

The Higher Education Students' Experiences With Technology

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Abstract— This study is to explore the students' preferences and familiarities towards technology and the use of technology tools for their daily lives related to academic tasks. Particularly, on the higher education students' access to technology-based tools and their preferences for a wide range of established and emerging technologies. Through the survey conducted on the first semester students of Polytechnic Merlimau Melaka, the results show and indicate that many of them are tech-savvy, even beyond the common technology applied. In the pattern of access and use of a range of other technologies (which are high-tech applications), a considerable variation is prevalent. The findings discussed is close to the notions of 'Digital Natives' of Prensky's reference, in which the implications for harnessing available technologies in order to support teaching and learning in higher education are also comprehensively reviewed in this paper.

Keywords- technology; teaching and learning; education performance; multimedia

I. INTRODUCTION

In the highly developed and modern era, humans cannot detach themselves from the waves of emerging technologies, especially in the field of education. This is due to the availability of information and communication technology that will enable educators to obtain applied and shared information; communicate quickly and without restrictions, in order to apply it in teaching and learning [1],[2],[3]. Therefore in this sense, understanding the impact of technology-enhanced learning for the staff in higher education is important if better-informed decisions are to be taken about how and why certain technologies can or should be adopted for teaching and learning [4].

Clark [5] said, *"In our nascent digital culture, the traditional essayistic literacy that still dominates composition classes is outmoded and needs to be replaced..... The replacement needed is in the context of intentional pedagogy of digital rhetoric through emphasizing of the civic importance of education, the cultural and social imperative of "the now", and the "cultural software" that engages students*

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in the interactivity, collaboration, ownership, authority, and malleability of texts." Prensky [6] clearly described it through the digital culture and environment in which the grow up "natives" had changed the way they think: *"It is now clear that as a result of this ubiquitous environment and the sheer volume of their interaction with it, today's students think and process information fundamentally differently from their predecessors."*

For instance, in Higher Education Institution (HEI) particularly in Malaysia, it is a requirement for students to complete assignments for courses using laptops or computers. However, by borrowing the term of McMahon and Pospisil [7], the laptops may not yet be integrated into their lifestyles and have not been exposed to them: 'used for everything'. Nevertheless, the acceptance to electronic-based methods has been prevalent in several universities and colleges in Malaysia. As an example, the mobile technologies (i.e., Wifi hotspots, 3G mobile phone, PDA or palm talk, tablet PCs) that are becoming the common needs of students (due to their beneficial effects on students' academic performance) as an evident that technology is widely accepted as educational aids and tools in Malaysia [8],[9],[10].

By referring to The Economist Intelligence Unit 2008 report [11], nearly two-thirds (63%) of survey respondents from the public and private sectors say that technological innovation will have a major impact on teaching methodologies over the next five years ⁽¹⁾. According to Yowell [12], the shift from education to learning means, *"Education is what institutions do, while learning is what people do. By the presence of digital media, therefore to enable learning in anywhere, anytime; formal learning must also be mobile and just in time."* Until today, Greenhow *et al.*, [13] states that learners have more choices about how and where to spend their learning time (e.g. in online settings or in private, public, or home school options) than they did 10 years ago.

According to Brown [14], this challenges educators to use the communication tools, which hook into the network effectively to help students construct their understanding and apply the knowledge they have gained to meaningful relevant tasks. Therefore, they need to expand the set of teaching and learning strategies accordingly. i.e., SMS [15], Mobile Devices [16], Wifi Virtual Laboratory [17], Web 2.0 [18],[19], mp3 [20], etc.

Previously, Waterworth [21] discussed the multimedia as a development of technology that integrates sound, music, animation, text, voice, video, and graphics which are produced by computer-based technology for education purpose. On the

other hand, Gayeski [22] defined multimedia as the computer-based media and communications system that serves to create, save, send, and receive text-based information, graphics, and audio. This means that the information technology has served as the basis for storing information, information processing, transmitting and distributing information in various forms (texts, pictures, graphics, sound, animation and video, or a combination of all the elements (known as interactive multimedia) via networking or internet). Neo and Neo [23] reiterated in some of their papers to state that through multimedia, the strategic instructional medium for teaching and learning in (our) institutions of higher learning would emerge as an effective platform for teaching and learning in the Malaysian classroom.

In relation to that reason, the positive results of studies conducted have proven that the students can receive and show high interest in using technology in their learning process: (i.e. Mohamed and Dzakiria [24] in case of internet classroom assistant that is implemented in UUM; Poon *et al.*, [25] in the implementation of web-based learning; Hong *et al.*, [26] in case of internet as a learning tool in University Malaysia Sarawak; etc.). Although, in national context, Daud *et al.*, [27] realized that Malaysia is still looking into the feasibility of adopting mobile learning in Higher Education Institution and its suitability for the Malaysian youth. This concern as was also pointed out by Poon *et al.*, [25] in their research paper regarding e-learning context, that the level of trust and confidence of Malaysians largely depends on the government's policies and efforts toward realizing it. This is due to this development that had happened without any specific policy direction from the government for higher education in which national government must have policies in place and 'ICT integration in education' as key priority [10]. On the other hand, as what Czerniewicz and Brown [28] said in the case of implementation of ICT in South Africa, that those in higher education might be needed to move beyond the rhetoric of ICTs as artifacts which simply need to be acquired, to the recognition that integrating ICT in teaching and learning requires access to a much fuller range of resources.

II. STUDY BACKGROUND

The use of electronic communications equipment such as computer, internet, and mobile phones could provide an 'ideal educational environment' ⁽²⁾ for modern concepts in education and teaching. However, students need comfortable interaction in an environment that demands the use of varied technologies and real problems [29]. This was previously assumed by Salabery [30], that the technology in teaching can improve students' attitude towards learning in and outside the classroom. To be effective, Gudanescu [31] stated that, however, they must be used to promote new learning goals and teaching strategies; student-centred, collaborative, engaging, authentic, self-directed, and based on development of higher-order thinking skills.

First, this is due to the notion of universal access to freely available educational resources facing inherent tensions from

within the academy, where the barriers to adopt have more to do with tradition and attitude, rather than technology [32]. Mainly, as Hamilton and Richardson [29] stated, because the traditional instructional design process has become complicated due to the addition of a need to choose technologies suitable for delivery of particular learning experiences.

Second, Shaw [33] had highlighted in almost half a century ago on "A Modern Concept of Education." In his argument, he stated "*if education is to be afforded by a series of experiences, these experiences however must be organized in some way to indicate their contributions to development; to facilitate learning: retention, skills and to show relation of one experience to others and eventually to a unified whole. The teacher sets the stage and remains in the background in such a learning-situation. Through this process, there is more learning and less teaching; more study and activity and less recitation. Pupils are guided in the solution of vital problems of individual and social life.*"

Third, in terms of how technology is used for education, Romiszowski and Mason [34] explained two concepts; the potential of the technologies and new learning environments. They tried to break down the distinction between teacher and teaching based on the collective construction of the educational course and, more broadly of new knowledge. While to a learner-centred approach to education, Jasola and Sharma [35] said that facilitators and students should therefore share the responsibility and participate in learning and teaching.

In that sense, the fact is that the current development of the telecommunication network is one of the dominant factors of the present situation in the widespread and continuous diffusion of access to the internet network [36]. Toprakçı [7] added that the internet is probably the most important tool for university students and their concerns are about the facilities and media for communication, research, access, and sharing information. This is due to the effect as follows:

a) Directly.

- It emphasizes the broader concepts of the students' interaction abilities, where aspects of communication facilities explained that the students could connect with friends in the real situation [38]. Gray and Xiaoli [39] added that students can freely communicate without being confined, not isolated and they are not scared or afraid to communicate through the internet with friends. Here, Goldman *et al.*, [40] stated that technologies as communicative vehicles, serve as platforms for dialogue, discourse, and connection. By using a mix of technologies educationally, youth learn to represent themselves without being confined to the structures that keep them out of the public debate, or tokenizing their "voices" as pure: true or naïve. As an example, Cavalli *et al.*, [41] brought the case about Facebook adoption for undergraduate students, where it has changed rituals of interpersonal communications.
- The usability of the internet in order to complete schoolwork or school assignment. Oliver and Goerke [42]

found that more than 90% of students used online resources for study purposes. Here, the student as the learner, Abdul Kader [8] said, *“Learners are motivated to learn and learn best when what they learn is relevant to their needs at the time of learning and how they learn is consistent with their individual learning styles.”* Previously, Toriskie [43] reviewed the student attitudes related to reading and writing in geography and history subjects, where the internet has given a positive impact. Smith [44], Terry *et al.*, [45], and Mbaeze *et al.*, [46] in their studies found that students’ performance in school enhanced. In the context of higher education, Krause *et al.*, [47] reported that first year students were spending 4.2 hours per week on the web for study and research, while only 3% said they never used the web for study purposes. The use of the internet in the educational environment has enabled easy access to many resources for sharing information. The prevalence of this sharing has brought additional benefits due to these resources, which can be used in any location and any time [48].

b) Indirectly.

- The assessment of test performed is more effective and efficient. This is due to the test carried out (in terms of application of e-learning method) more economical compared to paper and pencil method. Items answered by the students make the process more reliable and accurate in terms of scoring [49]. Therefore, Pischetola [50] stated that the activities of using the technology for teaching and learning plans should be well developed in order to enhance new individual skills and institutional capacities of assessing educational needs by monitoring the progress and providing supervision. This is especially, through a systematic approach to address the role of institutions in influencing the diffusion of innovation, like suppliers of ICT in terms of hardware or software and support centres as part of the environment.
- To facilitate the teaching-learning process, educators are required to use technology media effectively. Therefore, they need lesson preparation and planning, administration and management tasks ^[3] in which the key criteria such as lack of time, technology competence, attitude towards technology, administrator support, and technology facilities are important factors in the teaching-learning process through integration of mobile technology [51]. Lee [52] said, *“The key issue for teaching staff is, therefore, not whether we should use internet-based teaching and learning but how we should use it, operating under the triple constraints of work-load, accessibility and costs.”*
- A radical shift in the communication behaviour of educators is crucial to enable new ways of teaching-learning process through technology used. Hence, a teaching professional development ^[4] system will play an important role, no matter where and when they are applied and how, especially, to enable them as educators to remain highly productive through collaboration technologies [53].

As mentioned above regarding the general assumption where the students’ technological experiences are vital in the

implementation of higher education policy and practice, then a thorough understanding of students’ technological experiences are as follows:

- It will have clear implications for areas such as student access, equity, and transition [54].
- It would benefit the decision maker to make the policy and decision associated with the management and administration of information and communication technologies (technological infrastructure support, resource investment, student, and staff support) by defining a framework for the appropriate and effective use of ICTs in their educational systems [55].
- It will give the implications of the ways in which technology could potentially be harnessed in knowledge to improve teaching and learning [56].

However, there still remain questions such as the following:

- 1) How do the students use a range of more recent technology based on tools (including social networking, blogs, games, leisure activities, and Podcasting)?
- 2) What are the students’ desires and needs to use the particular technologies in order to support their studies?

III. METHODOLOGY

3.1. Sample

Data collected was from the first semester students who were beginning their studies at Polytechnic Merlimau. Table 1 shows the percentage of respondents based on gender. The students who completed the questionnaires represent 62.1% of the first semester students at Polytechnic Merlimau Melaka. The survey prioritized students who were born after 1990, due to the fact that they were coming directly from Sekolah Menengah (High School) after they had graduated and they were assumed to have not been working yet.

Students who participated in the study were born between 1990 and 1991. Data collected was from students as the respondents from five departments, such as Mechanical Engineering Department (M), Electrical Engineering Department (E), Civil Engineering Department (C), Accounts Department (A), and Hospitality Department (H).

3.2 Measure – questionnaire

The five pages questionnaire were specifically developed for this study; asking students about their access to use of and skills with technology based tools, and their interest to accept the established and developing technologies. The questionnaire comprised of four main sections: demographic information (6 items), access to hardware and the internet (11 items), use of and skills with technology based tools (computer: 10 items; mobile phones: 7 items; web: 16 items) and preferences for the use of technology based tools in Polytechnic studies (17 items).

Table 1. Percentage of students who participated in the survey

Department	Program	Gender		Respondent %		Total Respondent
		M	F	M	F	
MECHANICAL ENGINEERING (M)	DKM	60	7	87	13	100
	DTP	33	4			
	DEM	9	10			
ELECTRICAL ENGINEERING (E)	SKE	12	2	88	12	100
	DET	91	11			
	DTK	49	20			
	DKE	23	13			
CIVIL ENGINEERING (C)	SKA	19	14	65	35	100
	SUT	12	3			
	DKA	37	40			
	DSB	43	27			
ACCOUNTS (A)	DAT	17	52	21	79	100
	DPR	13	42			
	SPP	5	8			
HOSPITALITY (H)	DHK	28	50	22	78	100
	DUP	10	41			

3.3 Procedure

Data collected was during “poly-bridgade” session (R1001) in the third week of the first semester. The students were briefly informed about the project, where the participation was voluntary and confidential.

IV. DATA AND RESULTS

4.1 Students' access to technology

The survey asked about student access to a range of technology hardware, such as computers, mobile phones, digital cameras, their access to the internet, etc. The eleven items have been collected from each of the departments, but only the best of 3 items from every department is presented in the table. Students who indicated that they access at any time were then categorized as “unrestricted”.

Table 2 shows that most of the students have unrestricted access to 3 items of main hardware. As expected, a very high proportion of students have unrestricted access to an internet. More than 55% of the students from each department use internet every day. Additional analysis showed that 90% of the students from the mechanical engineering department access to broadband, 96% of students from the electrical engineering department access to wireless, 90% of students from the civil engineering department access to wireless, 76% of students from the accounts department access to dial-up, and 98% of students from the hospitality department access to broadband. A relatively high proportion of students from the mechanical engineering and hospitality departments have unrestricted access to mobile phones, which is 70% and 66% respectively. Finally, less than 7% of the respondents of the hospitality department have no access and not sure of using laptop computers, while 93% are had access. 18% percent of students from the electrical engineering department do not have access and are not sure of using laptop computers. A relatively high proportion of students from the mechanical, electrical and civil engineering departments and hospitality department have

unrestricted access to laptop computers, which are 74%, 80%, 77% and 87% respectively.

Table 2. Percentage of students who have ‘unrestricted’, ‘limited’, ‘no accesses or ‘not sure’ of hardware and the internet.

No	Hardware	Scale				
		1	2	3	4	5
1	"Laptop" computer	74	7	5	14	M
2	Internet (Broadband)	56	34	5	5	M
3	Mobile Phone	70	11	16	3	M
4	Laptop" computer	80	2	13	5	E
5	Internet (Wireless)	73	23	3	1	E
6	Mobile Phone	55	21	23	1	E
7	"Laptop" computer	77	8	12	3	C
8	Internet (Wireless)	77	13	3	7	C
9	Mobile Phone	55	17	24	4	C
10	Internet (Dialup)	73	3	10	14	A
11	Mobile Phone	60	21	15	4	A
12	"Laptop" computer	55	20	10	15	A
13	Internet (Broadband)	88	10	2	0	H
14	"Laptop" computer	87	6	5	2	H
15	Mobile Phone	66	30	3	1	H

* Note: Unrestricted access (1), Limited access (2), No access (3) Not sure (4) , Department (5)

Table 3. Percentage showing how often students in each of the departments use computer technologies.

No	Computer	Scale					
		1	2	3	4	5	6
1	Use a computer to play games, without accessing the internet or web.	79	3	15	2	1	M
2	Use a computer to play digital music files (example: iTunes) without accessing the internet.	55	27	6	6	6	M
3	Use a computer for creating multimedia presentation (example: Power Point, Director.)	23	33	35	4	5	M
4	Use a computer to play games, without accessing the internet or web.	23	27	15	16	19	E
5	Use a computer for writing documents (Example: word, excel.)	23	21	15	22	19	E
6	Use a computer for creating multimedia presentation (example: Power Point, Director.)	22	21	26	14	17	E
7	Use a computer to play games, without accessing the internet or web.	61	7	17	7	8	C
8	Use a computer for writing documents (Example: word, excel.)	43	15	21	14	7	C
9	Use a computer to play digital music files (example: iTunes) without accessing the internet.	41	23	9	15	12	C
10	Use a computer to play games, without accessing the internet or web.	43	24	11	10	12	A
11	Use a computer to play digital music files (example: iTunes) without accessing the internet.	33	22	12	16	17	A
12	Use a computer for creating multimedia presentation (example: Power Point, Director.)	26	42	12	13	7	A
13	Use a computer to play digital music files (example: iTunes) without accessing the internet.	50	10	20	10	10	H
14	Use a computer for creating multimedia presentation (example: Power Point, Director.)	35	10	34	7	14	H
15	Use a computer to play games, without accessing the internet or web.	25	20	35	13	7	H

* Note : Daily (1), Weekly (2), Monthly (3), Over monthly (4), Not used (5) , Department (6)

Table 3 shows the results of three high items from every department. Respondents from each of the departments have used computers to play games. Most of them are students of mechanical and civil engineering departments. The students from the mechanical engineering department who have used

computers to play games is 99% and 1% has not used before entering polytechnic. In conclusion, less than 31% of the students from the accounts and electrical engineering departments had not used computers to play games.

The students of the hospitality department do not create multimedia presentations frequently. To write documents, the use of computers among civil and electrical engineering department students is almost universal, that are 93% and 81% respectively. A large proportion of students from the mechanical engineering 94%, civil engineering 88%, accounts 83% and hospitality 90%, departments are using their computers to play digital music.

Table 4. Percentage showing how often students use mobile phone technologies

No	Mobile	Scale					
		1	2	3	4	5	6
1	Outgoing calls	44	23	21	12	0	M
2	Text or SMS sending	41	22	23	8	6	M
3	Snapping photos	30	24	44	25	25	M
4	Text or SMS sending	66	24	5	3	2	E
5	Outgoing calls	42	17	12	11	18	E
6	Sending MMS	33	20	20	22	5	E
7	Text or SMS sending	44	24	4	17	11	C
8	Outgoing calls	41	21	15	12	11	C
9	Sending MMS	22	31	32	7	8	C
10	Text or SMS sending	50	15	15	10	10	A
11	Snapping photos	48	17	11	12	12	A
12	Outgoing calls	33	23	34	5	5	A
13	Outgoing calls	46	30	20	2	2	H
14	Sending MMS	35	23	32	6	4	H
15	Text or SMS sending	28	40	20	5	7	H

* Note: Daily (1), Weekly (2), Monthly (3), Over monthly (4), Not used (5), Department (6)

Table 4 shows the three highest items used by students from each department. Majority of the students in every department used their mobile to text or 'sms' sending and outgoing calls. Although more than 82% of the students from each department used 'sms' sending and outgoing calls, but the highest percentage of students using their mobiles to text or 'sms' sending daily is from the electrical engineering department, that is 66%. The students from the mechanical engineering department who use their mobile phones to take pictures daily or weekly are 54%, while 25% of the students have not used their phones. More than 95% of the students from the electrical engineering department use mobiles to send 'mms'. Apparently, only 4%, 5% and 8% from the hospitality, electrical and civil engineering department students had not used mms before entering Polytechnic. There are only a small number of students from the mechanical engineering and accounts departments who did not use the mobiles to snap photos, which are 25% and 12% respectively

The results presented in Table 2, 3, 4, and 5 show that many of the incoming students in the first semester of Polytechnic Merlimau surveyed in this study are 'tech-savvy'. However, there are clearly areas where the use of technology based tools are far from universal among the first semester

students from each department. Moreover, for a number of activities, the ratio of students who have never used a particular technology based tool is low.

Table 5. Percentage showing how often students use web technologies.

No	Web	Scale					
		1	2	3	4	5	6
1	Using the web to download MP3 files (example: music, videos podcasts.)	48	28	9	11	4	M
2	Using the web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	44	22	11	4	19	M
3	Using the web to send or receive email (Example: Hotmail, Yahoo, Outlook.)	36	33	16	11	4	M
4	Using the web to send or receive email (Example: Hotmail, Yahoo, Outlook.)	43	7	12	8	30	E
5	Using the web to download MP3 files (example: music, videos podcasts.)	37	11	17	15	20	E
6	Using the web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	34	14	17	19	16	E
7	Using the web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	41	16	17	12	14	C
8	Using the web to download MP3 files (example: music, videos podcasts.)	29	16	14	13	28	C
9	Use the internet or web to play network games.	26	30	31	6	7	C
10	Using the web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	47	19	7	14	13	A
11	Using the web to send or receive email (example: Hotmail, Yahoo, Outlook.)	43	18	8	19	12	A
12	Other pastimes (example: for leisure activities.)	33	19	14	29	5	A
13	Use the internet or web to play network games.	34	31	23	6	6	H
14	Browsing for general information (example: news, holidaying, event timetables.)	26	13	31	20	10	H
15	Other pastimes (example: for leisure activities.)	28	32	25	10	5	H

* Note: Daily (1), Weekly (2), Monthly (3), Over monthly (4), Not used (5), Department (6)

4.2 Using technology to assist studies

The final question in the survey, presents the students with a list of technology-based tools that might be used in their Polytechnic studies. In order to recognize the importance to which they want to use the tools that assist their studies, students were asked to use a rating scale from 'Agree' to 'Disagree'

Table 6 presents the three highest data from mechanical, electrical and civil engineering, accounts, and hospitality departments based on rating. The first, includes technologies and tools for which there are very strong support. The technologies and tools in this category include the use of computers to create multimedia presentation, which is 77% from the civil engineering department. While in terms of using the web, there are 82% from the mechanical engineering department, 80% from the electrical engineering department, 80% from the accounts department, and 69% from the hospitality department. The second category includes tools and technologies, instant messaging or chat, which students from each department need for their studies. More than 67% of students of Polytechnic agree with it. The final category of respondents to use mobile to send or receive text messages are 71% from mechanical engineering department, and 77% from civil engineering department.

Table 6. Percentage of students who want to use technology-based tools to assist their studies

No	To assist with Polytechnic Study	Scale			
		1	2	3	4
1	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	82	11	7	M
2	A mobile phone to send or receive text messages or SMS.	71	21	8	M
3	Use a computer for creates multimedia presentation (example: Power Point, Director.)	68	22	10	M
4	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	80	15	5	E
5	Use a computer for creates multimedia presentation (example: Power Point, Director.)	79	15	6	E
6	The web to look up or search for information (example: online dictionaries, Google.)	56	29	15	E
7	A mobile phone to send or receive text messages or SMS.	77	18	5	C
8	Use a computer for creates multimedia presentation (example: Power Point, Director.)	77	12	11	C
9	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	67	10	23	C
10	Social networking software on the web (example: MySpace, Friendster.)	80	11	9	A
11	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	80	9	11	A
12	The web to look up or search for information (example: online dictionaries, Google.)	58	31	11	A
13	Social networking software on the web (example: MySpace, Friendster.)	69	19	12	H
14	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	69	14	17	H
15	The web to download MP3 files (example: podcats, itunes.)	60	19	12	H

* Note: Agree (1), Neutral (2), Disagree (3), Department (4)

Table 7 shows the percentage of the first semester students' needs in their studies. The respondents were questioned on the 16 items and the results revealed that all the first semester students needed the web, computer, and mobile in their studies. The three highest results show that 75.6% of students want the web for instant messaging or chat, 72.6% agree that mobile phones were used to send or receive text messages or 'sms' and 65.6% need computers for multimedia presentation.

V. DISCUSSIONS

This study shows that 'access to', 'uses', and 'perceptions of a range of technologies' of the first semester Polytechnic Merlimau students are significant to their needs. Therefore, it is important for Polytechnic administrators and lecturers to ensure decision-making about how to enhance the learning experiences of incoming Polytechnic students through the use of technology. This is due to as follows:

- a) The challenge for lecturers and administrators is how to provide the wide range of students' levels against the 'access to', 'familiarity with', 'preference of different technologies', and 'technology-based tools'. This study clearly shows the importance of technology in teaching and learning. Therefore, lecturers and administrators need to develop their talents in the field of dominant technology used by students from all departments. In this sense, they should understand what the central function of the education concerns against teaching and learning, which is not only the transfer of information or knowledge, but also the cultivation of critical and independent perspectives for the exploration of

meaning. As a successful professional educator, therefore, is not confronted to replace traditional applications with new ones [57]. The important things are, however, the lecturer has to realize various aspects of the learning process, which are influenced by the cognitively relevant characteristics of media: their technologies, symbol systems, and processing capabilities [58], where, technological competencies are further steps that need to explore any possibilities for achieving 'technology literacy' ⁽⁵⁾ characterized by individuals who can think conceptually related to learning 'technology' applications.

Table 7. Percentage of students who want to use technology based tools to assist their studies

No	To assist with Polytechnic Study	Scale		
		1	2	3
1	Using computer for general study.	36.2	41.2	22.6
2	Using computer to create documents (example: using Word, Excel, PDFs.)	44.4	28.4	27.2
3	Using computer to create web pages (examples: using Dreamweaver, Front page.)	21	33.4	45.6
4	Use a computer for create multimedia presentation (example: Power Point, Director.)	65.6	17.6	16.8
5	Portable computer (example PDA) as a personal organizer (Example: diary, address book.)	15.2	51.6	33.2
6	Accessing web to learning portal (example: 'Course' or 'Learning Management System'.)	16.8	39	44.2
7	The web to look up or search for information (example: online dictionaries, Google.)	51.8	32.6	15.6
8	The web for instant messaging or chat (example: MSN, Yahoo, ICQ.)	75.6	11.8	12.6
9	The web to build and maintain a website.	25.4	40	34.6
10	Social networking software on the web (example: MySpace, Friendster.)	43.2	27.2	29.6
11	The web to download MP3 files (example: podcasts, iTunes.)	48.8	24.6	26.6
12	The web to keep my own blog.	29.6	44	26.4
13	A mobile phone to send or receive text messages or SMS.	72.6	10.4	17
14	A mobile phone as a personal organizer (example: diary, address book.)	17.2	51.6	31.2
15	A mobile phone to access web based information or services.	27.4	42.6	30
16	A mobile phone to send or receive email.	21.2	53.4	25.4

* Note: Agree (1), Neutral (2), Disagree (3)

- b) The fact is that, the first semester students have experienced seeing the computer as a tool to solve problems, provide data sets, save time, and to simulate the real world events. In that sense, technology allows students to use a database or spreadsheet to find solution to various problems. The findings showed that 81% of the mechanical engineering department, 82% of the electrical engineering department, 85% of civil engineering department, 75% of the accounts department, and 93% of the hospitality department students have access to computers, before they enter Polytechnic Merlimau. Here, according to Rosenberg [59], the computer can be used as a learning media for students and should be comprehensively implemented in their studies to ensure they familiarize themselves with the use of software and software-related technical skills.

- c) There are 99% of students from the mechanical engineering department, 81% from the electrical engineering department, 92% from the civil engineering department, 88% from the accounts department, and 90% from the hospitality department of the first semester students' use of computers to play games and play digital music using digital music files. This means that multimedia capabilities allow students to explore their ideas by combining graphics, animation, video, and sound in their documents. Chen and Czerwinski [60] studied about the visualization of model in which to become a potential field that can expand access method, processing, and information management. Previously, Heinich *et al.*, [61] clearly defined those visual literacy skills as the learning ability to interpret visual messages accurately and easily to identify the visual display, such as shape, color, and composition.
- d) The study revealed that 48.8% of the first semester students want to download MP3s in order to use them in their studies. There are only 4% from the mechanical engineering department, 20% from the electrical engineering department, and 28% from the civil engineering department students who have never used the web to download MP3 files prior to entering Polytechnic. A recent study by Lee *et al.*, [62] suggested that many students preferred to listen to podcast learning material from their computers. The often cited advantage of MP3s is that, learners can access them anytime anywhere through portable MP3 players. Through this figure, it can suggest that the lecturers create the learning and teaching process in multimedia form. An important consideration in this discussion is student equity. Many studies show the audio material to enhance the oral skills of students, rather than traditional teaching techniques [63]. Here it means that they can apply it to teaching and learning. Ranges from recording lectures as a means of free class time for interaction and exposing students to international perspectives by inviting guest speakers.
- e) More than half of the students from each department used their mobile phones, and more than 60 percent used them to 'text' (*sms*) per week. This is aligned to the views of Anderson [64], that the creation of communication technologies provides opportunities to use mobile technology and wireless technology in education. It is not surprising, when they were asked to nominate technologies that might assist them in their studies, more than 2/3 of the respondents agreed that they would like to send or receive text messages via their mobile phones. The lecturers can also use online cases in the classroom discussions to encourage students to use more of the mobile PC. Students may have particular ideas about how their mobile phones could be used to support their learning.
- f) In terms of availability of web applications, less than 30% of the students do not use the web prior to entering the Polytechnic. Students from each

department use a web to download MP3, instant messaging or chat, send or receive emails, play network games, and browse for general information. The use of online technologies in teaching and learning allows students also to online learning in order to obtain the required information [65]. This gives idea for lecturers and students to carry out the process of learning and teaching into forms of internet connection, such as uploading and downloading the assignments as a learning process. The teaching and learning in the form of online learning process apply in order to enable students to interact virtually with the lecturers anywhere. However, Polytechnics should provide suitable networks such as broadband, dialup, and wireless where students can easily have access to them.

VI. CONCLUSION AND FUTURE DIRECTION

Based on the data and analysis results, we can identify that the first semester students in Polytechnic Merlimau have a wide range of experience in the application of technology before they entered the polytechnic. The concept of learning-based communication technology (ICT) is considerably more popular and important to increase the level of student achievement in the Polytechnic. The results show that the first semester Polytechnic students' experience in technology influences the outcomes of their results. This was as what found by Heinich [66] that technology helps in stimulating all senses of students, especially regarding the visual sense in which the effect is greater in the learning process compared to other senses. The use of computers in teaching and learning process and the application-involved internet directly helps in the management of learning process in the Polytechnic.

The most important thing to consider is how we can improve the level of skill in using this technology for the benefit of students and teaching staff. Good level of achievement in the use of office software, internet, and e-mail is a major challenge to the department to produce students who are competent and competitive in the job market. To enable them to face current challenges, all students have to be familiar with technology such as computers, internet, and mobile phones. Cooperation from all parties, including the Polytechnic management, the departments, lecturers, and students is important to ensure that students have a high level of skills and to ensure that the graduates of Polytechnic are competent and knowledgeable.

The findings also show that a large majority of 328 students from 500 respondents require computers for the presentation, like Power Point and Director, while a small number of students, around 14%, still do not have the knowledge of internet. Each of the departments should be able to provide laboratory facilities that are adequate and efficient for teaching and learning. Currently, there are no special laboratories available for students at Polytechnic Merlimau.

A study considering whether the internet connection used among students is good, fair or weak in terms of technology and related to their experiences against their needs, whether

before and during their studies at the Polytechnic, can be investigated in order to get a good result. The investigation reported in this paper would have benefitted from depth qualitative investigation from both 'students' and lecturers' perspectives on technology.

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Note:**{1} Learning during the next five years**

The survey asked what technology would most impact the delivery of online learning during the next five years. Respondents could select one of 14 key technologies. About 18 percent of respondents predicted that reusable content objects and wireless technologies would have the most significant impact. Smaller percentages (from 7 to almost 14 percent) selected peer-to-peer collaboration, digital libraries, simulations and games, assistive technologies, and digital portfolios. In contrast, less than 5 percent predicted that e-books, intelligent agents, Tablet PCs, virtual worlds, language support, and wearable technologies would have significant impact on the delivery of online learning. These findings seem to reflect the perceived importance of online technologies for sharing and using preexisting content.

Additionally, respondents predicted that advances in Internet technology (for example, greatly extended bandwidth and wireless Internet connections) are likely to increase the use of multimedia and interactive simulations or games in online learning during the next five to 10 years. Only about one in 10, however, predicted that advances in Internet technology would enhance videoconferencing or international collaboration, and just one in 16 thought it might offer greater chances to interact with field experts or practitioners. Again, the focus was on enhancing content and associated content delivery, not on the social interactions, cross-cultural exchanges, or new feedback channels that wider bandwidth could offer. Such responses indicate that respondents still see learning as content-driven, not based on social interactions and distributed intelligence. The emphasis remains on a knowledge-transmission approach to education, not one rich in peer feedback, online mentoring, or cognitive apprenticeship.

[Kim, K.J., and Bon, C.J. (2006) The Future of Online Teaching and Learning in Higher Education, *Educause Quarterly* No.4, pp. 22-30]

{2} The ideal educational environment

The ideal educational environment in terms of learning theory through as follows:

- The ideal learning situation is customized to the very specific needs of the individual,
- The ideal learning situation provides students with immediate feedback,
- The ideal learning situation is constructive,
- The ideal learning situation motivates students to persists far in excess of any externally imposed requirements,
- The ideal learning situation builds enduring conceptual structures.

[Foreman, J. (2003). Next-Generation Educational Technology versus Lecture. *Educause Review*, (July/August), pp.12-22]

{3} Class management procedures

Class management procedures for a lecturer preparing students for teaching in a technology rich environment fall into three time slots – formation of the management framework prior to the start of classes, evolving and regular management procedures during the running of the subject(s), and the orchestration and archiving of student work and subject evaluation after the subject is complete. However, it is not sufficient to lecture about these aspects – students need to see these procedures modeled.

- The phases of class management should be on personal experience basis across several classes' level. Use of the World Wide Web does not dominate these procedures. Here, one of a suite tools which can help to ensure smooth class organization is through an effective communication with students and appropriate use of past resources to assist students in understanding the skill-based design tasks they are set.
- Another role is to model higher order thinking skills that are associated with content 'expertise'. With each cycle of subject development, the educators anticipate (depending on his/her discipline, of course) that there will be a natural evolution not only of subject specific content, but also the ways that content is applied to the solution of real world problems. Computer-based tools are often part of that equation. The more experience educators gain working with electronic 'thinking' tools, the more comfortable they are likely to feel when the students request use of similar tools for assignment work. There are many benefits to be gained by allowing the students to use computers as mind-tools.

[Brown, C. (1998) Generic Class Management Strategies for An Education Lecturer in Information Technology. In Corderoy, R.(Ed), *Conference Proceedings ASCILITE'98*. Wollongong, Australia: The University of Wollongong, pp. 107-120.(p.107)]

{4} Teacher professional development

Teacher professional development is absolutely essential if technology provided to schools is to be used effectively. Simply put, spending scarce resources on informational technology hardware and software without financing teacher professional development as well is wasteful. Experience around the world in developing, industrialized, and information-based countries has shown that teacher training in the use and application of technology is the key determining factor for improved student performance (in terms of both knowledge acquisition and skills development enabled by technology). Educational technology is not, and never will be, transformative on its own—it requires teachers who can integrate technology into the curriculum and use it to improve student learning. In other words, computers cannot replace teachers—teachers are the key to whether technology is used appropriately and effectively.

[Carlson, S., and Gadi, C.T. Teacher Professional Development in the Use of Technology. [online] Available at http://www.ictinedtoolkit.org/usere/library/tech_for_ed_chapters/08.pdf]

{5} Technology literacy

Change increasingly defines the nature of **literacy** and the nature of literacy learning. A new era in literacy research, one in which the nature of reading, writing, and communication is being fundamentally transformed. New technologies generate new literacies that become important to our lives in a global information age.

[Leu Jr.,D.J., Kinzer, C.K., Coiro, J.L.,and Cammack, D.W.(2004) Toward a Theory of New Literacies Emerging From the Internet and Other Information and Communication Technologies, In Ruddell, R.B., and Unrau, N. (Eds.), *Theoretical Models and Processes of Reading*, 5th Ed. International Reading Association, Association: Newark, DE, pp. 1568-1611]