# The Requirements for Assessing Students' Contributions to Internet Forums in Information Systems Education

Mee Chin Wee and Zaitun A. B. Faculty of Computer Science & Information Technology University of Malaya 50603 Kuala Lumpur, Malaysia Fax: 603-79579249 <u>mcwee@yahoo.com</u> <u>zab@um.edu.my</u>

#### ABSTRACT

Project-Based Learning (PBL) is an essential component of Information Systems (IS) degree program. PBL provide an opportunity for students to analysis, synthesis and evaluate the knowledge they learned in IS courses. Educators could assess students' achievement on higher order thinking skill via projects. Team collaboration is an important element in PBL. Discussion among students working on the same project must be supported. Standard web collaboration and communication facilities such as Internet forums were used to collaborate and discuss project related issues among students. Assessing students' contributions to Internet forums have become an important task. This paper reports the findings of a survey on current practice of PBL in IS education, the use of Internet forums, the need to have a computer generated performance indicator and the requirements related to a computer generated performance indicator for assessing students' contributions to Internet forums for IS education. The survey was conducted in Malaysian Universities.

Key Words: Project-Based Learning, Internet Forums, Assessment, Students' contributions, Performance Indicator

## 1. Introduction

The Information Systems (IS) academic community regards PBL as an essential component of IS degree program [1]. PBL in IS curriculum has two purposes. First, it provides an opportunity for students to synthesis the knowledge they learned in the course. Second, it closely models professional practice in industry. PBL is a model of learning that organizes around projects. PBL is a constructivist approach to learning. Constructivism is a learnercentered approach that emphasizes the environment in which learning occur. In effect, the environment should provide a firm foundation for scaffolding learning for instance through a forum for sharing problem solving strategies. Hence, students are encouraged to reflect what they learned through discussions among themselves. Moreover, educators usually did not provide enough feedback for their students in PBL [2]. Internet Forums facilitate a socio-constructivist approach to teaching by allowing students to develop learning communities through sharing and reflecting upon their experiences and perspectives to one another online. Internet forums better accommodates the schedules and preferences of students, as the technology allows access at times of their choosing and is not dependent on a specific physical place. Assessing students' contributions to Internet forums have become an important task. There are many reasons why assessing students' contributions are necessary. Among them are to encourage students' participation, and to ensure student's contributions are focus on the topic given. However, to accurately assess students' contributions to

Internet forums is a time consuming task as an educator has to read all the discussions.

The goals of this study were to examine the current practice of PBL in IS education, the use of Internet forums to support student discussion in PBL, the needs to have a computer generated performance indicator, and other requirements related to a computer generated performance assessing the students' indicator for contributions to Internet Forums for IS education. The paper starts with a brief discussion of the theory and research underlying discourse analysis as it applies to threaded discussion forum assessment. The methodology that used to collect data on the goals of this study is followed. The paper continues with an analysis of the survey findings and its conclusion.

## 2. Discussion analysis

In the literature, typically, analysis of messages in Internet forums is at a number of different levels. These include the frequency/patterns of interaction; message length; timeliness of posts; and content analysis of messages. The following discuss the various participation indicators found in the literature.

## 2.1. Total number of postings

Collaborative learning can increase student achievement and higher-level thinking [3]. Student participation is a key to effective collaborative learning [4]. These research findings and observations indicate that students need to be active participants in order to succeed. From previous studies, it is found that "student postings constituted one indicator for actual participation in the course since it showed the number of times students read and responded in writing to other's postings" [5]. If posting a message is considered as one class activity, activeness of participation can be measured by message count, which is the number of messages posted by a student.

## 2.2. Message Length

Previous studies have found a positive relationship between the amount of time students spend reading postings and engaged in virtual dialogue with their classmates and their achievement of course objectives [6]. Therefore, students' effort in the virtual dialogue could be reflected by the amount of words they post to the system. Message length measure is defined to measure a student's effort in the class by counting all the words; no matter duplicated or not, in the student's messages.

#### **2.3.** Timeliness of posting

In terms of timeliness, regular due dates were best for stimulating the discussion online. Without deadlines, student might tardiness. The best interaction comes when posts are made in a quick sequence. Some students will not participate until other students had posted their work or wait until just before the discussion ends [7]. Early participation and feedback is encouraged in Internet forums.

#### 2.4. Message categorisation

Dringus and Ellis have developed a tool for categorizing and describing contributions in discussion forums [8]. The tool named Scale for Forums/Online Discussion Assessment (SCAFFOLD) is build upon the theoretical foundation established in the literature to develop a meaningful. usable schema for categorizing and describing discussion forum contributions. Dringus and Ellis summarised a range of participation indicators identified in the literature (including models for analyzing the process of learning in Internet forums such as Henri's model and Garrison and Anderson's Practical Inquiry Model of Cognitive Presence) and develop a list of 19 participation indicators. SCAFFOLD was evaluated and the results were positive for developing and conveying feedback on discussion forum assignments [9]. The list of indicators is adopted in this study since it items contains the elements of the highest level of knowledge that is analysis, synthesis, and evaluation. These highest

level of knowledge is important as IS academic community emphasized the importance of developing students' problem solving and critical thinking abilities as the exit characteristics of its IS.

#### 2.5. Content analysis

Another way to measure effective participation is utilizing Bloom's Taxonomy of Educational Objectives to interpret discourse contributed by students. The taxonomy identifies six educational objectives, listed in order of cognitive They are knowledge, complexity. comprehension, application, analysis, synthesis and evaluation. To determine the effectiveness of a student's participation in online discussions, an educator is manually categorising message according to Bloom's taxonomy of cognitive objectives by reading the text messages. Effective discussions address higher order skills in Bloom's hierarchy by engaging students in applying theories, examples, distinguishing between facts, evaluating responses of other students. providing opposing viewpoints as well as feedback on other discussion posts.

An approach to analyze the process of learning is proposed by Henri. Henri developed a model based on the educational quality of messages and focuses on the level of participation and interaction within the discussion group. Transcripts are analyzed according to five dimensions, these being participative, interactive, social, cognitive and metacognitive [10]. The model allow analysis of a range of aspects of an online discussion, the level of participation in the form of usage statistics, the nature of the interaction between contributors, and an indication of the learning process through an analysis of the cognitive activity evident in the message content. McLoughlin and Luca found Henri's content analysis model applicable to a teacher-centred discussion model but unsuitable to a constructivist student-centred discussion model [11]. Limitations of the coding approach include the difficulty to implement with less structured online discussions, the difficulty for assessors to make consistent judgments, and it is cumbersome to use.

approach for analyzing the Another process of learning in asynchronous learning network is Practical Inquiry Model of Cognitive Presence [12]. The practical inquiry includes four phases in describing cognitive presence in an educational context generally, in e-learning specifically. The phases are trigger event, exploration, integration and resolution. Cognitive presence means facilitating the analysis, construction, and confirmation of meaning and understanding within a community of learners through sustained discourse and reflection largely supported text-based communication. by The objective is to use indicators to assess critical thinking and discourse with regard to the developmental phases of practical inquiry. The descriptors and indicators that correspond to each phases of the practical inquiry process were used to assess students' contributions. Limitation of the coding approach is the difficulty for assessors to make consistent judgments.

## 3. Methodology

The data collection instrument was a selfadministered electronic questionnaire. Data collection through distribution of questionnaires was chosen because it larger sample, allows a a wider geographical distribution of the sample, and the collection of a large amount of data in a relatively short time [13]. An electronic questionnaire (in Microsoft Word) was chosen since all IS respondents are provided with an email account by the respective universities, it is faster in transmission and the difference of the quality of data responses compared with mail questionnaire is minimal [14][15]. However, e-mail is not anonymous. Anonymous e-mail can prohibit the researcher from detecting multiple submissions and making an e-mail list for follow-up e-mail surveys.

The instrument is a five-page questionnaire consisting of four sections. The first section of the questionnaire gathered the respondent's background. The second section of the questionnaire was dedicated to collecting data on the current practice of PBL in IS education and the use of Internet forum as a tool for students discussions. This section of the questionnaire consists of ten items that are adapted from [16]. The third section of the questionnaire was focused on the need to have a computer generated performance indicator and its related requirements of assessing students' contributions to Internet forums in PBL. The questionnaire items are developed with reference to the work of Dringus and Ellis [8] since the lists have categories that address higher order skills required in IS projects. The list of thread categories in the survey is smaller than SCAFFOLD after referring to the result of the findings reported in [9]. A list of features and functions that help in assessing Internet forums using SCAFFOLD were listed to acquire user feedback.

Seventeen public universities listed in the homepage of Ministry of Higher Education Malaysia that offer IS courses to their students were chosen for this study. IS courses are offered in a traditional face to face teaching method in these universities. These universities were considered as representing the IS teaching community in Malaysia. Prior to the distribution of the electronic questionnaire, an email was sent to these universities to get approval. Thirteen universities were agreed to participate in the survey and released the latest list of their full time IS educators. An electronic questionnaire was attached with an email and sent to IS educators in the thirteen universities. Two follow-up email were sent to the IS educators who did not return the questionnaire one week and two weeks from the initial emailing date. The answered questionnaires were completeness checked for (i.e. all auestions were answered) before conducting the analysis.

## 4. Results of the study

A total of 178 electronic questionnaires were transmitted and 73 usable sets were returned. Thus, the respondents represent about 41% of total IS educators from the thirteen universities. The respondents background are summarised in Table 1.

Demographic Variables	Frequency	Percent
Age Group		
30 and below	32	43.8
31-35	18	24.7
36-40	6	8.2
41-45	7	9.6
46-50	7	9.6
51-55	3	4.1
56-70	0	0
Gender		
Male	19	26.0
Female	54	74.0
Highest Education		
PhD	11	15.1
Master	61	83.5
Degree	1	1.4
Teaching Experience		
0-5	33	45.2
6-10	20	27.4
11-15	6	8.2
16-20	7	9.6
Above 20	7	9.6

 Table 1 Biodata of the respondents

For the second section of the questionnaire is to examine current practice of PBL in IS education. Table 2 summarised the findings. As depicted in Table 2, 98.6% of the respondents applied PBL in IS education. Whereas only 1.4 %, that is only one respondent did not apply PBL. In the subsequent analysis, the results ignore the blank responses given by the respondent who did not use PBL in IS education as a common approach suggested by [17]. The result revealed that majority of the IS teaching community in Malaysia applied PBL in their teaching. IS students in Malaysia are trained with work. Majority project of the IS respondents implemented 1 project per course and rarely more than two projects per course in IS education. Almost 95% of the respondents set IS project to complete after 3 weeks, and the option of 3 - 4weeks for project completion was popular among the IS respondent. The findings also show that IS project team member range from one to six in a group but would never more than six in a group. 85% of the respondents allocated 10% to 30% of the coursework assessment for IS projects. Only 14% of the respondents allocated more than 30% of the coursework assessment for IS projects. Almost 65% of the respondents did not specifically allocate time for IS project consultation. However, more than 50% of them selected the options of more than 30 minutes shall be allocate for a project team per week if possible. This reflected that IS respondents usually did not provide enough feedback for their learners in PBL similar to the literature [2]. 98.6% of the respondents agreed that student discussion is important in PBL. All respondents agreed that the use of Internet forums in IS education help in supporting discussion among students in PBL. 68% of the IS respondents had used Internet forums in IS education for student discussion and to provide feedback in PBL as shown in Table 3.

For the third section of the questionnaire is to seek the requirements for assessing the students' contributions to Internet Forums for IS education. 95.8% of the respondents agreed that it would be useful to have an Internet forum that can generate performance indicator scores for students' online contributions. As depicted in table 4, among the items listed in the SCAFFOLD, the most popular category selected for students' contributions assessing to Internet forums is "Analysis" category. Other items of SCAFFOLD were selected with varies percentage. All categories listed in SCAFFORD were selected by the respondents for assessment purposes.

Items (Features) that help educators in assessing students contributions listed in the questionnaire such as "Set up student grouping", "Categorize posting", "Approve/deny a student's participant", "Suspend/resume a student's participation", "Change a posting's category" are proposed to be added as more than 40% of the respondents had selected these features.

As depicted in Table 5, all the criteria that are "timeliness of posting", "Categories of posting", "Number of discussion posted" and "Length of posting" were selected with different percentage of respondents. All IS respondents would like to assess students' contribution since none of the IS respondents selected the NONE option. These criteria are included in а performance indicator as options so that the user could choose based on his prefer grading criteria. For the presentation of performance indicator scores, all features are proposed to be included. For the features that could improve students' contribution. all listed features are proposed to be included in the Internet forums since more than 40% of respondents selected as shown in table 6.

## 5. Conclusions

The authors viewed the survey as an "instrument" to identify the practice of PBL in IS education, the use of Internet forums and eventually gather information on the requirements for assessing students' contributions in Internet forums for IS education in Malaysia. The result of the analysis shows Internet forum was used in PBL for IS education and there is a need to develop a performance indicator as well as its supporting functions and features. Future research would involve the development of a performance indicator with the features and functions that were identified in the survey. The forum software that includes the performance indicators could be managed as data for assessing student's performance.

PBL practice and its parameter	Frequency	Percent
Use of PBL		
Yes	72	98.6
No	1	1.4
Projects to be completed per IS course		
1	48	66.7
2	18	25.0
3	4	5.5
4	1	1.4
5 or more	1	1.4
Average duration for project completion		
1-2 weeks	4	5.6
3 – 4 weeks	27	37.5
5 – 6 weeks	20	27.8
More than 6 weeks	21	29.1
Number of students in a group		
1-3	30	41.7
4-6	42	58.3
7-9	0	0
10 and above	0	0
Project contribute to coursework assessment		
Less than 10%	1	1.4
10% - 30%	61	84.7
31% - 50%	8	11.1
More than 50%	2	2.8
Time in minutes allocated for a project team per week		
did not specifically allocate time	47	65.3
Less than 15 minutes	1	1.4
15 – 30 minutes	10	13.9
31 – 45 minutes	10	13.9
More than 45 minutes	4	5.5
Ideally, time in minutes allocated for a project team per week		
Less than 30 minutes	22	30.6
30 – 60 minutes	37	51.4
More than 60 minutes	13	18.0

**Table 2 Project characteristics** 

#### Table 3 Types of Internet forums used

Type of Internet Forums	Frequency	Percent
Internet forums provided by university	32	43.8
Freeware hosted in the Internet	8	11.0
Internet forums provided by university + self code scripted hosted in a server	1	1.3
Internet forum provided by university + freeware hosted in the Internet	8	11.0
Internet forum provided by university + freeware hosted in the Internet + self code scripted hosted in a server	1	1.3
Do Not use any Internet forums	23	31.6

#### Table 4 Message categories and features

Messages categories	Frequency	Percent
Broadened	26	35.6
Evaluative	48	65.8
Questioning	49	67.1
Synthesis	40	54.8
Analysis	56	76.7
Summarizing	42	57.5
Resolution	29	39.7
Acknowledging	39	53.4
Clarification	39	53.4
Resources	46	63.0
Social	34	46.6
Features	Frequency	Percent
Approve/deny a student's participation	41	56.2
Suspend/resume a student's participation	33	45.2
Set up student groupings	60	82.2
Categorize posting	55	75.3
Change a posting's category	33	45.2

Table 5 Criteria in	a performance ind	icator and its presei	ntation method
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Criteria in a performance indicator	Frequency	Percent
None	0	0
Number of discussion posted	41	56.2
Length of posting	18	24.7
Categories of posting	43	58.9
Timeliness of posting	49	67.1
Presentation of performance indicator scores	Frequency	Percent
Filter to view only a group of students	31	42.5
Rank based on predefined criteria used in a performance indicator	62	84.9
Plain text or comma delimited format exportable for further processing	20	27.4

#### **Table 6 Features for Students interfaces**

Features	Frequency	Percent
Self categorize posting	34	46.6
Frequency on the criteria used in a performance indicator	47	64.4
A performance indicator score for each individual student	58	79.5

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