. 2000). The results of this study, however, contradicted with those from Aldridge et al. (2000) who found that Taiwanese students negotiated less compared to Australian students because of the competitive learning environments.

The two lowest mean scores attained were for shared control and critical voice, suggested that the ICT learning environment did not provide the opportunities for students to be in control during the learning process. They seldom had the chance to speak out about the way ICT lessons are managed and taught by their teachers. This finding was in congruence with those of Aldridge et al. (2000) and Puacharearn (2004) who found both these subscales had scored the lowest among the five subscales. They argued that in the Asian culture (Taiwanese and Thai), students rarely questioned their teachers' knowledge and hardly complained about the teaching methods. The researchers also stressed that it is a norm that lessons are usually bound by the syllabus and teachers must complete the contents which are then tested in the examinations. These situations mirror closely the Malaysian culture and school environment. Malaysian students are hardly given the opportunities to voice out their opinions during lessons and teachers always hurry to complete the syllabus, as examinations results are highly valued. Good examination results are seen as a passport to a better future in this country. For that reason, time constraints allow lesser opportunities for students to learn at their own pace and also over what they learn (Aldridge et al. 2000).

To conclude, the results of this study should be useful to Malaysian ICT educators and researchers, as more attention and emphasis should be given to create such learning environment that emphasizes on critical voice and shared control. It appears that these components are less dominant in learning environments where the

curriculum is more examination oriented. This phenomenon mirrors those in countries like Thailand, Korea and Taiwan where the school curricula are also exam oriented (Kim et al, 2000; Aldridge et al., 2000; Puacharearn, 2004).

At the same time, although the components of personal relevance, uncertainty towards ICT and student negotiations are more dominant in the ICT learning environment, more needs to be done to further improve the constructivist ICT learning environment in Malaysian schools. It is important to note, however, that based on the results of this study, it could be assumed that the current ICT learning environments emphasised to a certain extent the natural and constructive nature of learning (Wong et al., 2006).

### **Limitations of the study**

It is important to note that all data collected were based entirely on students' honesty and how they perceived their ICT learning environment. It also must be recognized that the participants involved were students who had taken the ICT subject as an elective in schools from the Klang Valley and had volunteered to participate in this study. Therefore, further caution must be used when generalising any findings for the entire population of students taking the subject in all Malaysian schools.

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