Attaining High Learning Performers in Social Groups using Web-Based Cooperative Learning Environment

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Abstract

Social groups are considered as a group of people, an organization or social individuals which are connected by social relations such as friendships, cooperative relations or informative exchange In web based cooperative environment, peer to peer inter action often suffers from difficulty due to lack of exploring useful social interaction information, so that peers cannot find appropriate learning between learners. Because of this, it can lead to poor interaction information and achievement but also lose the meaning of corporation learning. Finally, we improve the learners learning interaction and learning performance in cooperative learning environment.

Key Words -- *Web-based cooperative learning environment, cooperative problem-based learning environment, social networking.*

Introduction

Most social network services are primarily web-based and provide a collection of various ways for users to communicate such as chat, messaging, email, audio, video etc. in these days more people paid attention or interest to social network analysis. Because these facilitates the social functionalities to

benefit the learning interactions between learners. Such type of interaction information encourage a large number of users to cooperatively participate in web learning activities. Mainly, these social groups lie on the analyzing relationships among people.

In previous studies, they have actually examined the “studies” or “outcomes” of social networks in actual computer-supported collaborative learning (CSCL) settings. It have significant impact on learning performance in these CSCL setting. Because these learning activities in such a collaborative environment are predominantly based on communication, social interaction and coordination among learners involved in these environment.

In these cooperative learning environment, learners grouped together for learning activities, they often could not find appropriate learning partners to each other for conducting effective learning due to lack of complete social interaction information or they are assigned in appropriate learning partners by instructors. It explains mining useful information of cooperative social networks to explore active degrees and interactive relationships between learners in cooperative problem based learning environment. This information used to enhance the learning interaction and performance in cooperative learning environment by giving social ranking of individual learners.

Proposed System

In these social groups, mainly we define three types of interactive relationships between learners in the employed cooperative problem-based learning environment. This system is used to improve the learner’s learning interaction and to improve the sharing of information between learners. Those three types of interaction relationships are in-degree interaction, out-degree interaction and linked interaction between learners in cooperative learning environment.

(1) In-degree interaction value: The number of learners who actively interact with a certain learner in the cooperative problem-based learning environment. The in-degree

interaction value can be formulated as

$$R_{In(n)} = \sum_{m=1}^{t} C_{m,n} \quad \text{.....(1)}$$

Where *RIn*(*n*) stands for the in-degree interaction value of the *nth* learner, *Cm*,*n* is set to 1 if the *mth* learner actively interacted with the *nth* learner; otherwise, *Cm*,*n* is set to 0, and *t* is the total number of learners excluding the *nth* learner in the cooperative problem-based learning environment.

(2) Out-degree interaction value: The number of learners who accept interactive request from a certain learner in the cooperative problem-based learning environment. The out-degree interaction value can be formulated as

$$R_{Out(n)} = \sum_{m=1}^{t} C_{n,m} \quad \text{.....(2)}$$

Where *ROut*(*n*) is the out-degree interaction value of the *nth* learner, *Cm*,*n* is set to 1 if the *mth* learner accepts interactive request from the *nth* learner; otherwise, *Cm*,*n* is set to 0, and *t* is the total number of learners excluding the *nth* learner in the cooperative problem-based learning environment. The in-degree and out-degree interaction values represent popular and initiative degrees of a learner in the cooperative problem-based learning environment, respectively. Based on the in-degree and out-degree interaction values, this study further divides learners into four interactive types in the cooperative problem-based learning environment: Hub, Source, Sink and Island [2]. As shown in below figure.

(3) Linked interaction value : The number of learners who have bidirectional interaction with a certain learner in the cooperative problem-based learning environment. The linked interaction value can be formulated as

$$R_{Iv(n,m)} = \sum_{m=1}^{t} \left(C_{m,n} \times C_{n,m} \right) \quad \text{.....(3)}$$

where *RIv*(*m*.*n*) is the linked interaction value of the *nth* learner with the *mth* learner, *Cm*,*n* □*Cn*,*m* is equal to 1 if the bidirectional interaction exists between the *nth* learner with the *mth* learner; otherwise, *Cm*,*n* is equal to 0, and *t* is the total number of learners excluding the *nth* learner in the cooperative problem-based learning environment.

(4) Interactive score: The interactive score is viewed as a weight score of

interactive level between a learner with the other learning peers in the cooperative problem-based learning environment. According to quarter method of the statistics, this study divides all learners into four interactive intervals and assigns various weight scores for different interactive levels based on the linked interaction values of all learners. The Interactive score can be formulated as

$$I_n = \begin{cases} 4, R_{Iv} \geq R_{(\text{top } 25\% \text{ high})} \\ 3, R_{(\text{top } 50\% \text{ high})} \leq R_{Iv} \leq R_{(\text{top } 25\% \text{ high})} \\ 2, R_{(\text{top } 75\% \text{ high})} \leq R_{Iv} \leq R_{(\text{top } 50\% \text{ high})} \\ 1, R_{Iv} \leq R_{(\text{top } 75\% \text{ high})} \end{cases} \quad \ldots\ldots\ldots(4)$$

where *I n* is the interactive score of the *nth* learner, (top 25% high) *R* is the interactive interval whose learners' linked interaction values are the top 25% high.The learners categorized in the interactive intervals with high linked interaction value are easier to interact with peers than the learner categorized in the interactive intervals with low linked interaction value. Basically, these learners with high linked interaction value can be viewed as the Hub interactive type.

(5) Social score : The social score represents the social position of a leaner in the cooperative problem-based learning environment. Suppose the *nth* learner interacts with the *mth* learner. The social score is formulated as

$$S_n = \sum_{m=1}^{t} \left(C_{m,n} \times C_{n,m} \times I_m \right) \ldots\ldots\ldots\ldots\ldots(5)$$

where *Sn* is the social score of the *nth* learner in the cooperative problem-based learning environment, *Cm*,*n* ×*Cn*,*m* is equal to 1 if the bidirectional interaction exists between the *nth* learner with the *mth* learner; otherwise, *Cm*,*n* ×*Cn*,*m* is equal to 0, *Im* is the interactive score of the *mth* learner, and *t* is the total number of learners excluding the *nth* learner in the cooperative problem-based learning environment.

Based on Eq. (5), when the *nth* learner interacts with the *mth* learner, the *nth* learner can get the interactive score of the *mth* learner, and the *mth* learner can also get the interactive score of the *nth* learner in the cooperative problem-based learning environment. Here, we

further illustrate an example to explain how to compute social scores for individual learners in the employed cooperative problem-based learning environment.

Suppose that there are four learners A, B, C and D in the employed cooperative learning environment to perform problem-based learning. Figure 3 shows the interactive relationship graph of these four learners. Meanwhile, suppose the interactive scores of learners A, B, C and D are 3,2,4 and 1, respectively.

According to Eq. (5), the social score of the learn A is 2 because the learner A only exits the bidirectional interaction with the learner B. The social score of the learner B is 7 because the learner B simultaneously exists the bidirectional interactions with both the learners A and C. Similarly, the social scores of the learners C and D are 3 and 4, respectively.

As a result, the ranking order of the social positions in this social network is B, D, C, and A.

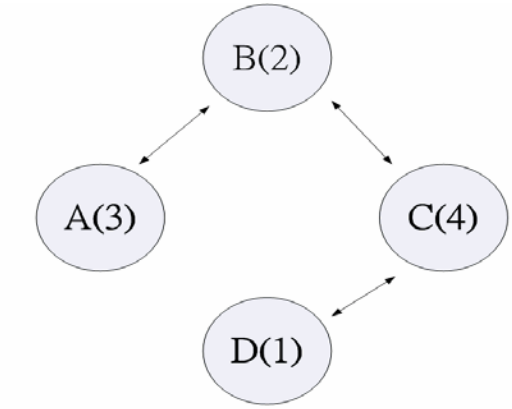

Figure 3. An example for illustrating how to compute social score in cooperative problem-based learning environment

We can find that a learner may get lower social score than the others even he/she interacted with much more peers if he/she often interacted with peers who only have low interactive score. On the other hand, a learner may get higher interactive score than the others if he/she often interacted with peers who have high interactive score.

Cooperative Learning Partner Recommending Scheme in the Employed Cooperative Problem-based Learning Environment:

Furthermore, the learners who get a high social score are appropriate to be recommended to a certain learner as learning partners because they obtain high identification from most learners or they may be pleased or have excellent abilities to help the other peers

to solve problems. The recommendation score for exploring appropriate learning partners can be formulated as

$$C_{n,m} = w \times \frac{S_m}{S_{\max}} + (1-w) \times \frac{R_{Iv(n,m)}}{R_{Iv(\max)}} \quad \ldots\ldots\ldots(6)$$

where *Cn*,*m* represents the recommendation score of the *mth* learner recommended to the *nth* learner who would like to find appropriate learning partners in the coopera tive problem-based learning environment, *Sm* is the social score of the *mth* learner, *S*max is the maximal social score among all learners, *RIv*(*m*.*n*) is the linked interaction value between the *nth* learner and the *mth* learner, *RIv*(max) is the maximal linked interaction score among the learners who interacted with the *nth* learner, and *w* is a adjustable linear combination weight.

Conclusion

The preliminary experimental results show that exploring social positions of individual learners in the employed cooperative problem-based learning environment has high potential to encourage learners to interact with peers more actively. Moreover, recommending appropriate learning partners for individual learners provides likely benefit in terms of promoting the learning performance of individual learners in cooperative problem-based learning environments.

References

[1] “Mining Interactive Social Network for Recommending Appropriate Learning Partners in a Web-based Cooperative Learning Environment” ,Chih-Ming ,Hong Chia-Cheng Chang, Graduate Institute of Library, Information and Archival Studies, National Chengchi University, Taipei116,2008..

[2] Jamali M. and Abolhassan H., “ Different aspects of social network analysis,” IEEE/WIC/ ACM International Conference on Web Intelligence 2006.

[3] Wasserman S. Social network analysis: Methods and applications. Cambridge University Press, 1994.

[4] Freeman L., Graphic techniques for exploring social network data. New York: Cambridge University Press, 2005.

[5] Social Network in Education, web available at http://socialnet work sined .wikispaces.com/

[6] Cho Hichang, Gay Geri, , “Social networks, communication styles, and learning performance in a CSCL community,” Computers & Education, vol. 49, issue: 2, pp. 309-329, 2007