

# Assessment on Contents of the Learning Management System

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**Abstract**— Most assume that adult learners are not concerned with access to the LMS or even with using it in their learning and would prefer a more conventional mode of learning. However, at the Asia e University in Malaysia, most of the learners are adult learners who are actively engaged in utilizing learning materials available in the learning management system (LMS). A sample group of 145 adult learners responded to the study, demonstrating that the contents of the university's learning management system are of quality, complete, relevant and current. In addition, the sample group was satisfied (e-satisfaction) and will keep using the LMS (e-retention) in future.

**Index Terms**— learning management system, contents, e-learning, quality information, information completeness, information relevance, information timeliness (current), e-satisfaction, e-retention.

## 1 INTRODUCTION

THE Learning management system (LMS) is widely used in e-learning higher education institutions including the Asia e University, the Wawasan Open University, Unitar International University, and the Open University [1],[2],[3]. This is due to the communication interaction facilities provided by the system. In general, the LMS was developed using web-based technology that aims to provide three types of communication interactions, namely 1) between students and academic facilitators via internet communication tools like email, chat, forum, etc., 2) between students and the system, and 3) among peer students via email, chat, and so on [4]. A survey conducted by previous researchers showed that most university students preferred Moodle over other types of learning management systems [5], and which is what the Asia e University, Malaysia uses as a means to deliver course materials to students. In parallel with the communication interaction facilities requirements, Moodle also allows interaction between the course administrator, students, and course facilitators [6]. As such, the quality of the learning materials is an important aspect that needs to be examined by learning providers, especially in private higher education institutions that opt for e-learning in delivering teaching materials to students. For the purposes of this paper, the content of the learning management systems or LMS will be evaluated based on its information accessibility, information completeness, information relevance, and information timeliness.

## 2 LITERATURE REVIEW

### 2.1 The Learning Management System

The advancement of technology and greater emphasis on e-learning has spurred the development of a learning management system that can cater to the learning styles of higher education institution students.

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The reasons most cited for this development are the capacity to deliver training anytime and anywhere, as well as cost saving (as there are no traveling, accommodation or tutor costs incurred). However, one of the main disadvantages of the e-learning experience is isolation and a lack of tutor guidance [7],[8]. Nevertheless, students have shown that they are willing to use the LMS provided it is user friendly and provides good support services like the IT Helpdesk and if, more importantly, it can fulfill the needs of on-demand content [9]. As such, the learning management system refers to systems that organize and provide students, teachers and administrators with access to online learning services [10]. Most learning management systems allows users to upload course information into the Web, including text, documents, files of many types including MS-Office, audio, images, grade books, assessments, hyperlinks, discussion boards and chat rooms [11],[12],[13]. In the online learning environment, the academic facilitator that uses LMS for a given course can administer said course, upload learning materials, give online tests and feedback, and so on. As for the students' side, the system allows them to upload documents, download learning material for learning purposes and interact with the academic facilitator through forums, chat and so on. The LMS is also able to provide on-demand content as needed by learners. In learning management systems, the main characteristics of learning objects are reusability, accessibility, portability, interoperability and durability [14].

### 2.2 Learning Management System – Content – Information Quality - IQ

In the Hexagonal e-learning assessment model (HELAM), content quality falls under technical issues, and the items under consideration are curriculum management, course flexibility, interactivity, practice exams, case studies, slides, content quality, assignments, tutorials, and exams [10]. All these reflect that good content information quality is important to encourage students to use the system. For the purposes of this study,

information quality is divided into four areas namely information accessibility, information completeness, information relevance and information timeliness [10],[11].

### 2.3 Learning Management System – Content – Information Accessibility

Information accessibility has become crucial in an education setting where higher learning institutions use learning management systems to deliver course materials and content to students. Most higher education institutions that utilize learning management systems will usually use Blackboard, WebCT, Learning Space, Moodle and other platforms to provide Web-based content [12]. A survey conducted by previous researchers indicated that a system that was unified and easy to access while allowing quick and easy location or retrieval of information was seen as the most desirable by most internet users [11],[15]. However, this depended on the accessibility of the system's design [16]. The accessibility of a system's design would allow users to perform retrieval activities with ease regardless of whether different machines or operating systems were used.

### 2.4 Learning Management System – Content – Information Completeness

The content or information is expected to be skewed towards industry standards so that it can be reused and interchanged across the various learning platforms. Since the cost of developing material for e-learning content is far greater than developing material for traditional classroom instruction, this means that the cost will be reduced when more students are able to access the content. The content is also reusable and easily adapted to the learning environment [8], [11]. Further, information completeness is valuable to students as it will help them adhere to the right direction and not go astray in their studying.

### 2.5 Learning Management System – Content – Information Relevance

LMS content should be clear, user-friendly, well-designed, and interactive [10],[17],[18],[19],[20],[21]. The information uploaded into the LMS must be relevant because it will be the key component in addressing the students' study needs.

### 2.6 Learning Management System – Content – Information Timeliness (Current)

The contents of the LMS should be current, timely, up-to-date, and contemporary [10],[17],[18],[19]. This is an important criterion for the contents of the LMS since it will meet the right knowledge requirements at the right time for the students. Current and updated content will be of more useful to students than the outdated content. This implies that there is a sense of time sensitivity related to the contents in which students will use the learning materials in their study provided that the information is timely.

### 2.7 E-satisfaction

E-satisfaction is used to measure the overall satisfaction of the online learning experience over a period of time for e-learning

students. Students who perceived e-learning to be useful and valuable are more likely to be satisfied with their learning experience [22]. Student satisfaction varies depending on the objectives of the system provided [23], for example, the need for the LMS to provide the necessary information with up-to-date learning resources, timely announcements, and other relevant learning materials needed to enhance the delivery of learning materials to e-learning students. However, if that which is to be presented or made available is lacking in quality, then the students' e-satisfaction will consequently be lower. Studies have indicated that information quality (content) is also used in evaluating the e-satisfaction of an e-learning system [24], [25].

### 2.8 E-retention

E-retention or retention is used to determine the loyalty of students or customers [26]. Most e-learning students in Malaysia and many other countries are balancing their studies with their careers, personal lives, and family commitments. However, if the e-learning students dare to take up the challenge to familiarize themselves with the new technology and benefit from the learning experience, their e-satisfaction and e-retention will increase [27], [28], [29], [30].

## 3 METHODOLOGY

### 3.1 Sample and Data Collection Method

Questionnaires were distributed to the Asia e University via an e-mail blast, and 145 people responded to it. The intended questionnaire is for all students that are enrolled for the September 2012 semester. Our target was for 200 students to respond to the questionnaire, and we only collected 145 usable sets.

### 3.2 Instrumentation

The items for each component were derived from past literature, as shown below.

Table 1: Item Descriptions

Items – Contents – Information Accessibility	References
1. The information in the PLS or LMS is easily retrievable.	[10],[17],[18],[19]
2. The information in the PLS or LMS is easily accessible.	
3. The information in the PLS or LMS is easily obtainable.	
4. The information in the PLS or LMS is quickly accessible when needed.	
Items – Contents – Information Completeness	References
1. The information in the PLS or LMS includes all the necessary values.	[10],[12],[17],[18] ,[19],[20]
2. The information in the PLS or LMS is complete.	
3. The information in the PLS or LMS is sufficiently complete for our studies.	
4. The information in the PLS or LMS covers the needs of our studies.	
5. The information in the PLS or LMS has sufficient breadth and depth for our studies.	
Items – Contents – Information Relevance	References

1. The information in the PLS or LMS is useful for our studies.	[10],[17],[18],[19],[20]
2. The information in the PLS or LMS is relevant to our studies.	
3. The information in the PLS or LMS is appropriate for our studies.	
4. The information in the PLS or LMS is applicable to our studies.	

Items –Contents- Information Timeliness	References
1. The information in the PLS or LMS is sufficiently current for our studies.	[10],[17],[18],[19]
2. The information in the PLS or LMS is sufficiently timely for our studies.	
3. The information in the PLS or LMS is sufficiently up-to-date for our studies.	
4. The information in the PLS or LMS is contemporary enough for our studies.	

Items – E-Satisfaction	References
1. I am satisfied with services offered by the PLS or LMS.	[22],[23],[25]
2. I have increased the frequency of visiting the PLS or LMS.	
3. I have recommended others to use the PLS or LMS for learning.	
4. The PLS or LMS provides me with the complete information necessary for my learning activities.	
5. Overall, I am satisfied with the PLS or LMS.	

Items –E-Retention	References
1. I intend to continue using the PLS or LMS.	[7],[28]
2. I recommend the PLS or LMS to others.	
3. I encourage others to use the PLS or LMS.	
4. I have a positive opinion of the PLS or LMS.	
5. I will continue using the PLS even if I have problems using it.	

## 4 FINDINGS AND DISCUSSIONS

### 4.1 Demographic Profile of Respondents

145 students responded to the survey, and it is representative of the total population of the Asia e University students in Malaysia. Table 2 shown demographic profiles of the e-learning students responded to the survey. Only 24.1% of the respondents were unemployed and the rest were employed. 66.9% of the respondents worked in the private sector, 6.9 % in the public sector, and 26.2% in other sectors. The age group of the respondents showed that 26.2% were below 25 years old, 11% were in 26-30 years old, 49.6% were 31 - 50 years old, and 13.8% were above 50. As such, most of the respondents were above 30 years old. About 62.8% of the respondents were female. 19.3% were Malay, 24.8% were Chinese, 29.7% were Indian, 25.5% were Indonesian and 0.7% was from other ethnic groups. In terms of work experience, 47.6% of the respondents have worked for more than 5 years. 62.1% of the respondents were pursuing a PhD, 46.2% of the respondents were from the School of Management and 64.8%. of the respondents were in their first year at AeU.

Table 2: Demographic Profiles

Item	Frequency	Percentage
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<b>Employment</b>		
Unemployed	35	24.1
Employed	97	66.9
Self-Employed	13	9.0
<b>Total</b>	145	100.0
<b>Age Group</b>		
Below 25	38	26.2
26 – 30	16	11.0
31 - 35	21	14.5
36 - 40	20	13.8
41 – 45	20	13.8
46 - 50	10	6.9
Above 50	20	13.8
<b>Total</b>	145	100.0
<b>Ethnic Group</b>		
Malay	28	19.3
Chinese	36	24.8
Indian	43	29.7
Indonesian	37	25.5
Others	1	0.7
<b>Total</b>	145	100.0
<b>AeU Program</b>		
DBA	7	4.8
Master	90	62.1
Bachelor	43	29.7
Diploma	5	3.4
<b>Total</b>	145	100.0
<b>Number of Semesters at AeU</b>		
Year 1	94	64.8
Year 2	35	24.1
Year 3	12	8.3
More than 3 years	4	2.8
<b>Total</b>	145	100.0
<b>Sector Type</b>		
Private	97	66.9
Public	10	6.9
Others	38	26.2
<b>Total</b>	145	100.0
<b>Gender</b>		
Male	54	37.2
Female	91	62.8
<b>Total</b>	145	100.00
<b>Years of Working</b>		
<b>5 years and less</b>		
6 - 10	61	52.14
11 – 15	26	22.22
16 – 20	13	11.10
21 – 25	6	5.12
More than 25	6	5.12
More than 25	5	4.3
<b>Total (missing 28)</b>	117	100.0
<b>AeU School</b>		
School of Management	67	46.2
School of Education	43	29.7
School of ICT	33	22.8
School of Graduate Studies	2	1.4
<b>Total</b>	145	100.0

### 4.2 Content - Information Accessibility

145 students agreed that the learning management system at the Asia e University is accessible because it is easily retrievable, accessible, obtainable and quickly accessible when needed. The respondents rated the ease of accessibility of the information in the PLS or LMS as being quite high. This indicates that the learning materials are easily accessible to stu-

dents for their learning purposes and needs.  
Table 3: Descriptive Analysis on Accessibility

Items	Mean	Std. Deviation
1. The information in the PLS or LMS is easily retrievable.	3.8414	0.84718
2. The information in the PLS or LMS is easily accessible.	3.8483	0.90777
3. The information in the PLS or LMS is easily obtainable.	3.8138	0.88181
4. The information in the PLS or LMS is quickly accessible when needed.	3.7517	0.92444

#### 4.3 Content – Information Completeness

145 students at the Asia e University agreed that the information in the learning management system is complete as the information includes all the necessary values, is sufficiently complete, covers the needs of their studies and has sufficient breadth and depth for their studies. On the other hand, students also perceived that the information in the PLS or LMS was less than complete. This implied that some improvement is needed to fulfill the information completeness criteria.

Table 4: Descriptive Analysis on Completeness

Items	Mean	Std. Deviation
1. The information in the PLS or LMS includes all necessary values.	3.6552	0.81972
2. The information in the PLS or LMS is complete.	3.3310	1.01417
3. The information in the PLS or LMS is sufficiently complete for our studies.	3.6276	0.84117
4. The information in the PLS or LMS covers the needs of our studies.	3.6759	0.84888
5. The information in the PLS or LMS has sufficient breadth and depth for our studies.	3.6966	0.83603

#### 4.4 Content – Information Relevance

The 145 students responding to the survey agreed that the information is relevant as it is useful, relevant, appropriate and applicable to their studies. Most students agreed that the learning materials uploaded to the LMS are relevant to their studies. This suggests that the information relevance criterion has been fulfilled.

Table 5: Descriptive Analysis on Relevance

Items	Mean	Std. Deviation
1. The information in the PLS or LMS is useful for our studies.	3.7517	0.88609
2. The information in the PLS or LMS is relevant to our studies.	3.7724	0.84775
3. The information in the PLS or LMS is appropriate for our studies.	3.8000	0.81309
4. The information in the PLS or LMS is applicable to our study.	3.7103	0.82426

#### 4.5 Content – Information Timeliness

The 145 students responding to the survey agreed that the information in the information management system is timely as it is sufficiently current, up-to-date, and contemporary. All 145 respondents disagreed that the information in the learning management system is old-fashioned. With timely informa-

tion, students will be at ease with their studying and learning.  
Table 6: Descriptive Analysis on Timeliness

Items	Mean	Std. Deviation
1. The information in the PLS or LMS is sufficiently current for my studies.	3.7103	0.84916
2. The information in the PLS or LMS is sufficiently timely for my studies.	3.5862	0.90972
3. The information in the PLS or LMS is sufficiently up-to-date for our studies.	3.6414	0.91800
4. The information in the PLS or LMS is contemporary for our studies.	3.5310	0.85029
5. The information in the PLS is old-fashioned for our studies.	2.9172	1.11495

#### 4.6 E-Satisfaction

145 students responded to the survey agreeing that they are satisfied with the LMS services, have increased their frequency in visiting it, would recommend that others use the LMS for learning purposes, believe that the LMS provides complete information necessary for learning activities, and are overall satisfied with the LMS.

Table 7: Descriptive Analysis on e-satisfaction

Items	Mean	Std. Deviation
1. I am satisfied with the services offered by the PLS or LMS.	3.7103	0.9422
2. I have increased my frequency of visiting the PLS or LMS.	3.6621	0.8516
3. I have recommended that others use the PLS or LMS for learning.	3.6207	0.9134
4. The PLS or LMS provides me with the complete information necessary for my learning activities.	3.6552	0.8529
5. Overall, I am satisfied with the PLS or LMS.	3.7103	0.8573

#### 4.7 E-Retention

The 145 respondents said that they would continue using the LMS, would recommend it to others, would encourage others to use the LMS, have positive opinions of the LMS and would still use the LMS even if they encountered problem while using it.

Table 8: Descriptive Analysis on e-retention

Items	Mean	Std. Deviation
1. I intend to continue using the PLS or LMS.	3.8759	0.8406
2. I recommend the PLS or LMS to others.	3.8000	0.9021
3. I encourage others to use the PLS or LMS.	3.7862	0.8787
4. I have a positive opinion on the PLS or LMS.	3.7931	0.9588
5. I will continue using the PLS even if I have a problem using it.	3.7931	0.8811

#### 4.8 Correlation Analysis

There are positive and direct correlations of the content in terms of accessibility, completeness, relevance and currentness. There are high correlations of e-satisfaction with all the content or information quality of the LMS. However, for e-retention, it was shown that there was a moderate correlation

with accessibility, completeness and timeliness, but a high correlation with relevance. E-satisfaction and e-retention is highly correlated for this study. These results suggest that the information quality of the content of the LMS is positively related to e-satisfaction and e-retention. This implies that content information quality must be of a high standard so that the students will be satisfied and will continue to use the LMS.

Table 9: Pearson Correlation Findings

	Access	Complete	Relevance	Updtd	E-satisfn	E-retentn
Access	1	.666**	.675**	.572**	.702**	.570**
Complete		1	.731**	.797**	.728**	.607**
Relevant			1	.747**	.739**	.736**
Updated				1	.724**	.650**
e-satisfctn					1	.835**
e-retention						1

## 5 DISCUSSION

### 5.1 Contents, E-Retention and E-Satisfaction

This study shows that the parameters of information content quality are positively related to satisfaction and retention. This implies that students will use a learning management system provided that the information content is complete, relevant, timely and accessible. The findings also implied that learning materials and resources uploaded to the LMS must be of high quality so that the students will return and use the LMS regularly to help them with their studies. Subject matter experts developing learning materials should be evaluated so that they would be better equipped to capture the students' interest. Better and improved learning materials would lead better opportunities in enticing potential students to enroll with the university.

### 5.2 Future Research Direction

A similar study may be expanded to other universities in Malaysia to evaluate whether the students at other universities that have adopted e-learning also experience high e-satisfaction and e-retention. The institutions which have implemented the LMS should take the initiative to evaluate the content information quality uploaded into the system. Furthermore, an important avenue for future research would be to include system quality and service quality.

### 5.3 Recommendations

This research explores the relationship between content information quality and e-satisfaction and e-retention. The research findings suggest that information quality is an important issue of consideration for higher learning institutions where students are solely dependent on the LMS for their studies and learning. Broken links and errors found within the contents would lead to an abandonment of the use of the LMS by students. Furthermore, poor information quality provided by the institutions in question would result in a loss of potential students. As such, it is important for higher learning institutions to assess the information quality in their LMS.

## 6 CONCLUSION

This study presents an initial investigation on content information quality dimensions that affect e-satisfaction and e-retention. Students perceived that the content information quality dimensions: accessibility, completeness, relevance and timeliness are positively related to e-satisfaction and e-retention. Thus, the overall indication of the results was that the information quality of the content in the LMS was positively related to e-satisfaction and e-retention.

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