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PEERS' INFLUENCE AND INTERFERENCE ON STUDENT-TO-STUDENT ONLINE DISCUSSION – A CASE STUDY

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Abstract

Online discussion board has been widely used in higher education because it allows communication to take place without the constraints of time and physical environment. Students can choose to take part in a forum at their convenient time but most importantly, they can view the posting and ponder before they respond. This gives two advantages: (1) Because students are given the time to reflect and research, they are expected to produce better quality discourse in their discussion; (2) It benefits those who are more visually inclined in their learning style and those who do not feel comfortable to converse face-to-face.

It is observed that in most non-mediated discussion forums, there is a great tendency for students to revolve their discussion around only the first few threads of posting without giving much regard to the quality and extent of the content. It is in this light that this paper tries to verify whether such a tendency can be established formally using data collected from a pre-service teacher module. It also looks into how peers can influence a student's perception on the quality of his/her discourse. It is hoped that the findings would shed light on how student-to-student discussion forum can be conducted more effectively.

Introduction

The use of technology in education has, in recent years, taken a new direction to move away from a learn-to-use paradigm to a use-to-learn mindset. The course, EED238 – Teaching and Learning with the Internet, is organized with this in mind. It allows Diploma in Education pre-service teachers (or trainees) an opportunity to further enhance their pedagogical skills through the use of Internet tools. It uses a mixed mode of instruction, combining face-to-face tutorials with online activities. Online activities include Internet assignments, web page development and web-based discussion. Trainees normally have to take part in online discussion forum two to three times depending on their progress. The online discussion is to complement the face-to-face sessions and promote learning through collaboration. It is built on a discussion board which sits on a Learning Management System called Blackboard. This system is configurable to allow postings to be anonymous or non-anonymous. For the purpose of assessment, trainees have to make themselves known in the discussion. Blackboard discussion supports

multiple threading and file attachment. All trainees are taught how to use the system before taking the course.

Non-Mediated Mode Of Discussion

Both tutor-to-student and student-to-student modes of discussion are valuable learning experience in higher education (McKenzie, 2002). However, this course chooses student-to-student discussion for three reasons. First, because most research focuses on the role of the mediator and the facilitation skills involved in the tutor-to-student interaction, little attention was given to the student-to-student mode of learning. In a mediated discussion, the students learn with the tutor in a manner very much like in the classroom. Knowledge is developed but not without the mediator. In a knowledge-based economy like Singapore, very often, managers, engineers and professionals and the like learn without a designated mentor and they always need to acquire the knowledge just-in-time (JIT). They depend very much on their peers and co-workers to accomplish their tasks. Senior Minister Mr. Lee Kuan Yew (The Straits Times, 10 April 1999) once said:

> "Old notions about work must be changed. Unlike a worker in the repetitive machine-based age, tomorrow's worker must depend more on his own knowledge and skills. He has to manage his own systems, supervise himself and take upon himself the responsibility to upgrade. He must be disciplined enough to think on his own and seek to excel without someone breathing down his neck…".

SM Lee's message is a clear indication that our education system must produce people of tomorrow who can think independently without having to be told how to do. We should train our students to function in environments in which individual opinions are valued and shared; judgments are seen as consensus and not derogation. Can we produce teachers who possess these traits? Can our students then learn from their teachers to become independent learners? Although this is not what this paper plans to answer but it is the basis on which the student-to-student mode of discussion is intended for.

Second, I was inspired by Habermas' (1984) "ideal speech situation" to foster a condition of *public sphere*. Cecez-Kecmanovic & Webb (2000) used Habermas' idea to define the concept of "ideal learning situation". It is a communicative practice intended to be free from any kind of distortion, any form of coercion and ideology that excludes all forces except the force of the better argument". In Cecez-Kecmanovic's & Webb's view, the greater the fulfillment of an ideal learning situation, the more successful the collaborative learning will be. When this idea is used in the discussion forum, it means discourse should be allowed to evolve naturally without any intentional intervention. The element of mediation should then be removed to allow the ideal learning situation to take place. The removal of mediation also helps to reduce the trainees' dependence on the tutor and promote self-directed learning.

Third, I want to encourage self-sustaining discussion. I hope trainees will cultivate a liking for synchronous communication. Through which, they learn to understand each

another through their own way of interaction and know the proper Netiquette (etiquette on the Net) when engaging in a multilogue within a group.

Why This Study?

Besides EED238, I also taught other courses which also used online discussion board as a means for collaborative learning. The discussion was conducted in a similar manner without mediation. My initial observation on these courses yield the following: (1) Trainees were generally apt at picking up the skills such as posting and responding to articles contributed. However, some consistent patterns did occur. (2) Trainees made an effort to respond to as many postings as they could. (3) Ideas and presentation seemed to be always similar for the first few threads; and (4) comments were usually complimentary rather than critical. Observation (1) and (2) are desirable, showing that the discussion was able to attract participation and there was a general acceptance on the need to learn collaboratively. However, (3) and (4) seem to suggest areas of concern that require more in-depth investigation. My immediate question deriving from this is: Is there a kind of "interference" or "influence" that causes this phenomenon to occur? This is the basis for initiating this study.

Interference And Influence

Before proceeding further with the discussion, I shall first try to establish the meaning of interference and influence in this context. Finkelstein, Spanoudakis and Till (1996) give a good basis for defining interference. In their work, they wanted to develop a toolkit that could be used to manage interference arising from putting together the various specifications needed to construct a model for a complex software system. Specification involves view points which may overlap if they incorporate components that refer to common aspects of the system. In their example, a same object in a domain of discourse may be referred to by different components of different view points. Put it simpler, this means that this object is bearing the attributes belonging to many view points. Finkelstein et al. also pointed out that "different view points are expressed using different representation schemes which embed a theory of the domain discourse, of the phenomena of interest in it and of the relationship between these phenomena". Accordingly, view point overlap is seen as a pre-requisite for interference. Deriving from these ideas, I consider view points to be analogous to postings in a discussion forum; components to be synonymous to ideas, concepts, organization or even presentation that makes up the discussion. I would therefore, define any overlapping of presentation, organization, ideas or perspective in a discourse as manifestation of interference.

Now what about influence? I shall derive my meaning from Summers et al., (2001). They said: "influence is the power to have an effect on the way someone or something develops, behaves, or thinks without using direct force or commands". This implies that influence is implicit and acts to drive the occurrence of a certain phenomenon. Its existence can therefore only be detected indirectly. Based on my past observations while running similar courses, they seemed to suggest that interference is caused by influence which could be the result of some unknowns. I suspect that peer belief is the main cause

behind this. By peer belief, I mean conforming to the belief of the majority. Why do I say this? Because such a tendency is often observed in a group or community where individuality is always overwhelmed by group practices. In an online discussion, influence is believed to be the cause to interference which exhibits itself in a form of view point overlapping. This overlapping is observed when the same or similar idea, concept or even the style of presentation appears in two successive postings or across several postings.

Methods

To verify the phenomena of interference and influence, this study adopts an experimental design and analytic induction approach to process the data. The design uses a control group and an experimental group for comparison. Intervention is the discussion board and is administered to the experimental group. Analytic induction has the rigour of transforming unstructured text information into manageable data and most importantly, it also allows researchers to make inferences through induction. It has been used extensively in open-ended interviewing, participant observation and documented analysis (Bogdan & Kiklen, 1998). This makes it very suitable for this study.

The Participants

Two tutorial groups of EED238 trainees took part in this study. Group 1 is the control group which consists of 21 trainees, 3 are males and 18 are females. Group 2 is designated as the experimental group which comprises 19 trainees, 8 are males and 11 are females. They are all pre-service teachers doing their Diploma-in-education program in the National Institute of Education (NIE). Trainee's educational background ranges from GCE 'O' level to GCE "A' level. All trainees are trained to teach in primary schools after their graduation.

The Treatment

There are two activities that trainees did in conjunction with the online discussion. Activity one aims at examining interference and its possible patterns. Activity two checks the existence of influence. The details of the two activities are described below.

Activity One

In this activity, both groups of trainees were told to examine good practices of constructivism and suggest ways to implement these practices in a classroom. They were first asked to read beforehand an article entitled "*Objectivism vs. Constructivism: The Origins of this Debate and the Implications for Instructional Designers*" written by David Lewis. They were then required to express their views on how to implement the "Six Element Model" effectively in a classroom situation. The assignment topic was "How to implement effectively in a classroom the six elements mentioned under the Constructivist Design Model?". Descriptions of the six elements are extracted and appended below:

- **Situation** – This is a preparatory stage in which the facilitator explains the goals of the activity and how students should develop their own opinions.
- **Groupings** – Not only does the facilitator need to group students, but they also need to group the materials available for learning activities. The materials available will often determine the number of groups of students.
- **Bridge** – This stage makes use of the student's prior knowledge. It may be thought of as prior knowledge activation. Students should be presented with an introductory problem to solve or think about. This may take place before or after student groups are formed.
- **Questions** – This stage is to support critical thinking or metacognitive skills. Students need to ponder the implications involved. These will be specific to the situation the facilitator develops.
- **Exhibit** – Remember learning is an active process. Learners need to actively make decisions and work collaboratively. Developing a product is a good way of accomplishing each of these goals. However, the product is not as important as the process required to develop it.
- **Reflections** –Finally, students need to reflect on the learning process. They should be reminded of what they learned and also learn from others, if they missed some important aspect of the activity.

Being the control group, group one trainees were treated in the conventional way. They had to avoid the possibility of group interaction which may give rise to influence; they did their assignment individually as homework and submitted their work to the tutor via email. Through out the whole process, group members were prevented from knowing what others wrote for their work.

Group two is the experimental group. Trainees in this group were to post their work online to the discussion board. Discourse behaviour and quality were then analysed for possible patterns of interference. In order to keep the basis for comparison constant for both groups, group members were told that discussion was not mediated and that they were not to respond to any other posting. This ensures that variables for influence are kept to the minimum.

Both groups were given a week to complete their work and they knew that their assignments were graded.

Activity Two

The second activity was carried out two weeks after the first. The aim of this activity was to verify the existence of influence by using peer-marking. In this activity, group one trainees were instructed to review their peer's work done in Activity One and assign a rating between 1 and 10 with 10 being the maximum. They were also required to justify their decisions by writing a short comment. To avoid reciprocate-marking, that is, two trainees mutually mark each other's work, trainees were divided into groups of three to do cyclic marking within their group. To illustrate this, assuming that A, B and C represent three trainees in any group. The arrangement for the marking went like this: A

marked B's work, B marked C's work and C marked A's work. A, B and C each received their classmate's work directly from me via email so that they only saw the work of their designated partner. Like in previous activity, I tried to keep away any effect that could result in influence such as influence due to reciprocity. For submission of work, each trainee sent their justification together with their partner's work to me via email.

For group two, the treatment was similar except that trainees posted their comments openly on the discussion board. Like for group one, trainees in this group were also grouped in threes, given a designated partner's work to review and they marked cyclically. The opportunity to refer to others' rating is the key intervention in this activity.

The time allowed for both groups to complete their assignment was also a week.

Data Analysis

Activity One

The text-based information collected from this activity was first processed qualitatively to convert it into manageable data. Based on the definition of interference in section 4, the process involved grouping of common ideas, perspectives, organization and presentation into categories called components, the term used in Cecez-Kecmanovic's et al. work. The first round of data collected yield eight components of view points which include style of presentation as a form of non-verbal expression. They are:

1. Subject Matter (subject and topic)
2. Use of Instruction (for briefing, teaching, introduction, recapitulation etc.)
3. Special Activity (watch a video online, surfing the net, run an applet etc.)
4. Group Size (no. in a group)
5. Specific Instructional Tool (e.g. browser, teaching aids, web quest, mind manager etc.)
6. Resources - hard and soft versions (PowerPoint slides, websites, text or picture materials etc.)
7. Presentation Style (Point-form, free-flow etc.)
8. Facilitation (use of instruction sheets, questioning etc.)

Each component represents ideas that were brought up at least twice by the participants and were considered relevant to the discussion. The next task was to examine group by group for patterns of occurrence for these components.

For Group 1 (Control group)

Since works from trainees were received randomly via email, they do not have any chronological relationship. They may, however, still exhibit view point consistency which I shall not attribute it to influence defined in our context but rather to other contributors like prior knowledge learnt from other classes. Just as expected, the data did

not reveal any apparent consistency except three of them, Special Activity, Group Size and Facilitation.

For Special Activity, it is not clear why 19 out of 21 trainees (90%) did not use unconventional activity to conduct their classes. Only two mentioned using tongue twister and lab experiment to complement their teaching. I suppose they did not read beyond the given article for new ideas. The same proportion also went to Facilitation. 19 of them did not propose the use of any supplementary material in their facilitation. A point to note is that the two odd-one-out trainees are not the same person in the two instances. As for Group Size, 14 out of the 21 (67%) mentioned that they would use group size of 4 to 5 in discussion activities. I can offer an explanation to this because I ever used this figure as an example during a face-to-face tutorial with them. But I did not say this number to the experimental group for I wanted to use this as a comparison.

For Group 2 (Experimental group)

The data collected for the experimental group showed somewhat a very different phenomenon. When the data were analyzed by the chronological sequence they appeared on the discussion board, I found pockets of overlapping in all the components except Use of Instruction and Presentation Style. Table 1 compares the observations obtained from the two groups.

Table 1. Comparison of Observations Obtained from the Control and Experimental groups for Activity One

Component	Group A (control group)	Group B (experimental group)
Subject Matter	No obvious consistency. Wide range of subjects was used as illustration. Subjects used were English (3)*, Mathematics (1), Science (6), Mother Tongue (1), Social Studies (2), Health Education (1) and Moral Education (4). Three postings did not mention any subject used.	Three clusters of subject choice replication happened at the 1st (4)*, 6th (4) and 11th (3) postings. All of them used science as the subject for illustration. Other subjects used were English (1), Mathematics (1), Social Studies (2), Health Education (1) and Enrichment (1).
Use of Instruction	No obvious consistency. Choice of use for frontal instruction included introduction (8), briefing (5) and recapitulation (2). The remaining (6) used mixed instructions or no instruction.	A cluster of using introduction for instruction was observed at the 1st (3) and 10th (4) postings. Another cluster using briefing for instruction was found at the 6th (4) posting. Others including those "Not Specified" were scattered in between.
Special Activity	90% did not use unconventional activity. Only 10% (2) used Tongue twister and Lab equipment.	Watching of video was repeatedly mentioned at 1st, 3rd and 4th postings. Then two clusters advocating the use of Net searching was found at the 6th (4) and 16th (4) postings. Others were using a mix of watching video and Net searching, role play or using printed pictures.
Group Size	67% mentioned that they would use group size of 4 to 5 in discussion activities; others used 2 to 3 or did not specify any.	There was no obvious region of overlapping except one cluster citing group size of 2 at the 1st (3) posting, one replication of group size of 4 at the 4th (2) posting and another replication of group size 5 at the 9th posting. Other use of group size ranged from 2 to 5 and appeared randomly.
Specific Instructional Tool	No obvious consistency. Tools mentioned included Jump page, Mind Manager, browser, plant samples and microscope.	Nearly everyone proposed the use of browser as a constructivist tool except the 11th posting.
Resources	No obvious consistency. Many different resources were quoted. They were websites (including audio and video clips), printed materials, greeting cards, crossword puzzle, costumes and PowerPoint slides.	Two small pockets of replication at the 1st (2) and 3rd (2) postings. The replication was very obvious with the 1st two postings proposing surfing the Internet followed by an activity using teaching aids. The next two postings suggested watching web movie except that the 4th posting has an additional activity of recognizing plants and animals from printed pictures. Another cluster of using known URLs was found at the 5th (4) posting.
Presentation Style	Generally there were two styles: itemized or infused. Itemized means the six elements were discussed item by item; infused means the elements were integrated into the context and discussed holistically. The distribution between the two was quite even with 57% used itemized style and 43% used infused style.	No obvious or apparent consistency of the style observed for the first eight postings. However, two small clusters of itemized style were observed at the 9th (3) and 16th (3) postings. No consistent pattern of infused style was found.
Facilitation	19 out of the 21 (90%) did not propose the use of any supplementary material in their facilitation. One of the remaining two mentioned using it but gave no detail as what material would use; the other proposed the use of a reflection log.	None except the 3rd and the 9th postings used worksheets to complement the facilitation.

*Note: Figure in parentheses indicates number of occurrence.

Activity Two

The ratings given by both groups were consolidated and the following statistics were produced.

Table 2. Statistics of the Ratings Given by the Control and Experimental Group

Statistics	Group 1 (control group)	Group 2 (experimental group)
Maximum	9	8
Minimum	5	6
Mode	7	7
Mean	7.1	6.9
Standard Deviation	0.99	0.62

As for trainees' comments, they are tabulated below for comparison.

Table 3. Comparison of Comments for the Ratings Given by the Control and Experimental Group

Types of Comment	Group 1 (control group)	Group 2 (experimental group)
Complimentary	20 or 95% (Main comments: Clear instruction, good use of Web Quest, all six elements are discussed)	15 or 79% (Main comments: interesting lesson, website informative, structured lesson)
Critical	6 or 29% (Main comments: Context of learning not clear, doubtful about effectiveness of method, no improvement suggestion)	11 or 58%(Main comments: Did not engage higher order of thinking, task too difficult, not enough reading material)
Both	5 or 24%	10 or 53%
No comment	0	3 or 16%

Results And Conclusion

Activity One

Group one trainees were quite well controlled as there was no noticeable consistent pattern of view point overlap except for Special Activity, Group Size and Facilitation. A possible explanation for this would be that constructivist way of learning is rather new to most trainees. What they produced in their work is simply a regurgitation of what was given in the face-to-face tutorials and the handouts. This is justifiable from the unusual high percentage of consistency figures in Table 1.

As for group two, overlapping of view point is observed in all the seven components. These overlaps exhibit in the form of clusters which have size ranging from 2 postings to 6 postings. The phenomenon recorded an indication of the existence of interference. The interference mostly started at the first posting of the forum, congregated to form a bigger cluster, reached saturation then broke away. Interestingly, this phenomenon is very

similar to the interference pattern observed when two coherent light sources interact. What causes the resemblance is that in light, interference produces pockets of overlap depending on the nature of the light; in discussion, it depends on the nature of view point which is determined by the view point components. This observation prompted me to suspect that participants in a discussion are well aware of view point exhaustion and they break away to avoid being seen as uncreative or plagiarizing after the discussion regresses to commonality. I also observed that when trainees are put in a social setting in which views and expressions are valued differently from self, view points begin to change distinctively; view points become driven by what others said, and more likely, by what others mostly said. I draw this conclusion from the observation made in Table 1 on the two components, the Special Activity and the Group Size. View points in these two components were initially unchanging in the control group but turned into variety after view points were shared on discussion board. This suggests that public opinion can exert influence on one's view point and view points tend to agree easily with peers in a community. If this holds ground, then Activity two should indicate a positive influence on the rating given by the experimental group trainees.

Activity Two

Quantitatively, Table 2 shows that trainees were more cautious about awarding marks in the experimental group. This is supported by the narrower rating range $(6 - 8)$ in the experimental group as compared to the control group $(5 - 9)$. A similar observation is also obtained when Standard Deviation is compared. I attribute this phenomenon to the fact that trainees in the experimental group were trying to look for a norm to conform to in order to gain public acceptance - a demonstration of group influence. Additionally, I also found a cluster of four 7s at the 3rd posting which may also be pointing to the possibility of peer influence. One interesting thing to note is that both control and experimental groups share a mode of 7 for rating and a similar mean of close to 7. "7" appears to be a "magic figure" popularized by the majority. I believe that this is the result of not using a standardized criterion for assessment. Why? Because trainees were not given any rubric in this exercise and they would, in a natural sense, look for a common criterion, in this case, the most popular rating in the group. In my opinion, "7" is too high for most of the postings submitted. Therefore, "7" is not just a non-offensive number but is also a diplomatic figure.

Now we look at Table 3 qualitatively. The data seem to suggest that the control group tend to be more tactful in their comments by being less critical. This, I see, is a common behaviour when one is asked to act alone for a decision. We tend to be more conservative by not being too direct in our opinion when we are not too sure about the situation. However, this behaviour could change when we are supported by group consensus and opinion; this is known as community of practice (Barab, 2001). Translated this to the context of this study, it could mean that the discussion board offers more openness to criticism because participant feels that "I am not the only one doing this". Worthy of note is that trainees in the experimental group were able to produce both complimentary and critical comments more than the control group, insinuating the advantages of learning collaboratively.

On the whole, there is still a tendency for trainees to be more complimentary than critical in their comments although the trend is less dominant in an open environment. There is also a certain degree of influence by peers when it comes to decision making. The influence on the second activity is less obvious than the first due probably to the fact that in Activity Two, the task offers less room for view points to share as rating an assignment is normally done individually. Moreover, it could be that rating is a highly subjective exercise in that personal subjectivity could overwhelm group opinion.

Implications

The existence of influence on view points in a discussion forum seems unavoidable. On the positive side, it allows one to learn from the others but on the flip side, it tends to compromise originality when it comes to creative ideas and innovation. The results in Activity One demonstrated this dilemma. It is very different from face-to-face collaboration whereby any influential behaviour can be immediately detected and managed. As a result, view point interference is less prominent. The findings from this study provide some basis for consideration when using online discussion board for collaborative learning, in particular, when discussion is not mediated. It cautions users of discussion board to take peers' influence in a different perspective. Online discussion inherently generates conformity and hence promotes view point consensus but it may hinder originality and play down individuality. So, the choice depends on how one weighs the pros and cons against the purpose.

This study also indicates areas of concern that need to be investigated further. For example, why presentation style is not being influenced by peers? Is it because it is a cumulative experience that cannot be duplicated easily? Will a similar finding be found if the discussion topic were less structured and non-academic? Perhaps a replication of this study in a different context may help to answer these questions.

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