

## SMK TUN ABANG HAJI OPENG IT EXPERIENCE

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### ABSTRACT

*Information Technology (IT) was first introduced as an optional (elective) subject at the Sijil Pelajaran Malaysia (SPM) level by the Malaysian Ministry of Education in 1999. The implementation of the IT curriculum is based on the new paradigm shift in education towards the smart teaching and learning culture which requires the teacher to change his role from being the "sage on the stage" to being the "guide by the side" and the students practising self-directed, self-access, self-assessed and self-paced learning (The Malaysian Smart School Blueprint, 1997).*

*The intention of this paper is to give an account on the adoption of the smart approach to the teaching and learning of IT at SMK Tun Abang Haji Openg with assessment as a tool for learning, thus creating a transformed classroom environment where learning becomes dynamic, lively and brimming with interaction. It will include an account of the learning environment that prevails, students-facilitators' attitude, the system of assessment being carried out, problems and solutions and the programme outcome after four years of implementation. The paper will end with recommendations, which may be of use to those who are interested to replicate, implement fully or partially the SMK Tun Abang Haji Openg IT experience.*

### INTRODUCTION

In 1996, the Smart School became one of the seven flagship applications of the Multimedia Super Corridor (MSC) project. The term "Smart School" is generally used to categorise schools, which apply information technology (IT) to various aspects of schooling such as teaching, learning, staff training and management.

The current education system will continue in smart schools with the National Philosophy of Malaysian Education as the main component and with moral values emphasised in the smart school curriculum (Nasirun, 2000).

The Malaysian National Philosophy of Education underpins every element of the Smart School Conceptual Model:

*"Education in Malaysia is an ongoing effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God.*

*Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high levels of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the Nation at large"*

*Education in Malaysia, 1993*

The five main objectives of the Smart School Initiative are to:

- encourage all-round development of the individual covering the intellectual, physical, and spiritual domains;
- provide opportunities for the individual to develop his or her own strength and abilities
- produce a thinking workforce that is also technologically literate
- democratise education so as to provide every child with equal access to learning
- increase participation of parents, community and the public in the education process

(Telekom Smart School, 2000)

Smart Schools will lead to the full democratisation of education where learning will be self-directed, individually paced, continuous and reflective. Thus, learning will shift from being teacher-centred to student-centred, supported by a flexible and open-ended curriculum. (The Malaysian Smart School Blueprint, 1997)

Information Technology, introduced as a subject at SPM level, is taught using the smart approach though most of the schools currently offering the subject are not necessarily categorised as smart schools.

## **BACKGROUND**

### **Information Technology in Secondary Schools**

Information Technology was first introduced as an elective subject at upper secondary level (SPM) in 1999. 15 schools throughout the nation were selected to offer this subject in a pilot run. Currently, there are 174 schools offering this subject. In the year 2000, the first cohort students took the national examination. (CDC 2002)

Information Technology, as a subject, is aimed at developing individuals who

- have a comprehensive knowledge in Information Technology,
- are skilful in handling information, using appropriate techniques and devices to solve problems or issues presented to them, and
- have positive attitudes towards the impact and contributions of Information Technology to their lives and the society

(Ahmad, 2001)

Thus, the program objectives are to enable students to

- study, use and understand the system and environment related to IT
- develop knowledge of principles and processes of IT
- identify and explore needs and opportunities that use IT
- generate ideas to develop technology in relation to identified needs
- use IT effectively to communicate and solve problems

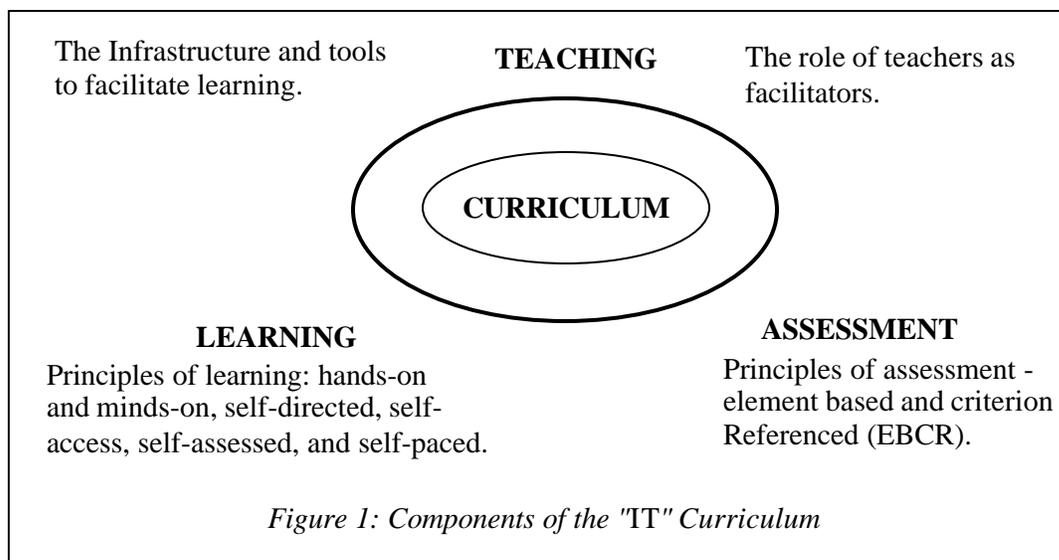
- be aware of implications on society and everyday livelihood when using IT
  - appreciate the importance and contributions of IT for societal development
- (PPK, 1999)

### The IT Curriculum

The Malaysian definition of a curriculum is guided by what is stipulated in the Education Act 1996 interpreted as the National Curriculum:

*"The National Curriculum is an educational program that includes curricular and co-curricular activities comprising of all knowledge, skills, norms, values, cultural elements and beliefs to help holistically develop students' physical, spiritual, mental and emotional potentials and to inculcate and enhance desired moral values and for the delivery of knowledge."*

The IT curriculum was formulated in the smart teaching and learning context and further supported by criterion based assessment. It is based on the new paradigm in education, which emphasises on understanding and mastering processes. In this approach, students play an active role in deciding his learning path (self-directed) and progress (self-assessed). Implementation of the IT curriculum will address issues on teaching, learning, and assessment (refer Figure 1).



The three components of the IT curriculum as in Figure 1 ensure that the curriculum objectives are achieved. They are inter-dependent and support each other. (PPK, 1999)

The IT curriculum recognises that students have different learning needs. It seeks to ensure that every student, regardless of his or her abilities and capabilities are stretched to their fullest potentials in a way that is best suited to his or her learning pace and style.

Assessment in the IT curriculum is based on criterion-referenced testing, a shift from the conventional norm-referenced testing.

In norm-referenced testing, an individual's performance is compared to the performances of a group, referred to as the "norm group". The average score is determined and each individual's score is positioned based on that score. This basically means that 50 percent of

the group do better than average and the other 50 percent, below average. (Valpar, 1999-2002)

“What can you say, for example, about an individual who scores at the 87<sup>th</sup> percentile on a math test? Nothing, until you know something about the norm group” (Valpar, 1999-2002). Different conclusions are reached if the norm group shifts from a collection of fourth graders to a group of undergraduates majoring in physics.

While norm-referenced testing ascertains the rank of students, criterion-referenced testing determine “... what test takers can do and what they know, now how they compare to others” (Anatasia, 1988).

Criterion-referenced testing is not concerned about a central measure but sets a standard of achievement to be reached and students are graded not in comparison to each other but in comparison to the standard set. When this is used everyone can achieve a perfect score. Criterion-referenced testing, unlike norm-referenced testing, uses an objective standard or achievement level. An evaluatee is required to demonstrate ability at a particular level by performing tasks at that degree of difficulty. Scores on criterion-referenced tests indicate what individuals *can* do — not *how* they have scored in relation to the scores of particular groups of persons, as in norm-referenced tests. (Valpar, 1999-2002)

Criterion-referenced testing eliminates all the confusion. Concrete criteria are established and the individual is challenged to meet them.

Assessment in the subject Information Technology is based on criterion-referenced testing where the standard of achievement is referred to as the aspect criterion (“*kriteria aspek*”).

### **Course Contents**

The scope of this subject in all IT schools in Malaysian Schools encompasses six areas (“*bidang*”):

- B01 Computer System
- B02 Application Software
- B03 Multimedia
- B04 Programming
- B05 Networking and Telecommunication
- B06 Management Information System

Each area comprises three constructs: knowledge, skills and values, also referred to as elements (Figure 2)

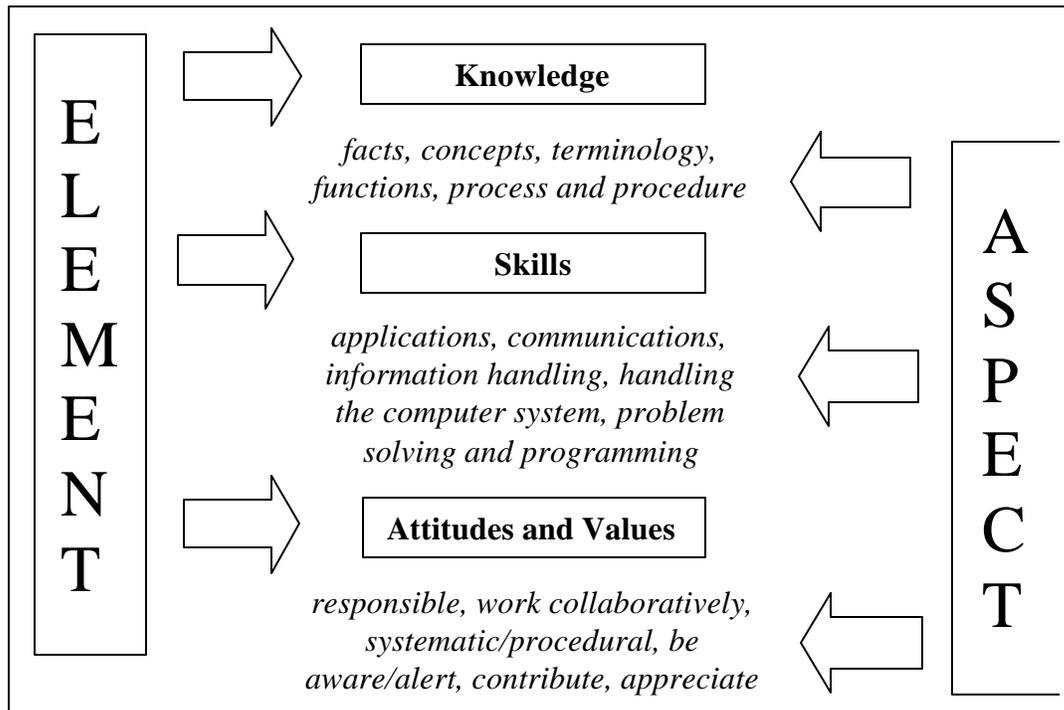


Figure 2: Elements and Aspects of the IT Curriculum

Element is the construct that is desired to be built in the student via educational intervention. Aspect is the portion of the construct that is developed in the effort to build an intended element. Parameter is the condition that should be achieved or acquired by the student in an element or aspect. (Ahmad 1999)

### Assessment for Better Learning

"Assessment is the process of accumulating information with the purpose to evaluate a product of education." (Ahmad, 2001)

For the students, assessment signifies the judgement of others regarding their work. Sound assessment should be both a barometer of how the students are progressing as well as a compass indicating future direction. (Herne 2001)

There is a need to shift from using assessment as a negative force in schools to a positive force that builds a climate of reflection about what is going on in classrooms. In order to do so, the students need to be made clear on what is to be learned, how well they are performing in relationship to the established criteria and what they need to do to improve. (Hearne, 1992)

Assessment for IT as a subject is conducted at two levels, school based and central based. At present, the central based assessment is conducted at the end of the 2 year learning period, whereas the school based assessment is conducted throughout the two year duration.

The Malaysian Examination Syndicate (LPM) have developed, with the help of a group of IT teachers, the "*Rekod Pembelajaran*" to record and keep track of individual student's assessment. There are 146 criteria to be assessed over a period of 2 years at school level and is referred to as "School Based Assessment".

Each criterion has a code for easy reference. The instrument to be used and the assessor for each criterion have been set by LPM. Instruments used include check list, discussion, essay, learning contract, log book, oral test, practical test, portfolio, project, report, scrape book, student lead conference (“*Sidang Kendalian Murid*”), and others.

IT assessment can take the form of self -assessment, peer-assessment, teacher-assessment and parent assessment.

**Self-assessment** enables students to monitor their own progress against specific objectives and evidence of their work.

**Peer-assessment** helps to improve learning and to develop social and cooperative skills.

**Teacher-assessment** recognizes progress and strengths, diagnoses difficulties and plans strategies to overcome them.

Assessment, which promotes learning, is characterised by it:

- is embedded in a view of teaching and learning of which it is an essential part;
- involves sharing learning goals with students;
- aims to help students to know and to recognise the standards they are aiming for;
- provides feedback which leads to students recognising their next steps and how to take them
- is underpinned by confidence that every student can improve;
- it involves both teacher and pupils reviewing and reflecting on assessment data

(Assessment Reform Groups, “*Beyond the Black Box*”, University of Cambridge School of Education 1999)

**Formative Assessment** is practiced as it has a powerful impact on student learning. Students are able to "self-assessed" themselves so they can move on to in order to achieve. It helps indicate the student's performance in a particular skill/knowledge hereby enabling the student to improve learning through self-evaluation. Feedback from formative assessment is focused on the task and not the student.

**Summative Assessment** is carried out to summarise achievement at a given point in time and is more structured than formative assessment. It provides teachers, students and parents with information on student progress and level of achievement.

**Scoring is as follows:**

- T** - Response given is more or better than what is stated in the criterion statement.
- A** - Response given satisfies the criteria and qualities stated in the criterion statement.
- B** - Student answers, but answer does not satisfy the criterion statement.
- O** - Student gives no answer (evidence), or answer (evidence) is not relevant to the criteria and qualities stated in the criterion statement.

The score “A” is the benchmark that every student must achieve for every criterion. Nevertheless, students are encouraged to strive for the “T” score.

## SMK TUN ABANG HAJI OPENG IT PROGRAMME

### **The Learning Environment**

Each Information Technology class is allocated 4 lessons per week with each session lasting two consecutive lessons of 40 minutes duration each. All lessons are conducted in the computer laboratory to allow free access to the computers.

The computer lab provides a conducive environment for learning, allowing IT students to practice self-paced, self-access, self-assessed, and self-directed learning. These learning strategies allow them to develop their strengths to a level of excellence and thus breed a generation of inventors and innovators.

IT students are able to access information from various sources such as books, the Internet, other references - soft or hard copies, and etc., independent of the teacher (self-access). They are able to learn at their own pace without being held back by slower students or having to deal with material beyond their capabilities (self-paced). IT students are allowed to explore topics of interest without being tied down to a rigid curriculum. Here, the teachers act as guides by the side to encourage continuous interest in learning.

The learning environment maximise each student's active rather than passive participation. IT students learn more from hands-on, interactive pursuits than from the more traditional passive approach to instruction. They are able to think creatively and critically and have a reasonable level of self-sufficiency. IT students learn to solve problems by exercising courage in making decisions and assuming responsibility for them, process and manipulate information, think critically and reflect on what they have learned as well as transfer and apply knowledge from one discipline to another and to daily life.

Learning is made enjoyable and fulfilling by creating opportunities for collaborative and independent learning. IT students are able to think, communicate, handle information and solve problems. They use the Internet and World Wide Web (WWW) as well as other resources to conduct research on their own initiative instead of waiting for the teacher to provide the learning material. The "spoon feeding" culture, which is the total reliance on a single source of information is no more applicable nor suitable as information flows from various sources made available to these students.

Assessment of the student learning is ongoing and seeks to motivate more learning. Students who have yet to achieve the benchmark ("A" score) are encouraged to keep trying and those that have achieved the benchmark can always try to work for the "T" score. Learning occurs not only when a student is being assessed but also when a student assesses another.

Every IT student has the following documents,

- "*Rekod Pembelajaran*", to record details of every criterion assessment such as the construct code, the criterion statement, the instrument to be used for assessment, the assessor (teacher, peer or self), date assessed, and the score. IT students fill this document after each criterion is assessed.
- "*Rekod Taksiran*", is used during assessment itself. It serves as a check list and a guide to the assessor to ensure reliability and validity of assessment. This document is filled by the assessor.
- "*Rumus Taksiran*", a single sheet containing the code of all the 146 criteria to be assessed over a period of two years, is maintained and updated by individual student.

Both teachers and students refer to this document to obtain an overview of the student's progress at any point in time.

A file is provided to every IT student to keep all documents related to assessment, for future reference and as evidences of assessment.



"Rekod Pembelajaran" and "Rekod Taksiran"



Students' files

The "*Jadual Perancangan Harian Pelajar*" is used by groups of 4 to 5 students. Here they list the criteria they plan to learn and be assessed for the session. They may or may not plan the same criteria. At the end of each session, students will update this document themselves. This document is handed to the teacher at the end of each session. IT teachers will refer to this document to monitor student's progress and achievement for the day.

Learning styles and strategies

- Authentic
- Collaborative
- Constructivism and active learning
- Social and cultural dimension

IT teachers at SMK Tun Abang Haji Openg acknowledge that the main aim of assessment is to improve and promote learning. Assessment is carried out every lesson. Student scores are used as key indicators of every individual student's progress and achievement.

Based on the list of criteria in the student's "*Rekod Pembelajaran*", each student are expected to select at least two criteria and record that in the "*Jadual Perancangan Harian Pelajar*" before the lesson begins. Within the lesson, each student will seek to acquire the knowledge or skills as specified in the targeted criteria. They are assessed by their peer or teacher and target to achieve at least an "A" for both criteria.

### **Student-facilitators' attitude**

As a prerequisite to teaching IT in SMK Tun Abang Haji Openg, teachers had to equip themselves with the following skills so as to handle the IT class effectively.

- Learning
- Creative and Critical Thinking
- Facilitating
- Assessment and Evaluation
- Technologically Competent

IT teachers need the above mentioned skills to be able to facilitate effectively as IT students carry out different activities according to their abilities and readiness.

### Comments from teachers involved in the teaching and learning of IT

Below are some comments from IT teachers with regard to the teaching of learning of IT using the smart approach.

*“Teaching IT the proper way will shock any teacher. Students progress at their own pace and learn what they are ready for. I think this increases students interest and to a certain point, makes learning IT a very delightful experience. Once their interest is aroused, it will be easy to acquire knowledge through the guidance of the teacher.”*

*Michelle Ng Paik Mui, SMK Tun Abang Haji Openg, Kuching*

*“Using SEDAAP in teaching helps the student learn by themselves, follow their own pace and they can access freely any information from any source in order to learn. Teachers act as a guide but must have a lot of information to entertain students’ needs. Students need to be motivated in order to optimise learning.”*

*Zainori Bin Othman, IT teacher trainee, FIT, UNIMAS*

*“The approach being used to teach the IT classes has brought a new concept of teaching and learning for me and my students. No doubt students find it difficult in the beginning, but you should see how they go once they got the grasp of it. I'm working with 3 groups of students; the good ones, the medium ones and the weaker ones (based on their PMR results). The first 2 groups went on fine but the weaker ones are having some problems, but not with the approach but with their attitude.... still having some time motivating them.. Well couldn't blame them anyway, since 10 years of learning based on teacher centred. I feel they find it a bit difficult to cope with SEDAAP, which needs a lot of attention from them. I still feel this approach could be further enhanced with the Information Literacy Skills, which I'm working on right now...hopefully after this September I could try it out with my class. As for the teacher, this approach has given me a new role as a facilitator. I find it I enjoy my new role better than the previous and it has given me a lot of room to explore the teaching and learning with my students. Besides it has given me a chance to use resources for teaching and researching.”*

*Muhammad Syafiq Sim Bin Abdullah, SMK Permas Jaya, Johor Bahru*

### Comments from students involved in the teaching and learning of IT

*“Mata pelajaran Teknologi Maklumat adalah sebuah mata pelajaran yang menarik untuk dipelajari dan saya tidak mudah bosan dengannya kerana saya sendiri yang merancang pembelajaran pada hari itu tanpa dipaksa oleh guru. Maksudnya, saya boleh belajar tentang sesuatu yang paling saya minati terlebih dahulu tanpa dirancang oleh guru atau mengikut turutan bab seperti mata pelajaran yang lain.*

*Saya boleh capai maklumat dan mencari maklumat sama ada di Internet mahupun dari buku rujukan untuk taksiran, dengan usaha saya sendiri Melalui pelbagai taksiran yang saya lakukan, saya juga boleh menilai kemampuan kadar sendiri melalui gred-gred iaitu O, B, A, dan T yang saya perolehi. Jika taksiran saya mendapat gred yang rendah, ia dapat memupuk*

*semangat saya supaya bekerja keras untuk mendapat gred yang lebih cemerlang.*

*Dengan mempelajari Teknologi Maklumat, ia dapat memupuk sikap saya supaya lebih berdisiplin, bijak merancangan pembelajaran dan bijak membahagikan masa untuk melakukan sekurang-kurang dua taksiran dalam satu hari.”*

*Suhaila Bt Bohan, 4S1, SMK Tun Abang Haji Openg, Kuching*

*“Setelah beberapa bulan saya mempelajari pendidikan Teknologi maklumat, saya dapati banyak faedah melaluinya. Walaupun pada mulanya saya mendapati kelas ini amat susah, cara pembelajaran dan pengajaran yang lebih menjurus kepada proses pengajaran dan pembelajaran pendekatan bestari sedikit sebanyak mempengaruhi keadaan saya belajar”*

*Adiba Rashida Bt Mazalan, 4S1, SMK Tun Abang Haji Openg, Kuching*

### **Problems**

The following are the problems faced by students and teachers at SMK Tun Abang Haji Openg:

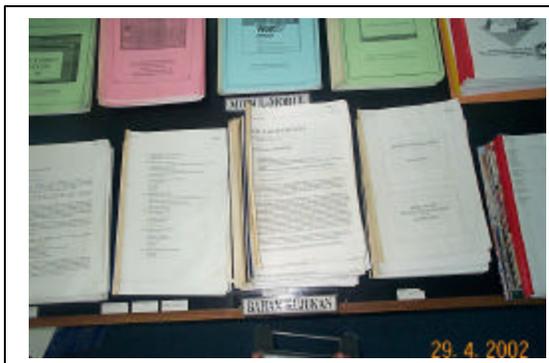
- i. Students are used to the conventional way of learning where the teachers teach and the students listen and try to absorb as much as they can.
- ii. Students, used to being “spoon fed”, are not used to looking for information on their own.
- iii. Students lack self-confidence and do not know how to plan their own learning process. They prefer to be instructed by their teachers.
- iv. IT teachers find writing the yearly plan, and daily lesson plan the conventional way not applicable anymore as students plan their own learning and they can start with any criterion from any field.
- v. The lack of supporting documents to record and monitor assessment results in poor management of assessment in the class.
- vi. Initially, IT was offered to students from one class. Not all students were interested in taking the subject and found it difficult to cope with the new approach as well as the need to go through assessment every lesson. It was a daunting task teaching students who felt that they were forced into taking IT as a learning subject.
- vii. About 40 percent of the IT students at SMK Tun Abang Haji Openg do not own a computer at home. About 20 percent of the IT students are boarders. There are no cyber cafés nearby and most of the students come from nearby “kampung”s.

### **Solutions**



Both the “*Rekod Pembelajaran*” and “*Rekod Taksiran*” are kept in the computer lab.

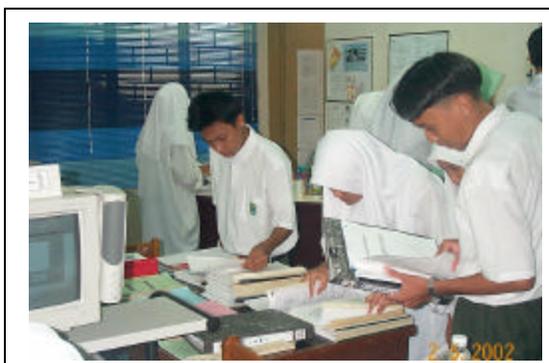
- i. The students are given detailed briefings on the smart approach to learning including the supporting documents to be used in monitoring assessment.
- ii. Resources are made available to the students in the form of books, notes and other references including those in digital form. Teachers act as facilitators and help guide them when needed. Initially the students were dependent on the teachers but eventually they became more independent and are now able to look for information on their own.



Resources - printouts



Reference Books

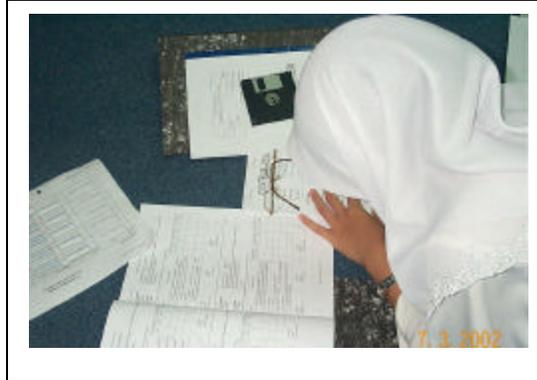


Accessing the resources (self-access)

- iii. Teachers act as guides to students who plan their own learning. A "*Jadual Perancangan Harian Pelajar*", is used by the students to plan and report on their daily lesson progress (see Appendix A). Students are divided into groups of four or five students. Each student is responsible in planning at least two "*kriteria aspek*" to be learned and assessed every lesson. Teachers will refer to the "*Jadual Perancangan Harian Pelajar*" to monitor every student's progress and take necessary follow-up steps especially students who are not able to achieve at least an "A" score for at least two "*kriteria aspek*".



A brief reminder at the beginning of each session



Self-directed learning



Collaborative learning



Innovative - makeshift table



Self-directed, self access, self-assessed, and self-paced learning ...



- iv. A group of IT teachers called in by the Curriculum Development Center, Ministry of Education came up with a proposed yearly plan and a sample daily lesson plan to be used in schools. The daily lesson plan for the teaching and learning of IT used by SMK Tun Abang Haji Openg follows closely to the proposed lesson plan.

Mata Pelajaran :	Teknologi Maklumat
Kelas :	Tingkatan 4T
Masa :	710 - 830 pagi
Objektif :	Supaya setiap pelajar dapat menguasai sekurang-kurangnya dua kriteria aspek yang dirancang seperti yang tercatat dalam " <a href="#">Jadual Perancangan Harian Pelajar</a> ".
Aktiviti :	Pelajar-pelajar menjalankan aktiviti-aktiviti pengajaran dan pembelajaran serta pentaksiran berhubung dengan kriteria aspek masing-masing dengan bimbingan guru. Sila rujuk " <a href="#">Jadual Perancangan Harian Pelajar</a> ".
Nilai :	Bertanggungjawab, bekerjasama, bersistem, peka(sedar), member sumbangan, dan menghargai
Refleksi :	Ahmad dan Ah Chong tidak dapat mencapai sasaran masing-masing dan akan diberi bimbingan tambahan. Kumpulan "Yahoo" akan memulakan projek Laman Web dan perlukan bimbingan guru.

- v. The "*Rekod Pembelajaran*" is only suitable for recording the student assessment but is of not much help during the assessment. Another document, the "*Rekod Taksiran*" is compiled and is used by the students and teachers during assessment. Assessment is transparent and learning occurs when the student is being assessed as well as when the student assesses another. Scoring is clear-cut.



Collaborative learning



Student assessing student



Teacher assessing student



Facilitating students' at work

- vi. From 2001, IT is only offered to students who are interested in taking the subject. Interested students apply at the beginning of the year to take up IT, and 40 students are selected from them. Since these students come from more than one class, it is not possible to place IT in the usual imetable. IT classes are now conducted outside school hours, in the afternoon as follows.
- vii. Tuesday            Thursday
- viii. Form 4            1300 – 1430    1430 – 1600
- ix. Form 5            1300 – 1430    1430 – 1600
- x. To provide the necessary facilities for follow-up activities, the computer lab is opened from 2 to 4 in the afternoon on Wednesdays and Fridays. The computer lab is also opened on Saturdays from 9 to 12 noon.

### PROGRAM OUTCOME (AFTER 4 YEARS OF IMPLEMENTATION)

The examination results of the Information Technology subject for the year 2000 and 2001 for the school as compared to the national level is shown in Table 1 below.

Grade	2000		2001	
	School	National	School	National
1A (%)	0.0	0.8	0.0	0.7
2A (%)	11.1	3.6	22.2	4.1
3B (%)	27.8	9.1	44.5	16.9
4B (%)	13.9	11.2	22.2	20.2
5C (%)	5.5	1.2	0.0	0.1
6C (%)	16.7	7.1	0.0	5.7
7D (%)	13.9	18.1	11.1	17.6
8E (%)	11.1	48.2	0.0	33.5
9G (%)	0.0	0.7	0.0	1.2
<b>Jumlah</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>No of Candidates</b>	<b>36</b>	<b>978</b>	<b>18</b>	<b>2492</b>

Table 1: 2000 and 2001 IT Examination Results, SMK TAHO Vs National Level

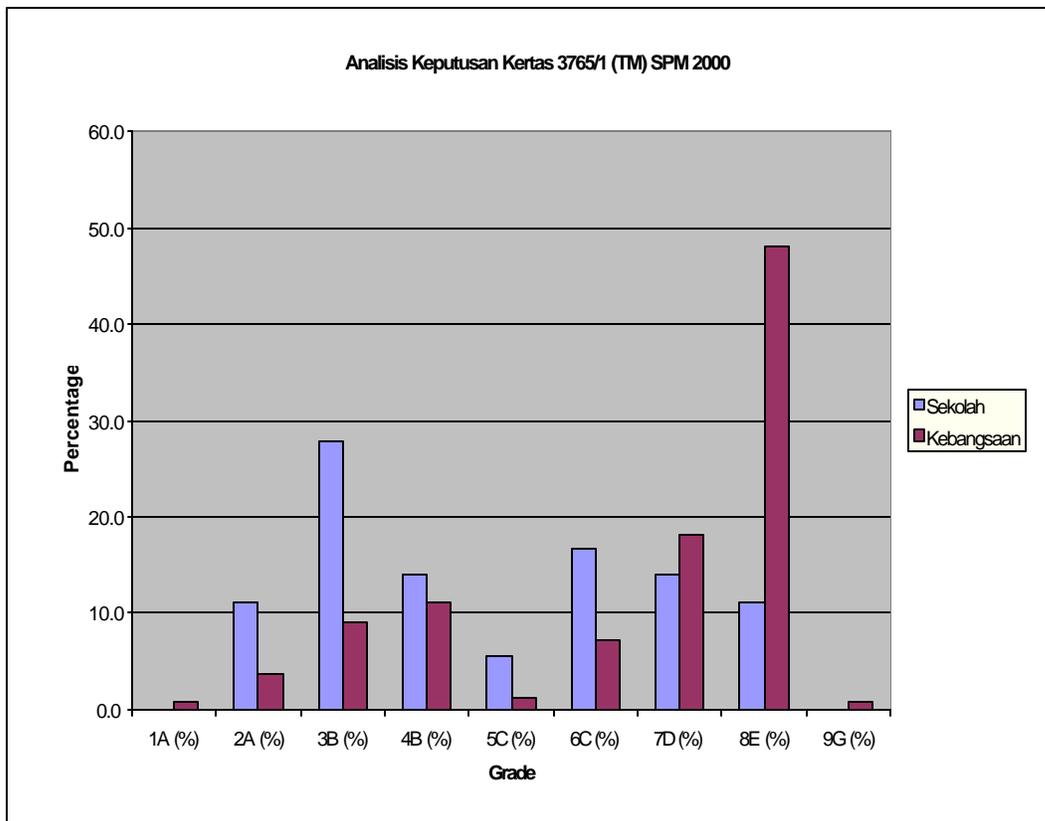


Chart 1: 2000 IT Examination Results, SMK TAHO Vs National

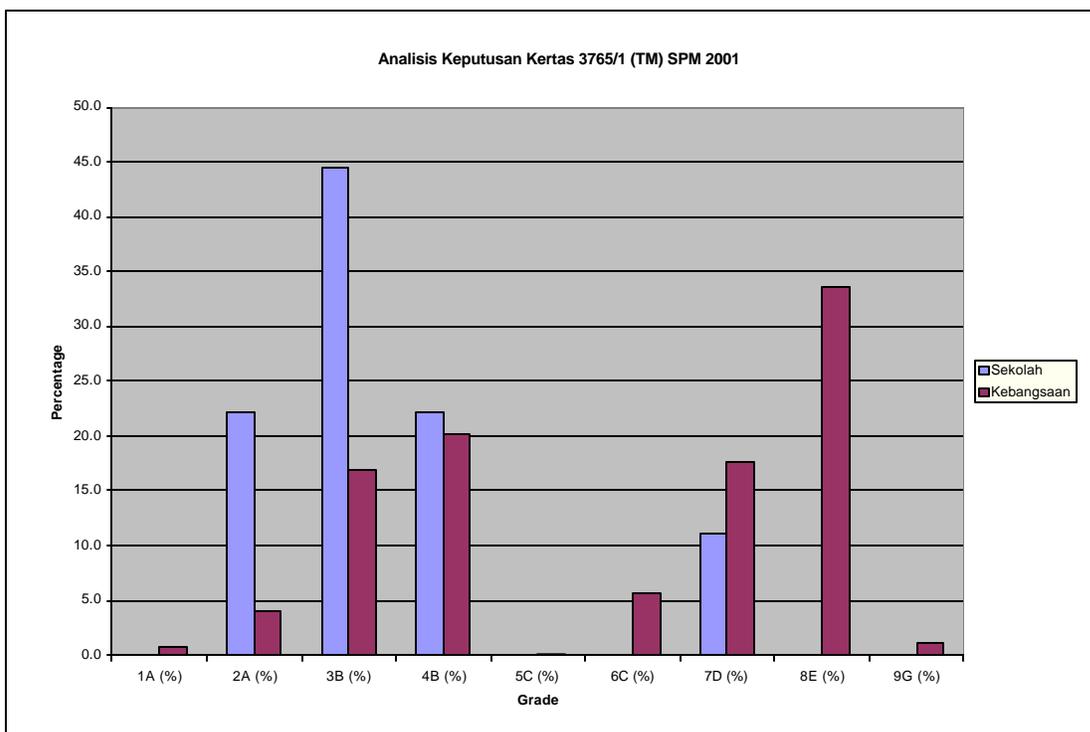


Chart 2: 2001 IT Examination Results, SMK TAHO Vs National

From the above table and charts, it can be noted that the performance of students of SMK Tun Abang Haji Openg is well above the national performance in terms of quality. There is also a marked improvement of the students' performance in the year 2001 as compared to the year 2000.

	2000		2001	
	School	National	School	National
<b>Distinction (1A, 2A)</b>	11.1	4.4	22.2	4.8
<b>Credit (3B, 4B, 5C, 6C)</b>	63.9	28.6	66.7	42.9
<b>Pass (7D, 8E)</b>	25.0	66.3	11.1	51.1
<b>Fail (9G)</b>	0.0	0.7	0.0	1.2

Table 2: 2000 and 2001 IT Examination Results, SMK TAHO Vs National Level

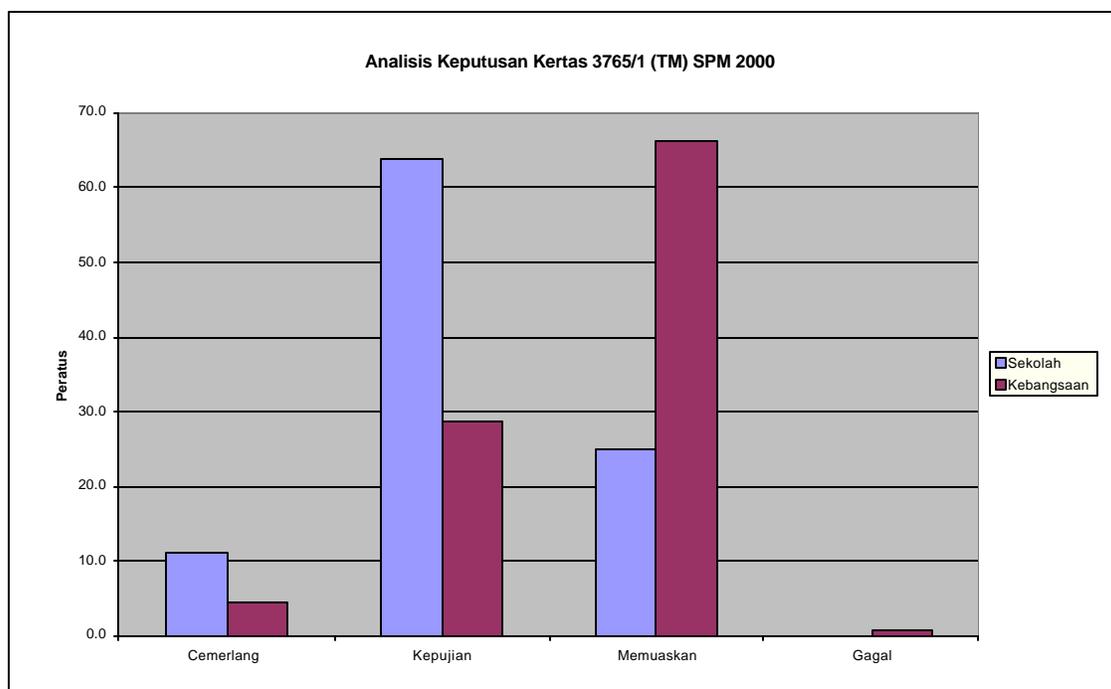


Chart 3: 2000 IT Examination Results, SMK TAHO Vs National Level

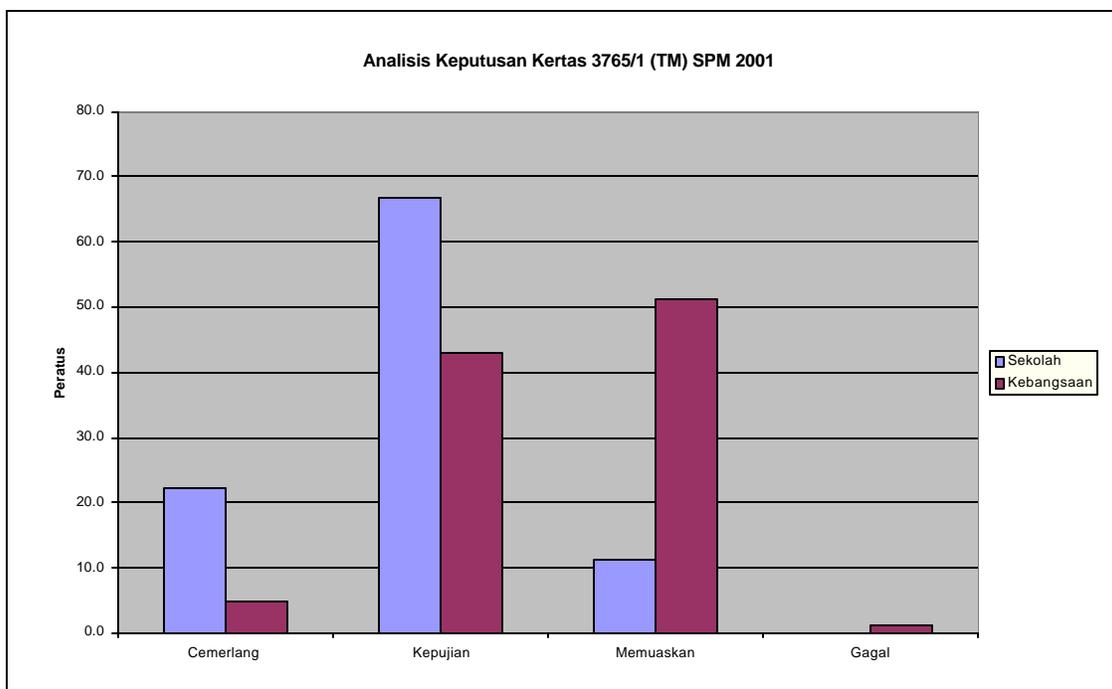


Chart 4: 2001 IT Examination Results, SMK TAHO Vs National Level

## RECOMMENDATIONS

1. Each Information Technology class is allocated 4 lessons per week and it is recommended that each session last two consecutive lessons of 40 minutes duration each. It is further recommended that all lessons be conducted in the computer laboratory to allow free access to the computers for all IT students
2. The teaching and learning of IT is conducted using the smart approach focussing on self-directed, self-paced, self-accessed and self-assessed learning. It is recommended that, IT teacher be well prepared for changes. IT teachers can no longer prepare their lesson plan based on a day to day basis. As facilitators, IT teachers need to be well versed with the criteria to be assessed and be able to provide guidance to the students when required. Students are free to choose any criterion they would like to cover for the day.
3. There are no text books for the subject IT. Resources should be made available to the students in the form of reference books, notes in both digital and non-digital form. Students should be encouraged to surf the net for information and share what they have acquired with their peers.
4. The maximum number of students recommended per class is 40. To cater for the needs of the students, it is recommended that two teachers handle a class of 40 or else reduce the class size to 20.
5. There are four projects, which can be conducted in as a group or individually. The projects are related multimedia development, programming, home page, and information system. IT teachers need not teach the students the usage of the different software before starting the project. Students will learn as they develop their system, thus learning through problem solving.

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