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A 'Uses and Gratification Expectancy Model' to predict students' 'Perceived e-Learning Experience'

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ABSTRACT

This study investigates 'how and why' students' 'Uses and Gratification Expectancy' (UGE) for e-learning resources influences their 'Perceived e-Learning Experience.' A 'Uses and Gratification Expectancy Model' (UGEM) framework is proposed to predict students' 'Perceived e-Learning Experience,' and their uses and gratifications for electronic media in a blended learning strategy. The study utilises a cross-sectional research design, and elicits data from secondary school students through a field survey-questionnaire. The findings suggest that there are significant relationships between five dimensions of students' UGE for e-learning resources, and their 'Perceived e-Learning Experience.' It is plausible that these UGE aspects of students' 'communication behaviour' towards electronic media are important determinants of effective integration of the e-learning resources in school-curriculum. While this research focuses on students at secondary-school level, some elements in the UGE model may apply to students using e-learning resources at other levels of their education. This model gives researchers and educators a new tool to forecast the success of development and deployment of e-learning resources in education systems.

Keywords

E-learning, Uses and Gratification Expectancy, Blended learning strategy

Introduction

In 1999 the Malaysian government, through the Ministry of Education (MOE), introduced e-learning initiatives in both primary and secondary Smart Schools, ostensibly to prepare students early enough for the knowledge based economy and the marketplace of the 21st century. The Smart School initiative is part of the government's long-term plan to develop an IT-literate society by the year 2020. The objective of the initiative was to transform the education system from the traditional paradigms of acquiring knowledge and memorising facts to fostering critical thinking and creativity through the deployment of new teaching methods and multimedia technology (Theaker, 1997). The Smart School Concept is about innovative ways of integrating technology in the Malaysian education system to enhance the teaching-learning process. The aim is to utilise e-learning resources to promote students' self-paced, self-accessed and self-regulated learning. The need for Malaysian 'Smart School pedagogy' epitomises this paradigm shift from teacher-centred to the learner-directed environment. In such an educational context, it is envisaged that the student continually learns from various sources, other than solely from the classroom-teacher.

In a blended learning strategy, the integration of e-learning resources and face-to-face teaching in educational system promises positive outcome for the students' learning experience. There is an increased expectation about the usefulness of electronic learning (e-learning) to complement traditional face-to-face learning in schools (MSC, 2007). However, the use of computer technologies in the Malaysian Smart Schools, have made slow progress even though the government has been generous in funding this category of schools. There are some questions, both theory and practice, concerning how the promised potential for these e-learning resources can be realised. The introduction of technology in the teaching and learning process invokes pertinent issues; concerning students' expectations and communication behaviour towards e-learning systems in these schools. These issues need to be addressed before Malaysian Smart Schools can make the anticipated progress in integrating technology in the school system. It is plausible that students' 'uses and gratifications' for e-learning resources may be a significant predictor of successful integration of these new technologies in education systems.

There is a need for analytical study in order to understand students' 'uses and gratifications' for e-electronic media in educational context. The assumption that students will always find some gratifications from any use of electronic media, can lead educators to adopt a complacently uncritical stance towards the constraints and affordances that come with e-learning media (Chandler, 1994). The problem is that there are several factors that may constrain students' 'uses and gratifications' for these e-learning resources, and consequently impede their learning experiences.

It is important to understand 'how and why' students use computer technology in educational context in order to: (i) detect students' preferences, expectations and learning difficulties; (ii) design and develop suitable e-learning resources that are in congruence with students' communication behaviour; and (iii) help teachers to support, guide and scaffold students' learning processes.

Uses and Gratification Expectancy framework

A theoretical framework for this study is grounded in the convergence of theories from various fields, specifically philosophical and epistemological perspectives, and communication theories. The role of communication in the learning-process, whether implicitly or explicitly expressed, is critical as it deals with the 'interpretation and transmission of information,' 'construction of meaning' and creation of new-knowledge, which together may influence students' learning experience. Communications theories relevant to this research study arise from the perspectives of media uses and gratifications. Uses and Gratification Theory presupposes prior adoption of an innovation and concerns itself with the individual user's motivations to continue the use of that technology (Ruggiero, 2000; Stafford, Stafford & Schkade, 2004).

Uses and Gratification theory is based on the notion that media cannot influence an individual unless that person has some use for that media or its messages (Rubin, 2002). This marks a shift from the traditional viewpoint of 'powerful-media-effects' theories, in which an audience is depicted as passive, and easily manipulated by media influences. This perspective is compatible with the constructive philosophy of learning, which emphasises that learning is an 'active' process, that is, "learning occurs most effectively when the student is engaged in authentic tasks that relate to meaningful contexts;" it is not something done to the student, but rather something that a learner does (Heinich et al., 1996, p.18). Uses and Gratification theory focuses on students' motives and their self-perceived learning needs: as a 'limited-media-effects' theory, this approach is concerned with 'what students do with education media'; this is in contrast to the 'powerful-media-effects' theories that are concerned with 'what media do to people' (Chandler, 1994; Littlejohn, 1996). Uses and Gratification approach also assumes that e-learning resources may compete with other information sources for satisfaction of students' learning needs. It presents a paradigm that suggests an 'active' participant that makes motivated choices. This approach focuses on students' 'active' participation by assessing their reasons for using e-learning resources to the disregard or in combination of other educational resources (Severin & Tankard, 1997). The theory suggests that students consciously choose the medium that could satisfy their learning needs, and that they are able to recognise their reasons for making media choices.

Some researchers argue that such an approach is too simplistic to accurately account for audiences' gratification sought (GS) or gratification obtained (GO) from the media (Littlejohn, 1996). In response to this criticism of 'Uses and Gratification' approach, Expectancy-value theory is invoked, in this study, to extend and add detail to the basic tenets of 'uses and gratifications' idea (Littlejohn, 1996). Expectancy-value theory links individual's needs or expectations to their individual goal satisfaction (Palmgreen, 1984; Vroom, 1995). According to Expectancy-value theory, students' 'communication behaviour' describes a set of 'beliefs and values' that may initiate the learners' tendency to integrate education media technology in their learning processes (Borders, Earleywine & Huey, 2004). It is thought that students' 'communication behaviour' shape their 'uses and gratifications' for these educational media. From this perspective, the integration of Expectancy-value theory and the Uses and Gratification theory serves to accommodate the suggestion that e-learning resources offer gratifications which are expected and valued by students.

The integration of the two theories forms the basis of a Uses and Gratification Expectancy (UGE) concept. Simply, this concept maintains that if 'students' 'expectancy' (beliefs and values) for e-learning resources is positive, it is likely that they would continue to use these education media; if negative, then they would tend to avoid them (Littlejohn, 1996; Palmgreen, 1984; Vroom, 1995). This is in accord with the constructivism perspective of learning, which maintains that knowledge is constructed based on the learner's experience and expectancy (beliefs and values) (Munro & Rice-Munro, 2004). This two-pronged approach attempts to relate students' 'uses and gratifications' for e-learning resources (gratification sought (GS)) and their 'Perceived e-Learning Experience' (gratifications obtained (GO)) (Littlejohn, 1996). The underlying assumption is that students, as active-media users, have expectations; they are value-oriented and that they play an active role in selecting and using education media to fulfil their learning needs (Palmgreen, 1984). According to a 1973 seminal study by Katz, Gurevitch and Haas, students expect and seek education media with a genre of communicative attributes that gratify their (i) Cognitive needs, (ii) Affective needs,

(iii) Personal Integrative needs, (iv) Social Integrative needs, and (v) Entertainment needs (Hamilton, 1998; Katz, Blumler & Gurevitch, 1974; Severin & Tankard, 1997).

According to Hamilton (1998), these dimensions of UGE concept may be defined as (1) Cognitive UGE, which refers to students tendency to seek acquisition of information, knowledge, understanding, creativity and critical thinking skills; (2) Affective UGE, which refers to students search for emotional fulfilment, pleasant feelings and aesthetic experience; (3) Personal Integrative UGE, which refers to students seeking credibility as capable self-regulated learners; (4) Social Integrative UGE, which refers to students seeking interaction and collaboration among the learning community; and (5) Entertainment UGE, which refers to students' tendency to seek e-learning resources that are fun and exciting, or soothing and calming. It is argued that these UGE aspects of learners' 'communication behaviour' towards e-learning resources are inextricable elements of the students' learning processes: the communication process initiates the learning processes and may influence the 'Perceived e-Learning Experience.' From this perspective, these dimensions of UGE aspects of students' communication behaviour form the premise for research hypotheses in the current study.

Research hypotheses

The hypotheses for this study are based on UGE conceptual framework, and inspired by philosophical and epistemological perspectives (Katz, Blumler & Gurevitch, 1974; Littlejohn, 1996; Munro & Rice-Munro, 2004; Palmgreen, 1984; Severin & Tankard, 1997). Five hypotheses are suggested and presented as follows:

1. The first hypothesis stems from 'Cognitive UGE' concept, which maintains that students use electronic media technologies to acquire data, information and understanding in order to be creative and critical thinkers as they construct new knowledge. It states that:
   H1: Students' Cognitive UGE for e-learning resources is positively related to their Perceived e-Learning Experience

2. The second hypothesis stems from 'Affective UGE' concept, which maintains that students seek aesthetical value and emotional fulfilment as they use computers and other media technologies in the process of knowledge construction. It states that:
   H2: Students' Affective UGE for e-learning resources is positively related to their Perceived e-Learning Experience

3. The third hypothesis stems from 'Personal Integrative UGE' concept, which maintains that students seek to integrate e-learning resources in their personal learning processes and through internalisation of new learning experience into their individual mental schema; they, individually, seek to internalise new interpretations, new meanings, and new knowledge as independent thinkers and self-regulated learners. This hypothesis states that:
   H3: Students' Personal Integrative UGE for e-learning resources is positively related to their Perceived e-Learning Experience

4. The fourth hypothesis stems from 'Social Integrative UGE' concept, which maintains that students seek social collaboration in order to integrate e-learning resources in their learning process, as they seek to create consensual meaning and co-construct new knowledge. The hypothesis states that:
   H4: Students' Social Integrative UGE for e-learning resources is positively related to their Perceived e-Learning Experience

5. The fifth hypothesis stems from 'Entertainment UGE' concept, which maintains that students seek e-learning resources that have some pleasurable value: fun and exciting, or even soothing and calming, in order to be mentally engaged and immersed in their learning processes, as they endeavour to construct new knowledge. The hypothesis states that:
   H5: Students' Entertainment UGE for e-learning resources is positively related to their Perceived e-Learning Experience

Research Method

Overview

This study utilised a cross-sectional survey type of research design. The purpose of this research was to explore 'how and why' UGE aspects of students' 'communication behaviour' towards e-learning resources may affect their learning experience, in a blended learning strategy. The study elicited data from students in Malaysian Smart Schools; their vantage points of view provided information on subtle but important aspects of Smart School classroom experience (Nair & Fisher, 2001). Question schedules centred on UGE aspects of students' 'communication behaviour' and their 'Perceived e-Learning Experience' (Table 3). A Uses and Gratification Expectancy Questionnaire (UGEQ) was developed to determine 'how and why' students' UGE for e-learning resources influences their 'Perceived e-Learning Experience.' The internal consistency of this instrument was examined using Cronbach's Alpha values (Table 4). Exploratory Factor Analysis (EFA) was used to identify dimensions of the students' UGE. These dimensions were further subjected to Confirmatory Factor Analysis (CFA) using structural equation modelling (SEM) technique; to verify their structure and examine the underlining dimensionality. Subsequently, a Uses and Gratification Expectancy Model (UGEM) was developed based on SEM procedures. The constructs (latent variables) were validated using standard statistical methods.

Sampling Frame

The Malaysian Smart Schools project encompasses 88 designated public Smart Schools; these are technology-enhanced public schools that are funded by the government. These pilot schools are meant to serve as a benchmark for the transformation of the schools, in Malaysia, into 'Smart Schools' status by 2010 (MSC, 2007). Currently 54 of these schools are residential Smart Schools. This study targeted a sample of students from these residential Malaysian Smart Schools. There are about 1000 secondary-level students in each of the 54 residential Malaysian Smart Schools; this translated into a target population of approximately 54,000 students. These types of residential Malaysian Smart Schools are distributed all over the country, both West (Peninsular) Malaysia and East Malaysia.

Stratified random sampling

In total nineteen secondary-level residential Malaysian Smart Schools were selected using stratified random sampling method, with at least one school representing each of the thirteen states in Malaysia. Stratified random sampling means that every student of the population had an equal chance of being selected in relation to their proportion of the total population (Denscombe, 2003). It is a mixture of random selection and purposive sampling.

Residential Malaysian Smart Schools were specifically selected because of the likelihood that the students, in these schools, could access the computers and had access to the internet either in school's computer laboratories or library. These criteria were essential in order to attain homogeneous sample and to minimise in-between group differences. Other considerations, why these residential Smart Schools were targeted, are (1) the Ministry of Education had equipped these schools with computer laboratories and internet connectivity; this meant (2) majority of the students had some access to computers, CD-based courseware from the Ministry of Education and had some internet access. (3) Since these students were residential, they formed a fairly homogenous group for such a study. (4) Residential Smart Schools were fairly distributed all over Malaysia, both Peninsular (West) Malaysia and East Malaysia. (5) These are national schools that admitted students from all over Malaysia. (6) There was fairly a big number of such schools, 54 in total, from which twenty one schools were selected (two of the schools were utilised for the pilot study, and 19 schools for the main survey). (7) Each school had about 1000 students, from which about 60 students were randomly selected.

Description of the sample

The targeted classes were Form 1, Form 2, Form 3 and Form 4 in the residential Malaysian Smart Schools. The participating students for this study fulfilled the following requirements: were computer literate; had some exposure to e-learning resources to be able to form an impression of it; had some access to the internet; could communicate in

English, use English-medium based CD-courseware from the Ministry of Education, Malaysia and, had capability to navigate through multimedia-based e-learning resources.

Sample size

In total 1003 students participated. The responses to the 'Uses and Gratification Expectancy Questionnaire' (UGEQ) were sorted out for usability. After cleaning the data, this resulted in 992 usable responses: 11 incomplete questionnaires were left out. Thus, a 99% usable response rate was achieved.

In keeping with the suggestions for sample size suitable for structural equation modelling (SEM) to be between 150 and 400 (Hair et al., 2006, p.741); approximately 40% of the sample was re-selected using the Random Command in SPSS 13. That is, 398 was selected out of the initial 992 usable responses of the participating students was utilised for structural equation modelling purposes. Hair et al. (2006) posit that, whereas a big sample size greater than 400 may be desirable, the structural equation model becomes unstable.

Participants' profiles

Demographics of the participating students

Out of the 992 useable responses, 441 (44%) of the sample were male students, and 551 (56%) were female: 113 (11%) were Form 1 (13 years of age); 306 (31%) were Form 2 (14 years of age); 87 (9%) were Form 3 (15 years of age); and 486 (49%) were Form 4 (16 years of age). The number of usable responses was randomly re-selected; using the Random Command in SPSS 13.0 and reduced to 398. The analysis of the demographics of this final survey sample is shown in Table 1.

Table 1: Demographics of the final survey sample

Class	Age (in years)	Number		Male		Female	
Form 1	13	26	7%	12	3%	14	4%
Form 2	14	148	37%	67	17%	81	20%
Form 3	15	41	10%	21	5%	20	5%
Form 4	16	183	46%	71	18%	112	28%
Total		398	100%	171	43%	227	57%

Table 2: Students' experience with the use of computers

Number	Measurement-Item	Range	%
Q6A	How long have used computers?	About 2 years or longer	97%
Q8A	Do you use a computer at home?	Yes	89%
Q12A	Do you use internet at home?	Yes	64%
Q1C	About how many times per week do use the computer?	Twice or more	73%
Q3C	About how many times per week do you use the internet?	Twice or more	47%
Q7A	Do you have an e-mail address?	Yes	75%
Q9C	Do you use technology to help you with your school work?	Yes	95%
Q10C	When you are at school, where do you use technology most often?	Classroom	22%
		Computer lab	65%
		School library	13%
Q11C	Outside of school, where do you usually access the internet?	Home	80%
		Cybercafé (CC)	14%
		Friend's house	2%
		Have no regular access to the internet outside school	17%

Students' experience with the use of computers

Table 2 shows students' experience in using computers in and out-of-school. Most (97%) of the participating students had used computers for about 2 years or longer. The overall results, from the demographics of the survey sample, suggest a statistically homogeneous group of students suitable for the purpose of this study (Table 1; Table 2).

Table 3: Constructs and measurement-items

pneumonic	Construct and Measurement-items
	Construct 1: Cognitive Uses and Gratification Expectancy
KNMNTHG3	I use computers to help me to know many things
SEARCH2	I use the internet to search for new information
ANSQU4	I carry out internet searches to answer questions coming from class discussions
EXPLORE5	I use computers to explore topics of interest, beyond my normal school assignment
	Construct 2: Affective Uses and Gratification Expectancy
TALKCO33	I like to talk to others about computers
SHOWF23	I like showing my friends how to use technology in different ways
AESTH17	Computer-based courseware layout, animation and illustrations are good to look at
ENJOY9	I enjoy working with a computer
	Construct 3: Personal Integrative and Gratification Expectancy
INTERN20	Learning to use internet is easy for me
COMPES19	Using computers is easy for me
ANYWT21	Using the internet allows me to be virtually anywhere at any time
NAVG54	I can search and navigate through multimedia content on CDs and on the internet
	Construct 4: Social Integrative Uses and Gratification Expectancy
FEEDBK27	Using e-mail gives me the feedback I need from others
EMAILF31	I use e-mail to interact with my friends
LEARNC28	Using the internet prepares me to join the extended learning community in the world
COMMUN52	Using computers improves my ability to communicate with other people
PARASO25	Using computers keeps me from feeling lonely
	Construct 5: Entertainment Uses and Gratification Expectancy
MUSND39	I like the background music and sound effects on the CD-courseware, they make learning fun
COMPGM38	I like playing educational computer games
EDUWEB36	I find educational websites on the internet to be interesting
FUN40	It is fun to experiment with technology
	Construct 6: Perceived e-Learning Experience
OWNPAC51	Using computer allows me to learn at my own pace
CONTRO50	Using computers gives me control over what I want to learn and when I want to learn it
CRITIC47	When I discover a new thing on the internet, I think about it critically
DISCOV46	I discover things on the computer on my own
ACCESS41	I am able to access information that I need from computers

Statistical sample power

In general statistics, the sample power is a function of the sample size (Hair et al., 2006); from this perspective the researchers used a sample size of 398 (*see Sample Size section*) of the usable responses in order to maximise on the statistical sample power. Statistical sample power refers to the ability to detect and reject a poor model. This is

especially critical in SEM analysis: in contrast to the traditional hypothesis testing, that tests for 'significant' result when $p<0.05$; the goal in SEM analysis is to produce a non-significant result, where $p>0.05$ (Chin, 1998; Hair et al., 2006).

Theoretical methods for calculating statistical power for SEM analysis are not robust nor is there an agreed upon standard (Chin, 1998). For practical purposes, Hair et al. (2006, p.741) recommend that a sample size of between 150 to 400 respondents are needed to derive adequate effect sizes; for models with three or more measurement-items (observable variables) per construct. Sample sizes lower than these values are not sufficient for convergence, and may result in misspecification; whereas sizes greater than 400 may result in an unstable model. In this study a final sample set of 398 respondents was obtained and used in the data analysis. Subsequent statistical calculations indicate that all the models tested in this study have adequate statistical 'model-fit' to draw proper conclusions regarding testing of the research hypotheses.

Exploratory List of terms

An exploratory list of terms that possibly describes students' UGE was identified as Cognitive, Affective, Personal Integrative, Social Integrative and Entertainment (Table 3). These are variant typologies of personal and media interactions, based on a 1973 study by Katz, Gurevitch and Haas (Hamilton, 1998; Rubin, 2002; Stafford, Stafford & Schkade, 2004).

Reliability Testing - Cronbach's Alpha

The researchers used Cronbach's Alpha value to assess the reliability parameters. It provided a summary of the inter-correlations that existed among the set of items. Any suspect measurement-items were removed. For this research study, the Cronbach's Alpha value was 0.9 implying a statistically acceptable internal consistency reliability; that is, since it is above 0.7 as suggested by Hair, et al. (2006), and Stafford, Stafford and Schkade (2004). The internal consistency reliability test results for the UGEQ are summarised in Table 4.

Table 4: Internal Consistency Reliability for UGEQ

Factor	Alpha	No. of Items
Cognitive Uses and Gratification Expectancy	0.6	4
Affective Uses and Gratification Expectancy	0.5	4
Personal Integrative Uses and Gratification Expectancy	0.7	4
Social Integrative Uses and Gratification Expectancy	0.7	5
Entertainment Uses and Gratification Expectancy	0.6	4
Perceived e-Learning Experience	0.6	5
Overall	0.9	26

The survey exhibited statistically acceptable internal consistency reliability; with all the six constructs attaining Cronbach's Alpha of 0.5 or higher (Table 4). Taken together, these values provide evidence of a reasonably good fit, which is suggestive of trait-valid component measures or measurement-items that share in the common core of each construct.

Content validity

Validity of the measurement-items was assessed, in order to determine if a measure adequately reflected the real meaning of the construct under consideration. Two types of validity checks were performed in the initial stages of scale development: (1) Content Validity and (2) Construct Validity (Hair et al., 2006). Exploratory Factor Analysis (Table 7) shows the relationship between measurement-items and their respective constructs.

Normality of the collected data

Structural equation model (SEM) analysis depends upon assumptions of normality (Tabachnick & Fidell, 2000). Although this assumption underlies most multivariate techniques, no direct test is available for multivariate normality. According to Hair et al. (2006) "most researchers test for univariate normality of each variable" (p.410). although this does not guarantee multivariate normality, "if all variables meet this requirement, then any departures from multivariate normality are usually inconsequential" (p.410).

To determine whether univariate normality exists, the researcher examined the distribution of each observed variable for skewness and kurtosis (Table 5).

Skewness

Skewness is the degree to which a variable's distribution is asymmetrical, with positive skew describing a distribution where many scores are at the low end of a scale. For the skewness index, absolute values greater than 3.0 are extreme (Chou & Bentler, 1995). Based on this criterion, this result is within the critical values (Table 5); this suggests that the data in this study represent a satisfactory normal distribution.

Table 5: Assessment of normality

Variable	min	Max	Skew	c.r.	kurtosis	c.r.
PARASO25	1.000	5.000	-1.601	-13.043	3.018	12.291
ACCESS41	1.000	5.000	-.641	-5.222	.555	2.259
FUN40	3.000	5.000	-.996	-8.114	-.008	-.031
ENJOY9	3.000	5.000	-1.032	-8.406	.043	.177
DSCOV46	2.000	5.000	-.262	-2.133	-.452	-1.841
CRITIC47	2.000	5.000	.700	5.703	-.412	-1.679
CONTRO50	1.000	5.000	-.263	-2.146	-.268	-1.092
OWNPAC51	2.000	5.000	-.241	-1.964	-.244	-.995
MUSND39	2.000	5.000	-.780	-6.350	-.171	-.696
COMPGM38	2.000	5.000	-.415	-3.379	-.498	-2.028
EDUWEB36	2.000	5.000	-.479	-3.898	.008	.034
FEEDBK27	1.000	5.000	-.499	-4.065	-.049	-.198
EMAILF31	1.000	5.000	-1.055	-8.589	.317	1.290
LEARNC28	2.000	5.000	-.408	-3.322	-.619	-2.521
COMMUN52	1.000	5.000	-.449	-3.653	-.060	-.243
INTERN20	2.000	5.000	-.501	-4.084	-.196	-.798
COMPES19	2.000	5.000	-.316	-2.575	-.612	-2.491
ANYWT21	2.000	5.000	-.249	-2.024	-.832	-3.386
NAVIG54	1.000	5.000	-.223	-1.817	.042	.173
TALKCO33	1.000	5.000	-.207	-1.683	-.192	-.783
SHOWF23	1.000	5.000	-.112	-.914	-.194	-.789
AESTHT17	1.000	5.000	-.761	-6.200	1.076	4.383
KNMNTHG3	1.000	5.000	-1.626	-13.244	4.038	16.443
SEARCH2	2.000	5.000	-1.160	-9.447	.947	3.856
ANSQUE4	1.000	5.000	-.018	-.146	-.340	-1.386
EXPLORE5	2.000	5.000	-.590	-4.802	-.423	-1.721
Multivariate					64.748	16.926

Kurtosis

Kurtosis curve represents an index of the peak and tails of the population distribution: (1) positive kurtosis reflects very peaked distributions representing few outliers; whereas (2) negative kurtosis exists when the distribution is quite flat indicating many outliers. Absolute values higher than 10.0 for the kurtosis index suggest a statistical problem, and values higher than 20.0 are considered to be extreme (Kline, 1998). Based on this criterion, this result is within the critical values (Table 5), and suggest that the data in this study represent a satisfactory normal distribution.

Data Suitability for Exploratory Factor Analysis

To examine the suitability of the data for subsequent exploratory factor analysis (EFA), two tests were used: (1) Kaiser-Meyer-Olkin Measure of Sampling Adequacy; and (2) Bartlett's Test of Sphericity.

Table 6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	2785.859
	Df	496
	Sig.	.000

Kaiser-Meyer Oklin Statistics

Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy is a static which indicates the proportion of variance in the variables which is common variance, that is, which might be caused by underlying factors (SPSS 13.0). KMO Measure of Sampling Adequacy tests that the partial correlations among variables are small. KMO values closer to 1.0 indicate strong partial correlations. A KMO value of 0.836 (Table 6), indicates a strong partial correlations is exhibited in the data for this study: this suggests that this data is suitable for Exploratory Factor Analysis.

Bartlett's Test of Sphericity

Bartlett's Test of Sphericity indicates whether the data correlation matrix is an identity matrix, which would indicate that variables in the data set are unrelated (SPSS 13.0). The significance level gives the result of the test. Very small values ($p<0.05$) indicate that there are probably significant relationships among the variables. Significance value higher than $p>0.10$, may suggest that the data is not suitable for factor analysis. However, in this case the significance value is $p< 0.05$ (Table 6), further confirming that this data is suitable for Factor Analysis.

Exploratory Factor Analysis

Exploratory Factor Analysis was used to group measurement-items into profiles representative of students UGE for e-learning resources. Exploratory Factor Analysis was used to clarify convergent and discriminant validity. All factors were extracted that had an eigenvalue >1.0, utilising a common factor model (using SPSS 13.0).

The Exploratory Factor Analysis (EFA) isolated six sub-dimensions, namely (1) Cognitive, (2) Affective, (3) Personal, (4) Social Integrative, (5) Entertainment of UGE, and (6) Perceived e-Learning Experience. The result from the data is shown in Table 7.

Construct validity

Construct validity or factorial validity, describes the logic of items which comprise measures of social concepts; this refers to the extent to which the empirical definition of the construct corresponds to the conceptual definition of the construct (Hair et al., 2006). Two types of construct validities were used to assess Construct Validity: (i) Convergent Validity and (ii) Discriminant Validity.

Table 7: Exploratory Factor Analysis

ITEMS	FACTORS	1	2	3	4	5	6
INTERN20	Personal Integrative	.816					
COMPES19		.785					
ANYWT21		.487					
NAVG54		.433					
FEEDBK27	Social Integrative		.767				
EMAILF31			.700				
LEARNC28			.521				
COMMUN52			.485				
PARASO25			.385				
KNMNTHG3	Cognitive			.712			
SEARCH2				.679			
ANSQU4				.656			
EXPLORE5				.542			
OWNPAC51	Perceived e-Learning Experience				.673		
CONTRO50					.626		
CRITIC47					.600		
DISCOV46					.572		
ACCESS41					.387		
MUSND39	Entertainment					.765	
COMPGM38						.764	
EDUWEB36						.510	
FUN40						.484	
TALKCO33	Affective						.683
SHOWF23							.634
AESTH17							.459
ENJOY9							.399

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.
Rotation converged in 6 iterations.

(i) Convergent Validity: The first test was Convergent Validity of a scale. This was checked by the items converge on a single cluster of items that essentially measure the same thing. The six constructs exhibited convergent validity (Figure 1), that is, high factor loadings among items of the same component.

(ii) Discriminant Validity: The second test was for Discriminant Validity, or the extent to which unique factors were indeed different from one another, and tendency for the factors to cluster together without significant cross-loadings (Figure 1). According to Hair et al. (2006), discriminant validity refers to the principle that the indicators for different constructs should not be so highly correlated as to lead one to conclude that they measure the same thing. This would happen if there is definitional overlap between constructs.

Nomological Validity

Nomological Validity examines whether the correlations between the constructs in the measurement theory made sense; from this perspective, the matrix phi (φ) of construct correlations was useful in this assessment. The results of matrix phi (φ) of construct correlations among these constructs (Figure 1; Table 9) support the prediction that the positive correlations among the exogenous constructs are significant.

Measurement and Structural Equation Modelling

A two-step approach was used to test the research hypotheses. According to Hair et al. (2006) and Kline (1998) it is appropriate to adopt a two-step procedure in structural equation modelling: that is, (i) Confirmatory Factor Analysis (CFA) – that involves separate estimate of the measurement model by establishing relationship between latent

constructs and measured variables (Figure 1) before, (ii) Structural Equation Modelling (SEM) – that establishes a set of one or more dependent relationships linking the hypothesised model's constructs (Figure 2); SEM focuses on the nature and magnitude of the relationships between constructs.

The first step, involving Confirmatory Factor Analysis (CFA), was to test the reliability and Construct Validity of the proposed measurement model. This measurement modelling procedure was performed to assess the relationship between each construct and its indicator variables. Once a satisfactory measurement model was obtained, the second step, involving Structural Equation Modelling (SEM), was to test the structural theory: that is, the structural model that best fitted the data was identified, and then the hypotheses were tested. "Separate testing of the measurement model via a two-step approach is viewed as essential since valid structural theory test cannot be conducted with bad measures" (Hair et al., 2006, p. 848). The satisfactory CFA measurement model (Figure 1) was then subjected to a SEM procedure to establish, if any, existence of dependence relationships (Figure 2), and to test whether the researchers' hypotheses were plausible (Table 10), based on the collected data.

Modification Indices

The researchers used modification indices, to identify the source of problems in poor fitting models. Modification indexes (MI) were used to obtain a satisfactory model by adding arrows (in AMOS 5.0, MI's function flags missing arrows which might be added to a model). These indices identify paths and co-variances, which were manipulated incrementally, to achieve greater fit of the model (Figure 2); based on UGE theoretical justification. This was done carefully to avoid the risk of 'capitalisation on chance' and model adjustments that would make no substantive sense (Hair et al., 2006). Model-fit improvement, based on this MI technique, is measured by a reduction in Chi-square; so, the researchers were looking for a non-significant ($p>0.05$) Chi-square. At the same time the aim was to obtain a final model that was parsimonious, that is, have simple structure, with as fewer paths as possible.

Results

Overview

The resultant UGEM is used to test the research hypotheses by statistically investigating 'how and why' students' Uses and Gratification Expectancy for e-learning resources influences their 'Perceived e-Learning Experience.' Three of the initial five research hypotheses were supported, while two of the hypotheses were found to be non-significant. In overall terms, these results suggest that students use e-learning resources to gratify their Cognitive UGE, Affective, UGE Personal Integrative UGE, Social Integrative UGE and Entertainment UGE. These findings reveal the underlying dimensions that represent trait-valid scales that may be useful for understanding 'how and why' students' Uses and Gratification Expectancy for e-learning resources influences their 'Perceived e-Learning Experience.'

UGEM Confirmatory Factor Analysis result

Confirmatory Factor Analysis (CFA) was necessary, before testing research hypotheses, in order to determine whether the 'Uses and Gratification Expectancy Model' (UGEM) was indeed an acceptable structural equation model. The following figure displays the UGEM's Confirmatory Factor Analysis results (Figure 1).

Some of the pneumonics used

COGNITIVE	Cognitive Uses and Gratification Expectancy
AFFECTIVE	Affective Uses and Gratification Expectancy
P.INTEGRAT	Personal Integrative Uses and Gratification Expectancy
S.INTEGRAT	Social Integrative Uses and Gratification Expectancy
E/TAINMENT	Entertainment Uses and Gratification Expectancy
LEARNEXPERIENCE	Perceived e-Learning Experience

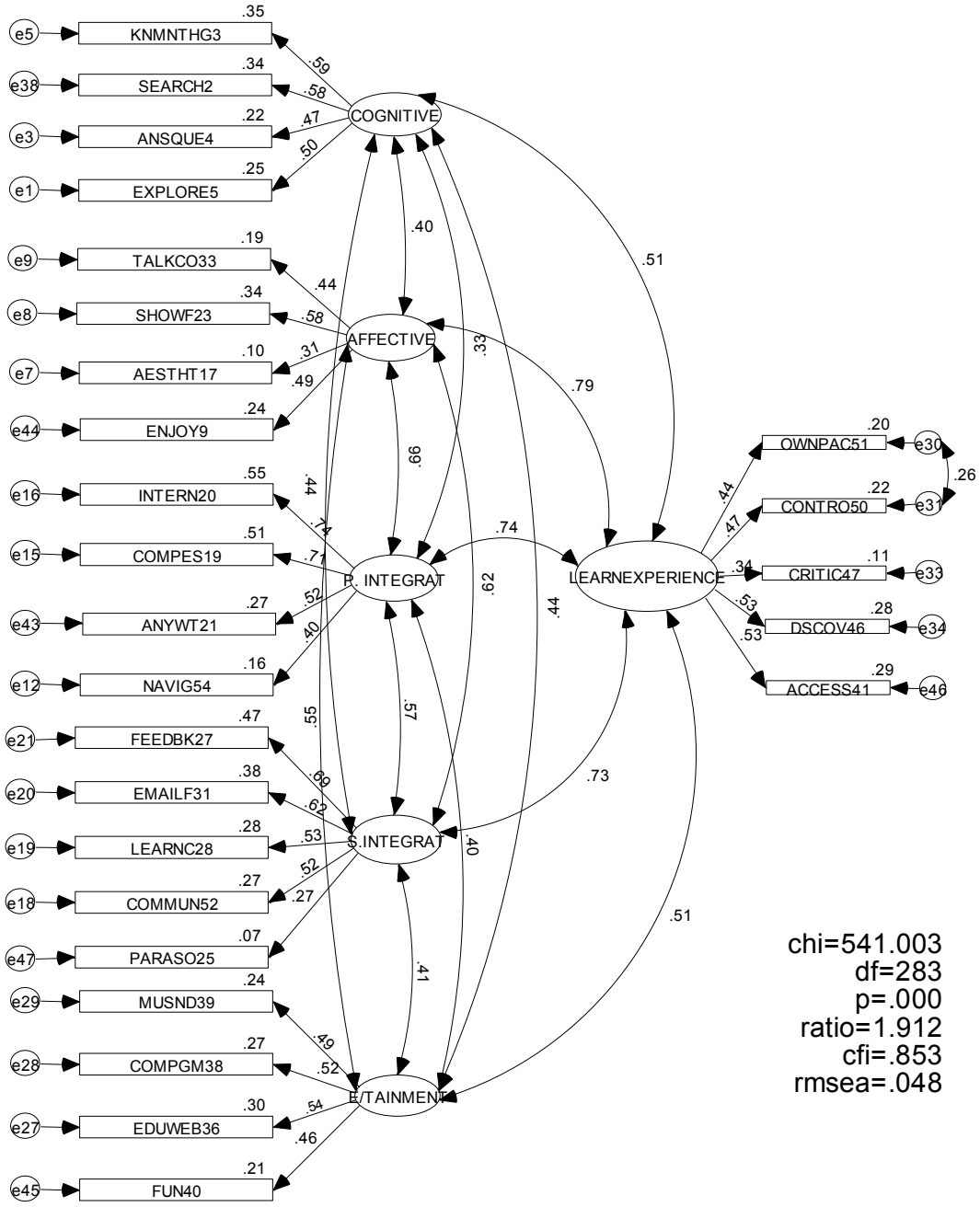

Figure 1: UGEM Confirmatory Factor Analysis

The summary of UGEM Confirmatory Analysis results are shown in Table 8. The p-Value of 0.00 is lower than the expected limits (≥0.05), the higher the better. However, the adjusted Chi-Square statistic, ratio derived by dividing the Chi-square amount by the degree of freedom, suggested the model was a good fit at 1.912, within the suggested limits =< 3.0 the lower the better. The Comparative Fit Index (CFI) was good at about 0.9, within the suggested limits ≥0.9.

The Root Mean Square Error of Approximation (RMSEA) was 0.05, less than 0.08, was acceptable; the smaller the RMSEA the better. A RMSEA of zero indicates a perfect model-fit. These results (Table 8) confirm that the Uses and Gratification Expectancy Model (UGEM) is a suitable measurement model for this study.

Table 8: Model Fit for UGEM

Fit Measures	Recommended Value	Value for this model	Adequate (Yes/No)
p-Value	$p \geq 0.05$ Higher value is better	0.00	No
Adjusted Chi-Square Ratio (χ^2/df)	≤ 3.0 Lower value is better	1.9	Yes
Root Mean Square Error of Approximation (RMSEA)	≤ 0.08 Lower value is better	0.05	Yes
Comparative Fit Index CFI	≥ 0.9 Higher value is better	0.9	Yes

Correlations among the UGE factors

The results further suggest that students' Cognitive, Affective, Personal Integrative, Social Integrative and Entertainment UGE; and their Perceived e-Learning Experience are significantly correlated as summarised in Table 9.

The results shown Table 9 suggest that (i) there are positive correlations among the various latent constructs, and (ii) that there are no multi-collinearity among the constructs since the correlation values are within the acceptable range, $r<0.9$. The significant ($p<0.05$) correlations suggest that these interrelated latent variables play an important role in the students' learning experience. Taking all these interrelationships into account, it may be postulated that these dimensions are inextricable elements of students' learning process: they are integral, if not initiating, part or all students' construction of new knowledge.

Table 9: Correlations among the Uses and Gratification Expectancy dimensions

Path (φ)			r	p-Value
COGNITIVE	<-->	E/TAINMENT	0.4	p<0.05
P. INTEGRAT	<-->	E/TAINMENT	0.4	p<0.05
S.INTEGRAT	<-->	COGNITIVE	0.4	p<0.05
E/TAINMENT	<-->	AFFECTIVE	0.6	p<0.05
COGNITIVE	<-->	LEARNEXPERIENCE	0.5	p<0.05
E/TAINMENT	<-->	LEARNEXPERIENCE	0.5	p<0.05
P. INTEGRAT	<-->	LEARNEXPERIENCE	0.8	p<0.05
COGNITIVE	<-->	AFFECTIVE	0.4	p<0.05
LEARNEXPERIENCE	<-->	AFFECTIVE	0.8	p<0.05
COGNITIVE	<-->	P. INTEGRAT	0.3	p<0.05
P. INTEGRAT	<-->	AFFECTIVE	0.7	p<0.05
S.INTEGRAT	<-->	P. INTEGRAT	0.6	p<0.05
S.INTEGRAT	<-->	E/TAINMENT	0.4	p<0.05
S.INTEGRAT	<-->	AFFECTIVE	0.6	p<0.05
S.INTEGRAT	<-->	LEARNEXPERIENCE	0.7	p<0.05

Uses and Gratifications Expectancy Model

The SEM's results of the study are displayed in the 'Uses and Gratification Expectancy Model' (UGEM) Figure 2.

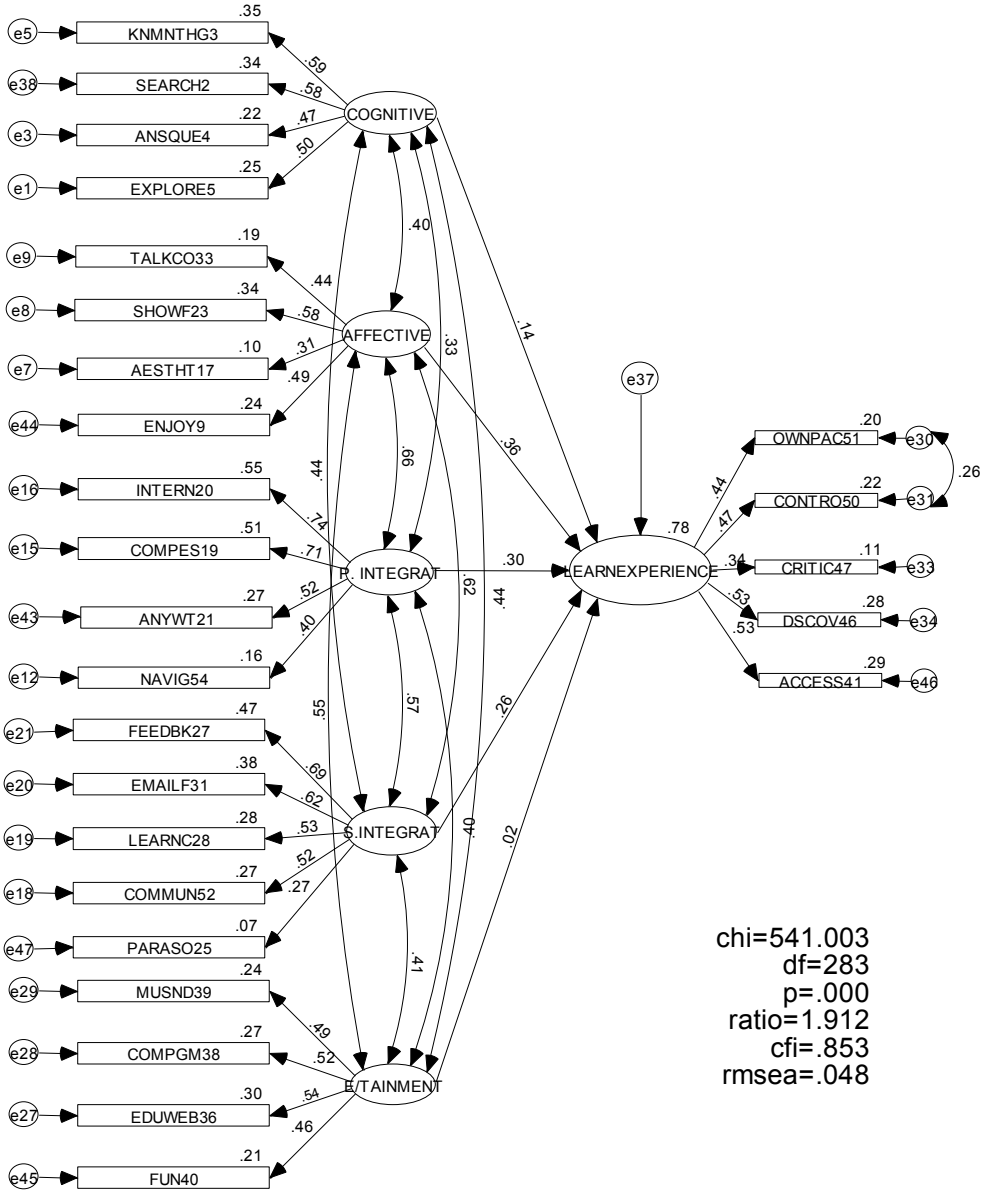

Figure 2: Uses and Gratifications Expectancy Model

Hypotheses testing results derived from Figure 2 are summarised in Table 10.

Table 10: Hypotheses results

Hypothesis	Path			γ	Sig.	Supported
H1 : $\xi_1 \rightarrow \eta_1$	COGNITIVE	→	LEARNEXPERIENCE	0.14	p>0.05	No
H2 : $\xi_2 \rightarrow \eta_1$	AFFECTIVE	→	LEARNEXPERIENCE	0.36	p<0.05	Yes
H3 : $\xi_3 \rightarrow \eta_1$	P. INTEGRAT	→	LEARNEXPERIENCE	0.30	p<0.05	Yes
H4 : $\xi_4 \rightarrow \eta_1$	S.INTEGRAT	→	LEARNEXPERIENCE	0.26	p<0.05	Yes
H5 : $\xi_5 \rightarrow \eta_1$	E/TAINMENT	→	LEARNEXPERIENCE	0.02	p>0.05	No

Variance of Perceived e-Learning Experience Explained

The Squared Multiple Correlation (SMC) was generated and used to explain the variance of students' 'Perceived e-Learning Experience.' SMC, equivalent to an R^2 in linear regression, is the explained variance of the each construct (Gefen, Straub & Boudreau, 2000). The overall SMC value, in this study, is high (0.78) (Figure 2), this finally confirms that the model fits the data well: the multiple regression equation fits the UGEM to predict a dependent latent variable (endogenous (η) construct) from the five independent variables (exogenous (ξ) constructs) (Equation 1). The result suggests that the predictors can explain 78% more of the variance of students' Perceived e-Learning Experience, than the 22% non-explanation attributed to error variance.

Model's prediction capability

The result shown in Table 10 suggests the model's multiple linear equation that predicts the students' 'Perceived e-Learning Experience':

$$\eta = \gamma_1\xi_1 + \gamma_2\xi_2 + \gamma_3\xi_3 + \gamma_4\xi_4 + \gamma_5\xi_5 + \zeta \qquad \text{Equation 1}$$

Where

η	represents Perceived e-Learning Experience
γ	represents path coefficient (regression weight)
ξ_1	represents Cognitive Uses and Gratification Expectancy
ξ_2	represents Affective Uses and Gratification Expectancy
ξ_3	represents Personal Integrative Uses and Gratification Expectancy
ξ_4	represents Social Integrative Uses and Gratification Expectancy
ξ_5	represents Entertainment Uses and Gratification Expectancy
ζ	represents the error terms

Discussion

The result of the study suggests that students' UGE for e-learning resources is positively related to their 'Perceived e-Learning Experience.' The 'Perceived e-Learning Experience,' as a consequential-effect for students using these media for education purposes increases as their cumulative expectancies are gratified (Equation 1). This is partially supported by Dependency theory, which states that the more the medium has to offer, the more useful it will become (Rossi, 2002). This viewpoint is in congruence with the UGE concept that reiterates the notion that students' 'Uses and Gratification Expectancy' for e-learning resources is a function of their 'beliefs and evaluations' of these education media: students will continue to use e-learning resources when their existing motives to use these educational media lead to more gratification. The results (Figure 2; Table 10) suggest that students use e-learning resources to gratify their (i) Cognitive UGE, (ii) Affective, (iii) UGE Personal Integrative UGE, (iv) Social Integrative UGE and (v) Entertainment UGE. These factors are discussed in the following sub-sections.

(i) Cognitive UGE

The result shown in Table 10 suggests that students' Cognitive UGE for e-learning resources has a positive value (0.14), but not significant ($p>0.05$) influence towards their 'Perceived e-Learning Experience.' The finding does not seem to support the first hypothesis (H1). However, a positive value of 0.14 suggests students' tendency to use e-learning resources to acquire information in order to construct new knowledge. The significance of Cognitive UGE may continue to vary as the efficacy of the e-learning systems continue to evolve and get refined, subject to (a) future development and deployment of e-learning resources and (b) various administrative and qualitative factors prevailing in the residential Malaysian Smart Schools.

The implications of the findings are that students seek information, understanding, creativity and critical thinking skills by utilising e-learning resources, provided for in a blended learning strategy. Some students are able to find, identify, manipulate and evaluate existing knowledge, from vast databases and resources available to them. There is need to encourage students to practice self-regulated learning: self-paced and self-accessed learning. This strategy

places focus on long-term mental development rather than short-term academic excellence (Infrastructure, 2005). Knowledge acquisition must shift from a passive, teacher-oriented approach to gaining knowledge and skills toward learning for life and work (Razali, 2002). Students must be challenged to integrate, both horizontally and vertically, this knowledge in their coursework and to solve problems in their daily lives. At the same time, they should develop skills to construct new knowledge to solve problems and to communicate this knowledge to others. There is a growing need for these generic skills rather than discipline-based skills (Andrews, 2004). Rote learning and the relevance of knowledge about facts is diminishing with an increasing emphasis on navigation, access, analysis, and creative transformation of information into knowledge (Jacobs, 2005).

(ii) Affective UGE

The results appear to support hypothesis (H2), which suggests that Affective UGE influences students' 'Perceived e-Learning Experience' by a positive value of 0.36 (Table 10); variation in this value is subject to various qualitative factors prevailing in the individual residential Malaysian Smart School and the student's personal circumstances. The practical and theoretical implications of the findings are that students' affective UGE for e-learning resources directly influences their cognitive processes. This hypothesis is supported by a meta-theoretical presumption that cognition and affect, while distinguishable in their ramifications towards students' communication behaviour, are closely related in the process of knowledge construction (Schlöglmann, 2001) and affective reactions (Atherton, 2005). The evidence from the data suggests that in order to enhance affective attributes of e-courseware, aesthetic design considerations such as computer graphics, typography, colour, navigational architecture, facial expressions, voice style, mood music and sound effects must be developed and deployed (Garrison & Anderson, 2003; Jennings, 2002).

There is need to maximise the degree of intuitiveness in an e-learning environment in order to minimise the learner's disorientation and cognitive overload (Hara & Kling, 2001; Kirsh, 2000; Lee, 2005). The key to affective and intuitive instructional design is that the learner should not have to think about his or her actions, but simply respond in an intuitive manner (Berry, 2002). Using today's technologies, user interfaces can be customised or personalised to support different approaches according to the learner's styles and preferences. Jennings (2002) posits that aesthetic design or cognitive aesthetics of e-courseware may influence students' communication behaviour, and have an emotional impact on the uses and gratification for the e-learning resources. It may be postulated that the students' emotional appreciation of cognitive aesthetics, may result in focussed attention, discovery-based learning, intrinsic gratification and overall-enhanced learning experience.

(iii) Personal Integrative UGE

The result suggests that Personal Integrative UGE influences students' 'Perceived e-Learning Experience' by a positive value of 0.30 (Table 10). This hypothesis (H3) is partially supported by Cognitive Evaluation theory that postulates that a major component of intrinsic motivation is the amount of control the learner feels over the learning situation (Becker & Dwyer, 1994). Personal Integrative UGE's pre-requisites include student's personal involvement, self-initiated learning and self-assessment.

The implications of this result are that students who are self-directed and actively involved in their own learning are likely to gain deep level of understanding (Beauschel, Gaiser & Draheim, 2003). In a blended learning strategy, students expect to be able to individually select the CD-courseware content, access the Internet and search for information relevant to their current areas of need, interest and self-study. They demand for interactive multimedia features that provide them with control rather than non-interactive, or passive, media. Becker and Dwyer (1994) found that the learners using interactive multimedia perceived greater degree of instructional control afforded by that information format, than that afforded by passive media. The learners exercise decisive control over their learning situation, and assume responsibility of their learning experience in terms of self-study and self-assessment. The role of the teacher should be to facilitate the teaching-and-learning process, so that locus of control for learning is passed from the teacher to the learner in a guided way, as student's self-efficacy is increased (Barone, 2005; Hase & Kenyon, 2000).

Personal Integrative UGE perspective emphasises on these aspects of self-regulated learning: (1) students are able to set their own study objectives and learn at their own pace (Chung & Reigeluth, 1992), (2) students with advanced knowledge or greater ability using e-courseware may be bored with repeating what they have already mastered unless they are allowed to choose the preferred content (Lunts, 2002), and (3) students who need some extra time to work on a topic or need to review previous topics, have an opportunity to establish better connections between relevant topics (Barone, 2005). This augurs well with the Malaysian Smart School concept, which advocates for self-paced practice, self-accessed, self-assessed and self-regulated learning (Infrastructure, 2005; Razali, 2002).

(iv) Social Integrative UGE

The result supports this hypothesis (H4) that Social Integrative UGE influences students' 'Perceived e-Learning Experience' by a positive value of 0.26 (Table 10). This finding suggests that social interaction enhances students' learning experience. Students seek guidance about the use of e-learning resources provided at their schools. They expect their teachers to be competent at the use of e-learning resources. Some students need "scaffolding" (Woolfolk, 1998), before they become self-regulated learners, progressing at their own pace, and at the same time meeting the requirements of the school-curriculum (Fergusson et al., 2005; Razali, 2002).

Faced with multimedia-based e-courseware, and the vast information of the internet's websites, the students require "encouragement to explore, but under the guidance of a teacher who, at each stage of progression, presents the essential tenets" (Jacobs, 2005). At the same time, interactive multimedia can afford learners with the possibility of vicarious experience by illustrating examples of other similar students performing tasks using skills to be learned; observation of other students using computers successfully can raise self-efficacy within an individual student by internally proposing to the learner that he possesses the capabilities to master comparable activities (Bandura, 1986). In general, as students get more opportunities to use computers, their self-efficacy increases and, in due course, they may increasingly find social usefulness associated with the use of these e-learning resources fostered through collaborative learning environment.

(v) Entertainment UGE

The result suggests hypothesis (H5) is not supported: that participating students' expectations for entertainment gratification from e-learning resources were not a significant influence towards their 'Perceived e-Learning Experience' (Table 10). However, a positive value of 0.02 suggests that there is a tendency for students to seek pleasurable value in the available e-learning resources. The significance of students' Entertainment UGE for e-learning resources is constrained by various qualitative and extrinsic factors, and at the same time it is still a subject of academic discourse and debate. In the past, the possibilities of positive effects of entertainment have received little attention from educators and education researchers, presumably because of stereotype and ready-condemnation of entertainment as cheap escapism (Bryant, 2002). There is a need for persistent re-evaluation of existing e-learning resources so that the appropriate entertainment value may be incorporated, innovatively, in future generations of these educational media, with possibility of positive consequences for the students' emotional welfare, pleasurable value and overall enriched learning experience. Today's students expect multimedia-based e-learning resources that afford them entertainment in the format of engaging visual models, music, narratives, sound-effects, animations, video, simulations, and educational games (Munro & Rice-Munro, 2004). Students' Entertainment UGE for e-learning resources may become significant as the efficacy of the multimedia-based e-learning systems continue to evolve and get refined.

(vi) Perceived e-Learning Experience

The results suggest that three hypotheses are supported: (H2) Students' 'Affective UGE' for e-learning resources is positively related to their Perceived e-Learning Experience (γ=0.357, $p<0.05$); (H3) Students' 'Personal Integrative UGE' for e-learning resources is positively related to their Perceived e-Learning Experience (γ=0.304, $p<0.05$); and (H4) Students' 'Social Integrative UGE' for e-learning resources is positively related to their Perceived e-Learning Experience (γ=0.261, $p<0.05$). Two hypotheses, however, are not supported: (H1) Students' 'Cognitive UGE' for e-learning resources is positively related to their Perceived e-Learning Experience (γ=0.145), but not significant

($p>0.05$); similarly to the H5 Students' 'Entertainment UGE' for e-learning resources is positively related to their Perceived e-Learning Experience ($\gamma=0.019$), but not significant ($p>0.05$).

Overall, the UGEM establishes positive relationships between students' UGE for e-learning resources, and their Perceived e-Learning Experience; although two of the dimensions are not significant based on available quantitative data. Together, the five dimensions of UGE explain about 78% of the variance in students' Students' 'Perceived e-Learning Experience' (Figure 2). The significance of these UGE aspects of students' 'communication behaviour' and the corresponding influence on their learning experience, may continue to vary as (1) the efficacy of the e-learning systems continue to evolve and get refined, and (2) students' get more ample access to these technologies, as the electronic media become cheaper and ubiquitous in future.

Limitation of the UGE model

Although the 'Uses and Gratification Expectancy Model' (UGEM) (Figure 2), generated and developed in this study, fits the data well and provides a theoretically consistent set of findings, there may be other unexamined models that fit the data equally as well or even better fit. This UGEM can at best be treated as a 'not-disconfirmed model,' that means, it is subject to further research and refinement.

In future research, it would be worthwhile to select diverse referent groups for use with UGEM in order to test and refine this model further. As this model has shown some promise in being able to predict students' 'Perceived e-Learning Experience,' albeit with a homogeneous sample of the students' population in Malaysia. Homogeneous sample, based on stratified random sampling method, was desirable in this study in order to "reduce the likelihood of extraneous variables having an impact on the research results (i.e., high internal validity)" (Reynolds & Diamantopoulos, 2000). According to Reynolds and Diamantopoulos (2000) the use of homogenous samples in such a research study is justified (i) when the constructs of interest are relevant to the specific homogeneous sample chosen: in this study this criterion underpins the investigation of UGE aspects of students' communication behaviour towards e-learning resources based on a sample of students drawn from Malaysian Smart schools, since these educational media are used in these schools (ii) when the objective is to test application of a theory: in this study this criterion underpins the testing of the 'Uses and Gratification' concept (an integration of two theories i.e. Uses and Gratification Theory, and Expectancy-value theory). However, in order to generalise the results within Malaysian schools and cross-country schools, probability sampling that yields heterogeneous samples (i.e. high external validity), which are representative of these populations, is necessary. In future, the UGEM should be tested with heterogeneous types of learners; across cultural, generational and digital divide within and outside Malaysia: only then can the full extent of its potential and generalisability be realised.

Significance of the study

The findings from this research suggest that students use e-learning resources to gratify their Cognitive UGE, Affective UGE, Personal Integrative UGE, Social Integrative UGE and Entertainment UGE. These results provide important information necessary to formulate incentives, strategies and learning environments that (a) are conducive to students' use of electronic media for educational purposes: this may be achieved by providing adequate e-learning resources to facilitate the teaching and learning process (b) motivate students to integrate the use of e-learning resources in studying core subjects like science and mathematics: this may be achieved by shifting from the traditional examination-oriented curriculum delivery, that tends to emphasis on rote learning and passing of examinations, towards a contemporary school-curriculum deployment and assessment procedures that reinforce creativity, innovation and problem-solving skills required in this digital era and (c) encourage media uses that motivate students to develop their creative and critical thinking skills; these are essential skill-sets necessary for problem solving and construction of new knowledge: these skills may be nurtured by integrating well-researched interactive multimedia-based e-courseware deployed as part of regular school-curriculum. In a blended learning strategy, these research findings may (1) help the school-administrators to determine the necessity to provide adequate computer facilities and suitable e-courseware in order for the students to realise full potential of electronic media technologies as educational resources, (2) encourage teachers to use innovative pedagogical techniques in lesson-delivery, and (3) guide teachers, as facilitators, to structure learning strategies that encourage student's self-paced, self-accessed, self-assessed and self-regulated learning.

These findings provide relevant information that should (i) help to detect students' beliefs, values, preferences, motivations and learning difficulties; (ii) support design and development of suitable e-learning resources that fulfil students' learning needs, expectations, interests and epistemological curiosity; (iii) help facilitators to scaffold, guide and support students' learning experiences; and (iv) guide students, teachers, educators, e-courseware developers and researchers on the efficacy of the Malaysian e-learning resources, designed to achieve national educational goals.

Conclusion

A 'Uses and Gratification Expectancy Model' (UGEM) is developed based on both theory and empirical findings. The model is used to investigate 'how and why' students' 'Uses and Gratification Expectancy' (UGE) for e-learning resources influences their 'Perceived e-Learning Experience.' This model establishes a structural relationship between UGE aspects of students' 'communication behaviour' and their 'Perceived e-Learning Experience.' The UGEM attempts to capture not only the evolving and complexity of students' UGE for e-learning resources, but also attempts to provide accurate interpretations of data analyses to predict students' 'Perceived e-Learning Experience.' The analytical results, based on this model, suggest that students' UGE for e-learning resources is a significant predictor of their 'Perceived e-Learning Experience.'

It is feasible to use the UGEM's parameters to predict the success of students' integration of technologies in their curriculum-based learning experience. The UGEM provides both descriptive and prescriptive applications: it describes factors that facilitate students' integration of technology in their learning processes; and outlines prescriptions and specific interventions that administrators and educators can implement to encourage regular use of technology to enhance students' learning experience. While this research focuses on students at secondary-school level, some elements in the UGE model may apply to students using e-learning resources at other levels of their education. This model gives researchers and educators a new tool to forecast the success of development and deployment of e-learning resources in education systems. The UGEM should aid courseware developers and education researchers in their quest for in-depth explanations about UGE aspects of the learners' 'communication behaviour' towards e-learning resources, and 'how and why' these factors influence students' learning experience. This study extends the existing knowledge on 'how and why' technology is used to fulfil individual students' learning needs. The overall theoretical and practical implications of this study contributes towards fostering an understanding of the generic relationship between 'media and learning' in contemporary education systems.

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