

Computer-Supported Collaborative Learning: Factors Affecting Students' Participation and Interaction in a Knowledge Building Environment

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Abstract: - This study seeks to explore the key factors and barriers that impact the learners' participation and interaction and in the Knowledge Forum environment. Moreover, this study was performed in one of the public universities in Malaysia. A quantitative and qualitative research approach through a questionnaire and interview were used. A total of 28 participants were surveyed using the questionnaire. A 40-items questionnaire was developed based on a review of previous literature. Descriptive statistics were adopted for data collection analysis. Thus, the results indicated the most important factors that affected learners' participation in Knowledge Forum: (a) classmates' behaviors, (b) discussions needs, (c) learners' characteristics, (d) restriction on the ongoing discussion, (e) deficiency of ideas, (f) ideas' level (g) knowledge building level, (h) issues of technical, (i) limited time and (j) misunderstanding. Consequently, the results can enable higher education institutions to take the required steps to encourage successful activities of knowledge-building in computer-assisted learning. Many recommendations have been suggested to improve learners' engagement and interaction in the knowledge forums environments.

Key-Words: - Computer-Supported Collaborative Learning, Knowledge Building, Knowledge Forum, Factors, Interaction, Participation

Received: April 23, 2021. Revised: May 18, 2021. Accepted: May 20, 2021. Published: May 24, 2021.

1 Introduction

Generally, helping learners working creatively with ideas, participating in constructive dialogue, and focusing on technology-based learning, are the basic learning processes that are important in the knowledge-based era. Furthermore, Collaborative learning is an educational approach that allows learners to address issues and problems from various views and to improve and revise their understanding of building (new) knowledge or solving problems [1]. This type of learning approach gives learners the ability to take part in debates and empower their epistemic agency.

Additionally, Computer-based collaborative learning (CSCL) indicates an educational context that promotes collaborative learning. CSCL is an important research field which explores the development of education and knowledge through technology-mediated collaboration and discourse [2]. In higher education, CSCL is increasingly popular, and online discussion forums are widely used to facilitate collective learning through inquiry and discourse [3-5]. Moreover, CSCL aims at supporting the participation of all students in knowledge

building and knowledge co-construction. It is generally accepted that the performance of these learning environments is measured by the level and consistency of the process of interaction and participation.

Furthermore, Knowledge Building (KB) in a collaborative setting is currently under-pressure to allow learners to develop substantive knowledge and be a productive part of the collaborative learning. In addition, KB is based on socio-constructive theories. Over the last few decade, KB Theory, Pedagogy, and Technology have been built to improve the ability of learners to build new knowledge and participate in sustained innovative ideas work. In addition, KB is distinguished from traditional learning by focusing on community knowledge rather than individual priorities and transferring the high level of the agency to learners. Grounded in a collection of 12 principles [6], KB fosters a sense of collective cognitive responsibility among learners and the cognitive agency for the continuous improvement of ideas. In addition, learners can work together to define common issues of understanding, consult professional resources, formulate their hypotheses,

and test them, and participate in discussions to build a link between thoughts and foster community knowledge. Also, the instructor enables each learner to become an involved community member and to assume an increasing level of the agency to set and achieve objectives, track progress and managing the building of community knowledge.

CSCLE and Knowledge Forum (KF) are networked learning environments designed using socio-cognitive and socio-technological dynamics, in particular, to promote the advancement of knowledge among community members [7, 8]. KF is an educational software platform designed to aid and promote knowledge-building communities. Currently, several higher education institutions have incorporated KF into classrooms and lectures due to the many benefits KF provides. This platform will improve learners' understanding [9] and performance [10]. Furthermore, KF is designed to sustain ideas at the forefront of online interactions so that learner can take collective responsibility for the development of knowledge and participate in sustained Knowledge Building Discourses [11, 12]. In KF environment, ideas are shared in the form of notes (i.e., multimedia elements) to the KF community space (views) to be further expanded by other members of the community. Moreover, learners may depend on the ideas of their peers by expanding or criticizing existing ideas of introducing new ideas. In addition, In KF's notes, there are several scaffolds based on the theory of knowledge building such as ("my theory", "I need to understand", "a better theory", and "putting our knowledge together") which promotes the advancement and consistency of ideas. Further, these scaffolds can be modified.

Furthermore, learners can use assessment analytic tools such as promising ideas tool (PIT) which are used to highlight promising directions for new progress [13] and idea thread mapper (ITM) tool used to make links over multiple discussion threads [14, 15]. These tools promote community monitoring and offers reflective and dynamic feedback as a normal part of the discourse of Knowledge Building, in order to help maintain improvement in ideas. In addition, learners will review their posts and decide which path they want to take [16]. Also, the contribution of learners is not only used for reading but also to take in the KF for references as well. These findings show that the forums are effective learning platforms, but only if learners interact with them.

However, the success of the KF in promoting learning processes depends on the level of learners' interaction and the quality of participation that occurs. It can be said that without the active participation of the learners, the full significance of

the online discussion cannot be realized. Moreover, instructors play a critical role in tracking and maintaining a high degree of engagement to encourage critical and reflective design among their learners. As online discussion forums environment may be beneficial for the learning process, it is important to examine the potential factors that define participation in that environment. Consequently, the intention of this study is to discover the problems that instructors must answer to facilitate participation by learners in the KF.

Various issues are needed to be addressed the level of participation and interaction in the KF in Malaysia. Some of these issues is the learners' contribution and participation in online discussion [17]. In addition, several studies found that learners' participation in online discussion forums remains at a low level [18-20]. Perhaps because they are less interested in participating and creating ideas or interacting with peers at online discussion forums. In addition, the time limited leads to a minimum or no commitment in participation [21] is among the issues that caused lower participation. This may be because of a commitment to work and families, making it difficult for learners to find time to join the online forum.

Reading existing messages before posting new messages is necessary to generate a quality interactive discussion [19]. In this regard, the learners do not follow the proper protocols for sharing to the environment. They prefer to focus only on the selected platform, with their peers' messages [22]. Furthermore, some learners just concentrate on the last posts and don't read the whole forum [23]. This clearly affects their learning, of course, as it appears to neglect the previous debate or forget the key concepts explored at the beginning of the online discussion. Prior studies showed that the majority of the topics in online discussion are brief and fragmented [23].

Also, the biggest challenge to the debate is that learners do not receive direct input from their classmates [24]. Other empirical researches indicated that learners did not participate in online discourse when they feel intimidated by other students or feel tired of reading so many posts [23] [25]. Similarly, other studies found that when a learner has a bad behavior such as rude posting or dominating in the discussion this affect other classmates to interacted or participated with him/her [26] [23]. There are also many learners who have dropped out from the online forum or become less active due to a lots of material is available to read [27]. This means that when the learner post so many notes or messages with complex information, it made other learners feel

uncomfortable and insecure to participate in such environment.

For instance, in Malaysia education scope, learners' participation in a virtual online environment is less favourable as traditional learning method is given greater priority. Earlier studies found that several indicators contributed to low participation of learners in online discussion forums. The key factors that influence learners' participation and interaction in online discussion forums in the context of universities in Malaysia should be investigated, identified, and discussed in a study.

On the basis of the concerns listed above, the goals of this research are to identify from the perspectives of instructors and learners the main indicators that led to restricted participation in the KF and identifying the driving factors that have contributed to the adoption of online learning in the KF.

2 Methodology

The study interviewed with two instructors and surveyed 28 graduate students who attended a blended course at Universiti Sains Malaysia, Penang, Malaysia. This study involves 24 female and 4 male students, 26 between 22 and 25 years old, and two over 25 years of age.

The questionnaire used in this study consist of all three parts, section A (Students Demographic Characteristics), and section C (Successful Factors). While section B consists of several dimensions of (a) Classmates Behaviors (including ten items) (b) Discussions Needs (includes three items), (c) Students' characteristics (including five items), (d) Restrictions on the Ongoing Discussions (includes four items), (e) Lack of Ideas (three items), (f) Level of Ideas (three items), (g) Level of Knowledge Building (items 4), (h) Technical Problems (includes four items), (i) Time Constraints (2 items), and (j) Misunderstanding (2 items). The 40 items will be measured by a five-point Likert scale ranging from 'Strongly Disagree' to 'Strongly Agree'. These ten indicators were determined by [28], while those forty items developed by researchers based on a review of previous literature. Reading the reliability of this questionnaire, the Cronbach's alpha is 0.875. In addition, Section C of the questionnaire also included open items that asked students to list the driving factors for their participation in the KF.

3 Results

3.1 Interviews with Instructors

Interview conducted with two instructors who are adopting the KF in their learning processes. In general, the results of this interview identified that the learners did not participate and contributed to KF environment.

Regarding the first instructor (Instructor A) who has been teaching for more than eight years in the area of Instructional Technology, the tools and elements in the online discussion forum have the potential to build the students' knowledge and also help them to work in groups. However, the most challenge is to maintain an extreme level of interaction and participation. The instructor showed that most learners did not read the thoughts; otherwise, they just conveyed their thoughts to meet the demands set by the courses. Furthermore, some students only read and write in the forum without being actively engaging in the discussion. Another problem is that there are students who respond only or send to specific friends in the forum. Besides, some students only read and respond to the latest participation in the forums.

The second instructor (Instructor B), who have more than 12 years of experience in teaching online learning, said that is the among elements of online discussion that can create conditions for students to build their knowledge through social interaction is a discussion forum. There are many obstacles to achieving the highest level of asynchronous discussion forums. It may be because the level of interaction and participation between students remains low.

Both instructors detected that the primary issue is that some learners only responded to the contribution that some of their classmates had posted. The time factor also plays a significant role since in the current KF is read and answered to by just a few learners. Moreover, some learners often post notes or comments in order to address their instructors' or peers' questions without reading the forum in depth. As there are often several threads involved in discussions some learners can find it challenging to follow all the available themes, which leads to learners moving their thoughts to contradictory and inconsistent thoughts without following the appropriate thread.

3.2 Questionnaire Administrated to the students

Results for all the ten factors are shown in Tables 1-10 sequentially. Furthermore, Five-point Likert on a scale which consists of five options are summed up in three main points. For a more in-depth analysis, the

researchers converted the points of “strongly disagree” and “disagree” to “disagree” and the points “strongly agree” and “agree” converted to “agree” while the “neutral” point remain the same.

3.2.1 Classmates Behaviors

A total of 12 students (42.9%) said they are continuing to participate if they received immediate feedback from other classmates or did not receive it. For the statement 'I feel lazy to participate if there's no direct comments from my other colleagues', 12 of the learners (42.9%) disagreed with this statement. Meanwhile, ten students (35.7%) they will continue to participate if there is instructor’s direct response or not. Moreover, a total of 12 learners (42.8 %) did not agree with this assertion for the item “I feel lazy to participate if there is no instructor’s direct response”. In addition, a total of 15 learners (53.5%) asserted that if they did not receive any direct comments, they would feel isolated. However, a total of 14 learners (50 %) will keep on participate, even though they have found that there are learners who always contribute as though they understood everything. A total of 15 learners (53.5%) decided to stop participating if there were remarks that made them feel embarrassed. In addition, 13 learners (46.5%) will avoid contributing to emotional discussions. However, a total of 22 learners (78.6 %) said they would keep participating, despite learners sometimes ask questions. Besides, a total of 22 learners (78.5%) agreed to participate actively in the forum if other learners commented publicly. Table 1 reports the findings for the behavioural factor of classmates or instructors.

Table 1. Frequency of Factor: Behaviors of Classmates

	Items	Disagree (%)	Neutral (%)	Agree (%)
1	I am frustrated that other peers have no immediate feedback	35.7 (n:10)	42.9 (n:12)	21.4 (n:6)
2	I feel lazy to participate if there is no immediate feedback from other peers	42.9 (n:12)	21.4 (n:6)	35.7 (n:10)
3	I feel disappointed if there is no immediate feedback from the instructor.	32.1 (n:9)	35.7 (n:10)	32.1 (n:9)
4	I feel lazy to participate if	42.8	25.0	32.1

	there is no immediate feedback from the instructor.	(n:12)	(n:7)	(n:9)
5	I feel isolated if there are no responses from others.	28.6 (n:8)	17.9 (n:5)	53.5 (n:15)
6	I stop participating when others give opinions as though they know everything.	50 (n:14)	17.9 (n:5)	32.1 (n:9)
7	I am going to stop participating when there is an embarrassing comment	35.7 (n:10)	10.7 (n:3)	53.5 (n:15)
8	I stopped participating when there is an emotional discussion.	25 (n:7)	28.6 (n:8)	46.5 (n:13)
9	I stop participating when a lot of questions are asked by the learners.	78.6 (n:22)	7.1 (n:2)	14.3 (n:4)
10	less participation helps other peers to response freely.	78.5 (n:22)	7.1 (n:2)	14.3 (n:4)

3.2.2 Discussions Needs

A total of 11 learners (39.2%) decided to avoid participating when the subject is less enticing. In addition, 14 (47%) learners accepted that their participation is only intended to fulfil some of the criteria for the course work. A total of 10 learners (35.7%) did not agree with this statement that "I stop participating as more discussion is conducted in the classroom", while 8 other learners (28.5 %) agreed with this statement. Table 2 shows the results of the discussion needs factor.

Table 2. Frequency of Factor: Discussions Needs

	Items	Disagree (%)	Neutral (%)	Agree (%)
1	I avoid participating when the subject is less enticing.	28.6 (n:8)	32.1 (n:9)	39.2 (n:11)
2	I just contribute/engage in the forum only to meet the course requirements.	21.4 (n:6)	28.6 (n:8)	47 (n:14)

3	I stop participating until more debates take place.	35.7 (n:10)	35.7 (n:10)	28.5 (n:8)
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3.2.3 Learners' Characteristics

A total of 19 learners (67.9%) disagreed with the argument that they would avoid participating because they were unable to gain new knowledge. A total of 14 learners (50%) will continue participating even though their classmates do not answer their questions. Eleven learners (39.2%) disagreed with the argument that if any learner were egoistic and uncooperative, they would avoid taking part. A total of 15 learners (53.6%) decided to avoid posting to one-way forums. Regarding the assertion that if the irrelevant thread is released, learners would stop participating, 42.8% for twelve learners are agreed. Table 3 highlights the findings for this factor.

Table 3. Frequency of Factors: Learners' Characteristics

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I stop participating because I could not gain new knowledge.	67.9 (n:19)	14.3 (n:4)	17.8 (n:5)
2 I'll continue participating even my questions are not answered.	17.9 (n:5)	32.1 (n:9)	50 (n:14)
3 I stop participating if others are selfish and uncooperative.	39.2 (n:11)	28.6 (n:8)	32.2 (n:9)
4 I stop participating if there is a one-way message that will discourage the discussion.	25 (n:7)	21.4 (n:6)	53.6 (n:15)
5 I stop participating when there is an irrelevant post.	28.6 (n:8)	28.6 (n:8)	42.8 (n:12)

3.2.4 Restriction on the Ongoing Discussions

A total of 13 learners (46.5%) decided that they will continue to participate while they felt uncomfortable. In contrast, 10 learners (35.7.1 %) are not sure whether to stop or proceed if it was difficult to follow the thread of the discussion inquiry. In addition, a total of 15 learners (53,5%) will not stop participating, while many peers offer a lot of thoughts in a forum. Nevertheless, a total of 11 learners (39.3%) will stop participating when a lot of notes or posts in the forum need to be read. The findings of this factor are reported in Table 4.

Table 4. Frequency of Factor: Restriction on the Ongoing Discussions

Items	Disagree (%)	Neutral (%)	Agree (%)
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1	I'll continue participating even although I feel unpleasant to participate.	28.5 (n:8)	25.0 (n:7)	46.5 (n:13)
2	I stop contributing because of the difficulty to trace the thread of discussion.	32.2 (n:9)	35.7 (n:10)	32.1 (n:9)
3	I stop participating If many thoughts are expressed in one post.	53.5 (n:15)	28.6 (n:8)	17.9 (n:5)
4	I stop participating when a lot of posts need to be read.	32.2 (n:9)	28.6 (n:8)	39.3 (n:11)

3.2.5 Lack of Ideas

A total of 13 learners (46.4%) decided that when the threads are simply duplicate or have the same meaning they will avoid participating. Then, a total of 12 learners (42.9%) will keep participating despite no exchange of ideas. In addition, 12 students (42.9%) did not agree with the lack of experience in sharing ideas through the forum. The information for this indicator is shown in Table 5.

Table 5. Frequency of Factor: Lack of Ideas

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I stop participating if the message to be sent out is duplicated.	28.6 (n:9)	25.0 (n:7)	46.4 (n:13)
2 I stop participating if there is a shortage of ideas.	42.9 (n:12)	17.9 (n:5)	39.3 (n:11)
3 I'm not familiar with using an online discussion forum to share ideas.	42.9 (n:12)	28.6 (n:8)	28.6 (n:8)

3.2.6 Level of Ideas

A total of 19 learners (67.8%) will continue participating if the discussion is very complicated. However, a total of 11 learners (39.3%) will continue contributing despite the dubious feedback. Furthermore, a total of 14 learners (50%) not sure if they will continue participating despite the peers often conclude the topics without making any additional explanation. Table 6 shows the comprehensive results for this factor.

Table 6. Frequency of Factor: Level of Ideas

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I'll continue to contribute even if the discussion is very difficult.	7.1 (n:2)	25.0 (n:7)	67.8 (n:19)

2	I don't contribute since getting dubious feedback.	60.7 (n:17)	17.9 (n:5)	21.4 (n:6)
3	I will continue to participate although some frequently infer something without any further clarification.	7.1 (n:2)	50.0 (n:14)	42.9 (n:12)

3.2.7 Level of Knowledge Building

Regarding this indicator, a total of 15 students (53.6 per cent) indicated that they would avoid participating when their classmates sent a rude post. Furthermore, 13 learners (46.5 %) agreed with the argument that if they do not understand the purpose of the discussion, they would avoid participating. However, 17 learners (60.8%) do not retract suspicion to inquiry the suggestions or opinions of others. A total of 14 learners (50%) also disagreed with the argument "I feel lazy to argue that I support and not extend the subject of debate". Table 7 shows the results of the level of knowledge building factor.

Table 7. Frequency of Factor: Level of Ideas

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I stop participating since there are rude posts in the forum.	39.2 (n:11)	7.1 (n:2)	53.6 (n:15)
2 I stop contributing as not aware of the aims of the discussion.	32.1 (n:9)	21.4 (n:6)	46.5 (n:13)
3 I always feel hesitant/shy to ask about other students' ideas.	60.8 (n:17)	21.4 (n:6)	17.9 (n:5)
4 I feel lazy when arguing resulting in constant agreement and lack of development of discussion	50 (n:14)	25.0 (n:7)	25.0 (n:7)

3.2.8 Technical Problems

Most the respondents (20 learners or 71.4%) decided to keep participating despite the difficulty of the forum. On the other hand, a total of 20 learners (71.4%) are unable to avoid participating as it takes a lot of time is required to fix a mistake in the posts posted. Furthermore, a total of 17 learners (60.7%) will continue to participate, despite the fact that they frequently have problems accessing the forums or the Internet. Most respondents (18 learners or 64.3%) have disagreed with stopping participating if they had difficulty removing the incorrect posts to the KF. Table 8 reports the findings for factor of technical issues.

Table 8. Frequency of Factor: Technical Problems

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I will keep participating even though finding ways to share the ideas is complicated.	10.7 (n:3)	17.9 (n:5)	71.4 (n:20)
2 I stop participating as shortage of time to fix the errors in the sent post.	71.5 (n:20)	17.9 (n:5)	10.7 (n:3)
3 I stop participating due I often have trouble accessing the forums/Internet.	60.7 (n:17)	17.9 (n:5)	21.5 (n:6)
4 I stop participating because I have issues to delete the erroneously sent posts.	64.3 (n:18)	14.3 (n:4)	21.4 (n:6)

3.2.9 Time Constraints

For this factor, it was shown that a total of 10 learners (35.7%) are going to participate despite the limited time to respond or send a forum. In addition, there was not sufficient time for a total of 14 learners (50 %) to revise the posts on each topic discussed. The information for this indicator is shown in Table 9.

Table 9. Frequency of Factor: Time Constraint

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I stop participating if there is no time to reply/ send a message.	35.7 (n:10)	32.1 (n:9)	32.1 (n:9)
2 I stop participating if there is no time to response or send posts.	21.4 (n:6)	28.6 (n:8)	50 (n:14)

3.2.10 Misunderstanding

A total of 23 learners (82.1%) disagreed that they did not know their classmates that making them feel afraid of questioning or writing against their views. In addition, a total of 18 learners (64.3%) will keep frequently participating in the forum despite their concern that their colleagues might misunderstand their posts. Table 10 offers information for this indicator.

Table 10. Frequency of Factor: Misunderstanding

Items	Disagree (%)	Neutral (%)	Agree (%)
1 I don't have closer relationship with peers because I feel shy to inquire or response	82.1 (n:23)	7.1 (n:2)	10.7 (n:3)

2	I stop contributing to the forum as I was worried about being misinterpreted my ideas by others.	64.3 (n:18)	21.4 (n:6)	14.3 (n:4)
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In final, this research confirmed that there are several interesting indicators affecting learners to acquire new knowledge during their learning processes.

3.3 Factors that Motivate the Online Discussion

From the analysis of the open-ended questions, this study identified 14 factors that stimulate the use of a knowledge forum. A summary of these results is shown in Figure 1.

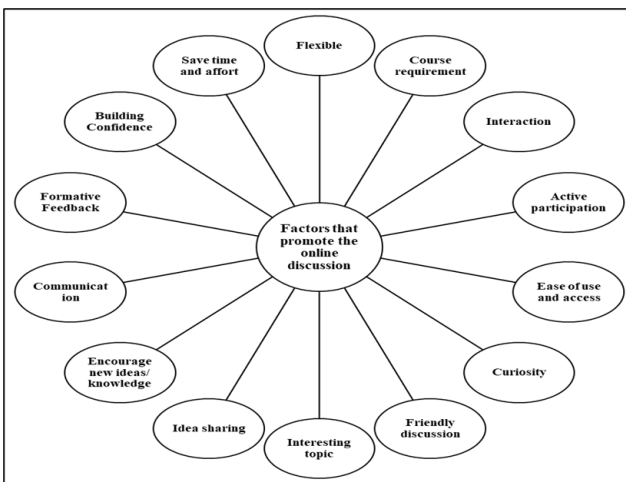


Figure 1. Factors that stimulate the Knowledge Forum

4 Discussion

In general, Sharing information is an important activities that can be adopted in the collaborative online learning , however, learners are not taking completely advantages of it [17, 29]. Moreover, this study confirms the Maor [29] research results where learners are less participated in the online discussions forum in many causes when (i) the other learners appear to conclude without providing any further explanation; (ii) forum or notes posted is a duplication or similar ideas; (iii) posts were posted in a one-way forum, in addition the existence of learners who become very dominant in the online discussion. This results is similar with the findings of [30] study, which has been showed that the participation that take place in online forum cannot be compared with traditional face to face classes. The chat situation becomes shallow in online debates forums and the learners’ willingness to participate in full conversation unnoticed [31]. In addition, Meyer [32] showed that learners’ satisfaction and experiences in face-to-face discussions was higher

than that of online discussions, as well as, they feel more active and excited in the face to face environments. Furthermore, it has been found that the delivery of online discussions is more emotional, slower, and takes a long time to write or read posts, react, provide responses, or interpret peer feedback. The study also found that individuals usually do not answer their questions or worries, and that instructors and peers have not received direct feedback. This results contrast with [32-34] study that found that the learners' participation became less intrusive when there was emotional discussions.

In addition, [20], Liu, Doore [35] detected that one of the most important barriers that restricting the performance of higher knowledge building is because learners are always afraid to inquire into their peers' idea. This study found that the learners sometime felt fear that they will be misinterpreted by their classmates, and they felt nervous or ashamed about asking or reluctant to inquire the thoughts of others. This result also confirms Hew and Cheung [36] that learners were more interested in answering inquires of classmates without additional explanation resulting a lower level of KB.

Besides, the level of debate and participation between learners depends on the discussion subject or issue that is more relevant than public questions[18]. This study also supports the finding of study [18] where the learners found the online discussion goals less explicit and did not understand the intent of this discussion and the results of this is that an online discussion becomes difficult and not centred. Also, earners commented that the subject of the online discussion was not motivating and interesting. The findings also found that without the effective participation of learners, an online discussion would not be adopted [37, 38]. Another explanation found from this study regarding why learners stop participating in online forum is that some of their classmates appear to spread their beliefs or views roughly, freely, embarrassingly, and questionably reactions.

Moreover, the efficiency of the online discussion environment in promoting learning and teaching relies on the implementation [23, 39]; for instance, the quality of learners’ interaction and participation and the extent of learners’ discussions play an essential role in knowledge building [17]. Furthermore, in this study found that some of the explanations and excuses requested by the learners for not participating in the online discussion forum, including time issues, shortage of reference material when answering on the forum, and a lot of available posts to read, and that they considered their participation in the online forum to be burdensome or

tired. In addition, the mindset of classmates, such as posting materials copied from different resources, and not their own view, considered as the factors that impede participation in KF.

Furthermore, this study demonstrates technical issues such as: (a) difficulty in accessing KF; (b) difficulty in deleting incorrectly posts in KF; (c) difficulty reacting to posts due to limited time; (d) difficulty in handling KF due to design difficulty; (e) difficulty review all posts due to insufficient time; (f) difficulty to follow the threads sequence and (h) the exchange of ideas through the KF is additional obstacles or factors preventing their involvement in the educational process. In comparison, the learners' contributions to the KF are less than face-to-face where same subjects are addressed. Furthermore, the findings of this study confirmed the results of [40, 41] that indicated that tools are not fully exploited in the online discourse learning environment.

Consequently, it can be concluded that the results of this study were usually similar with prior literature results. The findings proved that learners also benefited from the knowledge forum, which helps them to gain the required new knowledge or details. The learners also conducted online discussions that offered them with space to achieve their required tasks. The features mentioned by the learners were access to knowledge forum without locating and opportunities for brainstorming as well as multilateral online discussions. Furthermore, the interesting results in this section suggested that learners identified other motivating factors, such as (a) ease of knowing peers, (b) flexible time to discuss, (c) no handwritten work needed, (d) a flexible environment for discussion, (e) overcoming the issues of time in online debate, (f) a brief summary of the subject, (g) flexible time to discuss, (h) easily to access online content, (i) interactive, (j) easy to obtain marks, (k) a brief summary of the subject, and (l) internet speed, programming or internet expertise also lead to discussions and interactive activities.

5 Conclusion

In sum, there are many factors that promote or restrict student participation and interaction in the online discussion forum. In addition, one of the most important strategies to improve the learning experience is in the mixed learning mode where learning is combined online learning with face to face. Therefore, institutions of higher education must embrace a several approaches to enhancing learners' participation in the discussions of online forum. Unluckily, learners are often doubtful about the efficacy and effects of online discussion on their views and ideas level. These objectives can only be

accomplished by acting together and participating in the argument's discussions. In conclusion, this study offers several useful ideas for future empirical research such as:

- More research is needed on content analysis to assess the level and quality learners' knowledge building.
- More research on the analysis of social network is required to examine learners' participation patterns in the online platforms.
- More research is needed on content analysis to discuss the dynamic and sustain the participation in an online discussion forum.

Finally, it is hoped that these useful insights can assist decision makers of higher education to take the necessary steps/interventions to foster online collaborative knowledge building. It may also help educational policy makers to understand the specifications of collaborative knowledge building practices in order to increase overall organizational efficiency and performance.

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