

Students' Perception and Patterns of Listening Behavior in an Online Forum Discussion

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Abstract—Online forum is part of a Learning Management System (LMS) environment in which students share their opinions. This study attempts to investigate the perceptions of students towards online forum and their patterns of listening behavior during the forum interaction. The students' perceptions were measured using a questionnaire, in which seven dimensions were used involving online experience, benefits of forum participation, cost of participation, perceived ease of use, usefulness, attitude, and intention. Meanwhile, their patterns of listening behaviors were obtained using the log file extracted from the LMS. A total of 25 postgraduate students undertaking a course were involved in this study, and their activities in the forum session were recorded by the LMS and used as a log file. The results from the questionnaire analysis indicated that the students perceived that the forum is easy to use, useful, and bring benefits to them. Also, they showed positive attitude towards online forum, and they have the intention to use it in future. Based on the log data, the participants were also divided into six clusters of listening behavior, in which they are different in terms of temporality, breadth, depth and speaking level. The findings were compared to previous clusters grouping and future recommendations are also discussed.

Keywords—e-learning, learning management system, listening behavior, online forum.

I. INTRODUCTION

IN today's advancement of technology, online forum has been increasingly adopted by many higher education institutions. It is one of the Learning Management Systems (LMS) tools that provides enormous flexibility and ease of access of various online teaching and learning content. Its functionality of providing user friendly environment and interactivity has been the highest pulling factor. Videos, audios, pictures, diagrams, graphs, slide presentations and many more could be easily uploaded and discussed by the learners in an online forum.

Since the introduction of technology and internet, asynchronous online forum has been widely used to convey content to the students [1], [2]. It is widely acceptable because of its accessibility, simplicity, and compatibility with teaching and learning practices [3]. The asynchronous nature of online forum provides the opportunity for posting across temporal and geographical barriers [4], [5], allows students to log in at their own time and places of preferences [6], [7], and to contribute their thoughts in a less intimidating environment [8].

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Also, as noted by [9], the online forum is a place to provide significant opportunities for students to actively engage themselves in a learning process through active participation. Students can also obtain in-depth knowledge by participating in discussion, debating, inquiring and explaining [10]. Through these activities, it will increase the academic performances of the students and breed more positive attitude towards learning [11]. With the positive attitudes, the learners will find online forum interesting and give active participation in the forum. Studies investigating the technology-rich classrooms found that the students demonstrated superior attitudes, involvement and engagement with the course content [12]. Involvement and engagement with course content needs positive perception and this can be shown by feedback on usage of online forum activities.

In addition to the need to measure students' perception, the investigation of the forum use also provides a clearer pattern of their participation. The listening behavior will collectively conceptualize the various activities that have been carried out by the students during the participation in online forum. Thus, it is important to understand the processes of making and accessing responses in an online discussion as speaking (externalizing one's ideas) and listening (taking in the externalizations of others) [13]. Specifically, listening behaviors are the activities done by the students when they participate in online forum. "Online listening behaviors" are core to interactivity in online discussions and are significant part of the knowledge building process that can influence both the contributions made and the absorption of ideas between learners [14]. Therefore, it is equally important to investigate the patterns of activities in addition to their perceptions towards using online forum.

II. RESEARCH OBJECTIVES

The purpose of this study was to investigate the students' perceptions towards using online forum in a postgraduate course conducted in a Malaysian university. The research further explored the patterns of listening behaviors on online forum practices.

Specifically, this research aims to investigate:

- students' perception on an online forum discussion in a higher education course.
- students' patterns of listening behavior in an online forum discussion in a higher education course.

III. LITERATURE REVIEW

Perceptions are a thinking and opinion of oneself towards something. It affects the students to think differently about

online forum for learning process. Studies on perceptions towards online forum participation have been done by several researchers. For instance, [15] have discussed factors that contributed to their students' perceptions in using online forum which are grouped into three categories: (i) attributes of the asynchronous online discussion, (ii) role of the facilitator, and (iii) the design of discussion activities. Another research carried out by [16] indicated several factors that influence learner participation in an online environment, and they are technology and interface functions, content area experience, student responsibility and instructional tasks, as well as information overload. Furthermore, performance expectancy, effort expectancy, social influence and facilitating conditions can affect the perceptions of users in using online forum [17].

Moreover, several researchers have also stated that the perceptions can be caused by demographics factors. Researchers [18] have studied the relationships between learner participation and six socio demographic variables (i.e. gender, age, education level, occupation, residential area – urban or rural, and region of residence). They concluded that two variables (holding a university degree and living in an urban area) to be the strongest factors of participation in online forum. According to [17], moderators such as gender, age, experience and voluntary of use also affect the usage of online forum.

Another research also shows that learners' satisfaction with e-learning will enhance their motivation. Satisfaction towards online forum as a learning tool is also based on their perception. As research suggests, learner motivation is one of the main reasons affecting student performance and learning, particularly the success of online learning [19], [20]. Online forum which has the flexibility and convenience features, allows students to post their input according to their time. This will gradually increase the participants' satisfaction of using online forum. Their perceptions of usage also need to be translated into actions in online forum. However, there is still not enough research done to identify these complicated factors that affect the perceptions towards usage of online forum especially in Malaysian higher education context.

The content of the forums have been greatly researched upon in recent years. Many researchers have investigated on content analysis [21] and also meaning construction in forum posting [22]. Besides, in a study done by [23], they reviewed 50 studies that focus on the message to add on to the construction of knowledge. Although online discussion in practice should be a tool for knowledge construction and meaning making, but it is common to find fractured and incoherent conversations [24] with little interactivity among students [9]. In the past, interactions with others' messages have often been studied using broad indicators such as the amount of times online discussions are accessed [25] or the amount of posts students opened [26], [27]. However, it did not state which post they concentrate on, for how long and in what arrangement. Therefore, there is a need to conduct research on how students interrelate with the post of others and also of themselves in the process leading them to create a post that can be beneficial to everyone.

IV. RESEARCH METHODOLOGY

A. Participants

This research design is based on descriptive studies using a survey method. It focuses on the students' perception of online forum participation and their patterns of listening behavior. It involved 25 postgraduate students (13 females and 12 males) undergoing a master by coursework program in a public university in Malaysia. They age from 24-69 years old and most participants are Malaysians (22 people or 88%) while the other three are international students. Most of them are part-time students. The participants also are from diverse background with different knowledge and skills in the field of study.

B. Learning Environment and Setting

As online forum was part of the course requirement, the students are required to post their input in the online forum in a weekly basis. Therefore, the post can be in a form of questions, answers, doubts, or responses into the LMS environment used by the university. They are required to post at least one question and another post as a response to their peers' questions, or they can submit at least two responses for every week. Their posts are valid from the day the post was created and lasted for a week. After that the forum will be closed and no posts will be allowed. The topics will be based on the week's lecture and the students are free to discuss on that particular lecture content. The students' posts will then be generated into log data in the LMS environment and will be further analyzed using cluster analysis.

C. Data Extraction and Processing

In order to measure their perception, a questionnaire is distributed to the 25 students. The questionnaire is modified based on a survey on online forum participation. It consists of eight sections involving demographics, online experience, perceived benefits of participation in online forum, perceived cost of participation in online forum, perceived ease of use, perceived usefulness, attitude and intention. A total of 53 items were involved, with majority of these items use the scale from 'strongly disagree' to 'strongly agree'. The questionnaire was then distributed to analyze the participants' perceptions towards the LMS used in the selected course.

The second element of this study – the students' listening behavior - was investigated through the log data generated in the LMS. The log data will show the students' activities such as view, read and posting actions. A one-week of online discussion was chosen and analyzed in this study. With reference to the recorded data, it will then use to categorize the students into different types of learners. The recorded data on their activities during the interaction process were identified as the log file, and cluster analysis approach was used to categorize the participants. Cluster analysis by [28] revealed only three types of learners which are cluster 1 (superficial listener and intermittent talker), cluster 2 (concentrated listener and integrated talker), and cluster 3 (broad listener and reflective talkers). However, for this research, it will utilize the squared euclidean distance and average linkage between

groups to obtain the clusters. It also employs one way ANOVA to identify the clusters characteristics.

D. Research Variables

Two groups of variables were investigated in this study. The first group of variables was identified to measure the students' perception on online forum, while the second group of variables was used to measure the students' patterns of listening behaviors.

For the students' perceptions, the variables used are:

- Online experience*: The experience of using online forum.
- Perceived benefits of participation in online forum*: The expected advantages of using online forum in learning.
- Perceived cost of participation in online forum*: The expected disadvantages of using online forum in learning.
- Perceived ease of use*: The expectation of simplicity and easiness to use online forum
- Perceived usefulness*: The expectation of usefulness of using online forum
- Attitude*: The characteristics, manner and disposition towards online forum.
- Intention* – The course of tendency and action towards using online forum

The details of each variable are shown in Table I.

Meanwhile, for the patterns of listening behavior [28], the variables are:

- Percent of sessions with posting actions* became the indicator to measure the degree to which students integrated their listening and speaking behaviors in the discussion. This was designed to measure the number of sessions in which a student made a post, divided by the total number of sessions.
- Percent of posts viewed at least once* became the indicator to measure the breadth of a student's listening to others in the discussions. This was designed to measure the number of unique posts (made by others) that a student opened divided by the total number of posts made by his classmates to the discussion.
- Percent of total views that were read (not scans)* became the indicator to measure the depth of a student's listening to others in the discussions. This was designed to measure the number of times a student viewed other's posts that were slower than 6.5 words per second, divided by the total number of views.
- Average number of posts contributed per discussion* became the indicator to measure the quantity of speaking a student did in the discussions. This was designed to measure the total number of posts a student made, divided by the number of discussion.
- Average number of sessions per discussion* became the indicator to measure the degree to which a student concentrated or distributed his visits to the discussion. This was designed to measure the total number of sessions a student had, divided by the number of discussions.
- Average number of reads before contributing a post* became the indicator to measure the integration of listening and speaking behaviors. This was designed to

measure the total number of others' posts a student read before making his last post in a session, divided by the total number of posts made in the session.

- Average number of words per post* became the indicator to measure the quantity of speaking a student did in the discussions. This was designed to measure the total number of words contributed divided by the total number of posts created.

These seven variables of listening behavior patterns can be categorized into four main dimensions: temporality, breadth, depth and speaking [28]. Table II indicates the dimensions and the respective variables.

TABLE I
DETAILS OF THE ONLINE FORUM PERCEPTION QUESTIONNAIRE

No	Section	No. of items	Scale	Cronbach's Alpha Value
1	B (Online Experience)	6	1: NE to 5: EE	0.701
2	C (Perceived Benefits of Participation)	11	1: SD to 5: SA	0.869
3	D (Perceived Cost of Participation)	8	1: SD to 5: SA	0.839
4	E (Effort Expectancy)	5	1: SD to 5: SA	0.549
5	F (Performance Expectancy)	6	1: SD to 5: SA	0.914
6	G (Attitude)	6	1: SD to 5: SA	0.889
7	H (Intention)	9	1: SD to 5: SA	0.874

NE: No experience, EE: Extensive experience
SD: Strongly disagree, SA: Strongly agree

TABLE II
DIMENSIONS WITH VARIABLES [28]

Dimension	Variable for this research
Temporality	<ul style="list-style-type: none"> Percent of sessions with posting actions Average number of sessions per discussion Average number of reads before contributing a post
Breadth	<ul style="list-style-type: none"> Percent of posts viewed at least once
Depth	<ul style="list-style-type: none"> Percent of total views that were read (not scans)
Speaking	<ul style="list-style-type: none"> Average number of posts contributed per discussion Average number of words per post

V. RESULTS AND DISCUSSION

A. Perception of Online Forum Participation

1. Demographics Information

The respondents were almost equally divided in terms of gender, with 12 of them are male while 13 are female participants. In terms of age, 40% of them (10 students) are mainly from the 26-30 age-group. Meanwhile, both the 31-35 and the 36-40 age groups were represented by 8% (7 students) of the participants. Another respondent comes from the 'above 51 years old' group. In terms of nationality, majority of them (88% or 22 participants) are Malaysians, while three participants (12%) are international students.

2. Experience in Online Forum

A total of nine respondents (36%) have between 1-2 years of online forum experience, and the same number of

respondents claimed they have more than four years of such experience. There is only one respondent who has just started using online forum in less than a year.

3. Perceived Benefits of Online Forum

The respondents agreed that there are benefits in participating in online forum (mean: 4.14). A total of 96% respondents (or 24 students) agreed that online forum is a meeting place for people of different background and nationality. Besides, 88% respondents (22 participants) also agreed that it allows them to keep up with current updates of the course.

4. Perceived Cost of Participation in Online Forum

A total of 10 students (40%) felt that they experience information overload and stress when using online forum, while 32% of them stated otherwise. In addition, 36% of the respondents shown *neutral stand* in receiving comments that are contradicted with theirs.

5. Perceived the Effort Expectancy of Using Online Forum

As a whole, majority of the participants (88% or 22 respondents) agree that the online forum is easy to use (mean: 4.03). Also, a total of 23 respondents (92%) agreed that the interface of online forum is easily viewable.

6. Perceived of Performance Expectancy

In general, most of the students agreed that the online forum is very useful (mean: 4.11). Also, a total of 24 students (96%) agree that online forum is useful for sharing knowledge. In addition, 72% (18 students) agree that online forum will increase their writing skills.

7. Attitude

The students claimed that online forum is enjoyable, interesting and preferable tool (mean: 4.05). Also, there are 84% (21 participants) who strongly agree that they enjoy sharing knowledge through online forum.

8. Intention to Use

Overall, the students have the intention to use online forum (mean: 3.8). A total of 19 respondents (76%) agreed that they intent to use online forum in the future.

B. Patterns of Listening Behavior

The participants' patterns of listening behaviors were determined according to the seven variables: *Percent of sessions with posting actions*, *Percent of posts viewed at least once*, *Percent of total views that were reads (not scans)*, *Average number of posts contributed per discussion*, *Average number of sessions per discussion*, *Average number of reads before contributing a post*, *Average number of words per post*. The data was extracted from the log file of the participants' forum activities.

Based on the cluster analysis carried out to the data on the seven variables, a total of six clusters or groups of listening behaviors were generated. The number of participants for each cluster is depicted in Table III.

TABLE III
CLUSTER OF PARTICIPANTS

Cluster	No. of participants	Students
1	1	AAH
2	7	NZNY, SMAG, ASAH, KALM, SALS, HAYA, MRM
3	3	BOE, TYJ, SFMY
4	1	CPL
5	12	GAD, KBA, SNQ, MAMN, WSAR, JBS, NH, MYA, IAA, RAAR, SNH, MAMJ
6	1	HKAQ

The clusters were then ranked in terms of each of the seven variables so that the patterns of listening behavior can be observed. The ranking was carried out using the mean score of each variable for each cluster.

For instance, for the *Percent of sessions with posting actions* ('Sessions') variable, the ranking of the six clusters is as follows: First: Cluster 1, Second: Cluster 2, Third: Cluster 3, Fourth: Cluster 5, Fifth: Cluster 4 and Sixth: Cluster 6.

Also, for the *Percent of posts viewed at least once*, the ranking for the six clusters is as follows: First: Cluster 6, Second: Cluster 1, Third: Cluster 4, Fourth: Cluster 2, Fifth: Cluster 3, and Sixth: Cluster 5.

For the discussion purpose, the category of the ranking was done as shown in Table IV.

TABLE IV
CATEGORY OF RANKING

Ranking	Category
1	Highest
2	High
3	Moderate
4	Moderate
5	Low
6	Lowest

Based on the analysis, the highest mean value for Cluster 1 is *percent of sessions with posting actions*, *average number of post contributed per discussion*, *average number of reads before contributing a post* and *average number of words per post*. As for *percent of post viewed at least once* and *percent of total view that were read (not scans)* also show a high mean value. For *average number of session per discussion*, the mean value indicates a moderate level.

For Cluster 2, it obtained a high value in *percent of session with posting action* and *average number of post contributed per discussion*. It is moderate in *percent of post viewed at least once*, *percent of total view that were reads (not scans)*, *average number of session per discussion* and *average number of words per post*. It is low in mean value for *average number of reads before contributing a post*.

Cluster 3 obtained a moderate level for *percent of session with posting action*, *average number of post contributed per discussion* and *average number of words per post*. It has low mean value in *percent of post viewed at least once*, *percent of total view that were reads (not scans)*, *average number of session per discussion* and *average number of reads before contributing a post*.

Cluster 4 has high in mean for *average number of words per post*. It achieved a moderate level for *percent of post viewed at least once, percent of total view that were reads (not scans)* and *average number of reads before contributing a post*. It is low for *percent of session with posting action, average number of post contributed per discussion* and *average number of session per discussion*.

Cluster 5 reached high for *average number of sessions per discussion*. It has moderate level for *percent of session with posting action, average number of post contributed per discussion* and *average number of reads before contributing a post*. Next, it has low mean value for *percent of post viewed at least once, percent of total view that were reads (not scans)* and *average number of words per post*.

Cluster 6 achieved high mean value for *percent of post viewed at least once, percent of total view that were reads (not scans), average number of sessions per discussion* and *average number of reads before contributing a post*. It has low mean value for *percent of session with posting action, average number of post contributed per discussion* and *average number of words per post*.

Next, the seven variables were regrouped according to the four dimensions: temporality, breadth, depth, and speaking. Thus, the outcome of the regrouping was shown in Table V.

TABLE V
 SUMMARY OF CHARACTERISTICS BASED ON CLUSTERS

	Temporality	Breadth	Depth	Speaking
Cluster 1	Coherent	Comprehensive	Extended	Frequent
Cluster 2	Moderate	Moderate	Moderate	Moderate
Cluster 3	Incoherent	Limited	Limited	Moderate
Cluster 4	Incoherent	Moderate	Moderate	Moderate
Cluster 5	Moderate	Limited	Limited	Moderate
Cluster 6	Coherent	Comprehensive	Extended	Infrequent

From Table V, Cluster 1 has only one student with the characteristics of comprehensive breadth and extended depth. The participant is also a frequent speaker with posted several threads in the online forum session. This cluster complements [29]'s mastery-oriented group including a large number of sessions and viewing a high percentage of learning resources. However in another research of [28], it shows that they engaged in long sessions of online discussion, with higher viewing of post but just at the moderate level in reading others' post. The speaking activity is unclear as opposed to [28] where it is reflective in talking which is different with this cluster where it is frequent speaking.

Cluster 2 consists of seven students showing a moderate level in viewing and reading of the post. They also access the forum moderately and provide moderate feedback. It has different connotation with [29]'s task-focused cluster whose members were strategic in their activity of viewing and reading the posts. As compared to [28], the concentrated listener has the moderate breadth but different extended depth. Besides, [29]'s task-focused cluster focused on the number of session – which is similar to this cluster whereas [28] indicates a smaller number of session with longer time. The integrated talkers in [29] have the same moderation in terms of speaking.

Cluster 3 consists of three participants who are passive listeners with limited viewing and reading of others' post. Besides, they spent less time in sessions and provided moderate posting actions. This cluster is similar to [29]'s minimalists because they accessed only a section of the learning resources/posts available while superficial listener in [28] has limited depth but moderate breadth which is different in viewing of post. In addition, [29]'s minimalists and [28]'s integrated talkers had a relatively low numbers of sessions and shorter sessions length. Reference [28]'s intermittent talker which is infrequent speaking is different with this cluster which shows moderation in speaking.

Cluster 4 has only one participant with the characteristics of moderation of viewing and reading of the post. The participant spent fewer sessions in the forum discussion but provide moderate comments and suggestions. This finding is similar to that of [29]'s task-focused cluster where they are moderate in viewing and reading in online forum. In addition, [28]'s concentrated listener which is different in extended breadth but similarly moderate in depth. Since this cluster shows they spent less amount of time in engaging a post, at the same time it could not be associated with [29]'s task-focused cluster where it is moderate in temporality and [28]'s integrated talker in terms of session where they spend less time in longer session. Another similarity in terms of posting actions is displayed by [28]'s integrated talkers.

Cluster 5 encompasses 12 students who share the characteristics of limitation of viewing and reading of post. However, they show moderate speaking actions and sessions when engaging in online forum. It was found that this cluster is closely associated with [29]'s minimalist where it has very few activities of viewing and reading the post. Furthermore, [28]'s superficial listener who displayed limited depth and moderate in breadth where this cluster shares the same depth but different breadth. However, this intermittent talker does not share the characteristic with this cluster in the sense where the sessions of the members' engagement are shorter compared to this cluster which is moderate in length of sessions. Although these members are passive listeners, they connect themselves moderately to the discussion when contributing posts. Nonetheless, it is different in terms of posting action where in [28]'s intermittent talkers, they post infrequently whereas in this cluster, they post moderately.

Cluster 6 has one student who shows comprehensively in breadth and extended engagement in depth. Besides, it shows coherent temporality but suffers from low posting actions. One research that is closely associated with this cluster is from [29]'s mastery-oriented group where it has the similar characteristics in high number of sessions engagement and large percentage of viewing and reading others post. Furthermore in another research by [28], their broad listener cluster where they share the same extended sessions and comprehensive breadth but different in moderate depth. Moreover, it is different in terms of speaking for this cluster with [28]'s reflective talker. The reflective talker group shows reflectivity in their posting but this cluster shows less in giving comments and suggestions.

VI. LIMITATIONS AND FUTURE RESEARCH

This study involves online contribution and interaction data within one particular postgraduate coursework course offered in a public higher learning institution. Thus, the findings could not be generalized to other courses in terms of their listening behavior and perceptions. Moreover, the research data collected only consists of one week of online forum participation. A different pattern of listening behavior might be observed if more online forums are involved. Some students will have more contribution towards one particular week because they have more content and ideas to contribute. This will again make the data inconclusive in terms of the clustering division. Besides, the size of the samples only consists of 25 students and in some clusters, only one participant was involved. Thus, a larger sample size will indicate a clearer pattern of listening behavior and perhaps give a better showing of distinct characteristics in those clusters.

Future research should use a different online forum that could display the timing of students' activities in viewing, reading and posting of their ideas and comments. The Learning Management System used in this study has its own limitation as it does not provide the duration of each forum activity. With a better online forum, it will provide better comprehensive data so that listening behavior will be robust and complete. Besides, the future research can also show the listening behaviors of one group of students who work individually and do not have contact with the other groups. This might produce an interesting listening behavior of different individual groups. Lastly, the participants can also be divided into sub-groups and prompt into their characteristics. It can be further researched on the connection of characteristics displayed by the different sub-groups when they work together.

VII. CONCLUSION

Online forum provides a great platform for educators and learners to contribute their thoughts, comments and ideas. It is useful to have a perception on the online forum to prompt into their interest in online forum discussion. Apart from perception, listening behaviors which show their characteristics in discussion in online forum should also be investigated. Listening behaviors provide the input of different types of learners' activities in online forum. Thus, it gives practitioners the chance to analyze the different type of learners and provide them the appropriate learning activities that suits them best.

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