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# **Conversational Analysis as an Analytical Tool for Face-to-Face and Online Conversations**

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## **Abstract**

Some learning scientists are beginning to investigate social and cultural aspects of learning by examining the interactions between a learner and the environment as well as with other people in the learning environment. This paper proposes Conversational Analysis (CA) as a tool to analyze interactions between learners and instructors in face-to-face and online environments. It illustrates the potential of CA to enhance our understanding of the social aspect of learning by comparing analysis of transcripts in two distinct situations. Through the analysis, distinct characteristic interactions in face-to-face and online environments are uncovered by linking these analyses to the unique affordances of the learning environments.

## **Studying Human Interactions in Learning Sciences**

In the Industry Age where a large number of students goes through educational institutions to become economically productive citizens, the efficiency-driven instructionist approach makes sense (Papert, 1993). But in the 21<sup>st</sup> Century, life-skills like problem solving skills, creative and critical thinking skills, and collaboration and communication skills become critical (North Central Regional Educational Laboratory, 2003). A new science of learning, now known as learning sciences, began to emerge to investigate the inadequacies of instructionist approach of teaching.

The instructionist approach is deemed inadequate by many learning scientists as it ignores the social and situated nature of learning. This is evident by comparing school learning with professional practices. For example, scientists work in teams or communities which are engaged in similar themes of research so that new contributions can build on existing research findings. In contrast, students learn individually and are assessed for individual achievement in many schools. In communities of scientists, newcomers learn the trade by starting as peripheral members of a community, and gradually proceed to the core community through prolonged engagement in the culture and practice of the community (Wenger, 1998). That means newcomers learn in the context of professional practices. On the other hand, traditional instructional design models for classroom instruction have advocated an analytical and decontextualized approach where contents are divided into logically sequenced chunks and units for the learners (see Dick & Carey, 2005). This contradiction prompted many educational researchers and theorists to start taking a socio-cultural perspective to learning which believes that knowledge is constructed through social interaction and is context dependent (Bedner, Cunningham, Duffy & Perry, 1992; Roschelle, 1992). From this perspective, learning takes place because the individual interacts with the environment

and with the surrounding people. These interactions are crucial for the progression of one's knowledge of the world and also for one's personal development.

The conceptualization of socio-cultural theory of learning draws heavily on the work of Vygotsky (1962/1986), as well as later theoreticians such as Wertsch (1991). A key feature of this emergent view of human development is that higher-order cognitive functions develop out of social interaction (Tharp and Gallimore, 1988). Vygotsky (1962/1986) held that learning is embedded within social events and learning occurs as a child interacts with people, objects, and events in the environment. Vygotsky was of the view that mental functioning in the individual can be understood by examining the social and cultural processes from which it is derived. This involves an analytical strategy that may appear somewhat paradoxical: it requires the researcher to analyze the mental processes of the individual by going outside the individual, into his learning environment. In other words, methodologically, to understand the learning process, we need to analyze the interactions between the learners and the people or the environment.

Our lives within institutions like schools and their associated communities serve to give us the tools for making sense of our environment and to interact with those around us. These tools include languages, pictorial conventions, belief systems, value systems and specialized discourse and practices. With the advent of network technology, current educational practices also see an increasing trend in using networked computers as tools to foster online interaction within a community (Kirschner, Martens, & Strijbos, 2004). Computer-Supported Collaborative Learning (CSCL) is one field of study that focuses on online collaboration and interaction. In CSCL environments, individuals can be physically separated but their thoughts, ideas and convictions can still be communicated through the help of a mediating tool, in this case, the computer software. Network learning environments like chat, threaded discussion boards, or scaffolded forums like Knowledge Forum are some CSCL environments that are commonly studied. Likewise, interaction among the learners, as captured in the transcripts of the discussion, becomes the object of investigation to unravel the collaborative learning process.

In classrooms or in CSCL environment, one of the most common mediation tools for interaction is text. Analysis of the text becomes an important methodological issue. Quantitative Content Analysis (QCA) is a common technique used to systematically and objectively describe the manifest content of communication (Berelson, 1952). However, QCA is plagued with several methodological issues, including accuracy, reliability of procedures, and validity of the coding (Valcke & Martens, 2005). While QCA struggles with the psychometric issues of coding and quantifying mental constructs through text, in this paper, we argue for the use of Conversation Analysis (CA) as a grounded qualitative approach to understand the interactions among learners and instructors. The CA approach is not dependent on psychometric quantification of mental constructs and it is thus not susceptible to the validity issue of performing inference statistics on interpreted and quantified mental constructs (Riffe, Lacy, & Fico, 1998). The CA approach also takes into consideration the contextual information of the learning environment, which could be crucial in understanding learning from socio-cultural perspective.

In the following sections, we first review CA as a method, then illustrate how CA can be used to illuminate interaction processes and phenomenon in a face-to-face context and a computer-mediated interaction.

## Conversation Analysis

Every one of us lives in a world where we experience different social encounters. Social interaction is the basis through which business of the social world is transacted. Here, identities of the participants involved in the interaction are formed, shaped, affirmed or denied and cultures in which interactions take place are also renewed and modified. Social interactions can either be in the form of face-to-face contact or mediated contact through a tool. These tools can be in the form of language of the culture or in the form of technology aid like mobile phones and computers. The act of conversation is one of the oldest forms of socio-cultural interaction. Talk is thought made both visible and social and hence through analyzing conversation the thoughts of students and teachers can be 'seen'. Through analyzing talk, the complex interaction through which knowledge is transmitted, displayed, impeded or avoided can be examined.

The fundamental assumption of CA is that the act of conversation is not simply developed spontaneously, but rather, it follows a set of rules, which is different in different culture and context (Sacks & Schegloff, 1974; Garfinkel, 1967). CA is interested in how social orders are produced and how societies reproduce these social orders. CA seeks to place 'a new emphasis on participants' orientation to indigenous social and cultural constructs. It seeks to describe the underlying social organization – conceived as an institutional substratum of international rules, procedures, and conventions – through which orderly and intelligible social interaction is made possible.' (Goodwin & Heritage, 1990, p 283).

From the 1970s, CA is applied to institutional contexts like schools. Here, conversation is redefined to move beyond two participants to involve multiple participants. Conversations can take place between the students and teachers, between different groups of students and between the teacher and selected students in the class. The ecology of interaction that takes place in the classroom for learning is complex, yet has achieved levels of success for a long time. This web of interaction through conversations that takes place, once understood, will reveal the essence of multi-party conversations that allow for learning to take place. Linguists, sociolinguists, ethnographers and communication ethnographers, and later, researchers such as Sinclair and Coulthard (1992), Mehan (1979) and Cazden (1986) have carried out investigations into talk especially in classrooms to examine how talk has been 'institutionalized'. Through detailed analyses of actual interactive events of how teachers and students in classrooms use talk and other resources to accomplish learning, the practices and phenomena that have usually taken for granted can be explicated and understood. In order to analyze social interactions, it is important to integrate the analysis of *action*, *mutual knowledge*, and *social context*. As such in our analysis, we look for 'procedural bases for reasoning and action through which actors recognize, constitute, and reproduce the social and phenomenal world they inhabit' (Goodwin & Heritage, 1990).

While CA has been used to analyze classroom talks, its application in online environment is limited. In this paper, we argue that it is also valuable to use the art of CA to examine the features of 'conversations' that take place in an online environment to illuminate the interactions that take place in an online environment. An online environment provides affordances different from that of classroom environment, which may affect the interaction patterns and therefore the process of learning. In this study, we look at interactions in two contexts – a face-to-face classroom interaction and an online

discussion. The 'business' which is to be accomplished in both these contexts is the same, one of teaching and learning. But because the *context* of achieving this 'business' differs, the *actions* enable the 'business' can also be different. It is with this belief that we argue for the use of CA principles to establish the interaction patterns in the face-to-face and online environments. The accounts presented in this paper are important because they provide a rich description that can enhance the understanding of interactions that occur in a face-to-face and an online environment; they offer an alternative way to compare education interactions of teaching and learning in two different contexts.

In this study, we apply the same framework and notion of analysing classroom talk to study the online 'conversations' that are formulated. Understanding these online interactions and comparing them to traditional face-to-face conversations will allow teachers and researchers to better plan, design and facilitate online learning activities. Insights into the strengths of online environments will also allow traditional conversations to weave or to integrate with the new form of interactions.

### ***Data set and analysis framework***

In this paper, we use two different data sets: one from an online discussion and the other one from a face-to-face interaction. The face-to-face data set was collected from activities set in a science laboratory in Singapore; the online discussion was initiated by an activity in a science laboratory followed by discussions in Knowledge Forum, an online forum. The online data set focused on the topic of transformation of energy while the face-to-face conversation examined the topic of reproduction in plants. In both instances, the teachers interacted with a group of about 14 students. The data set for the online interaction was downloaded from message text in Knowledge Forum while for the face-to-face interaction, the lesson was audio recorded and the audio recording was transcribed. The purposeful choices of two distinct and unrelated contexts serve to show the potential of CA as an analytic method in understanding interactions, so the content of the data sets is not a limiting factor.

The unit for analysis in this case is a singular posting for online environment and a turn of talk for the face-to-face transcript. Specific episodes of significance are chosen to illustrate the patterns of interactions in this paper. Freebody (2003) suggested six 'analytic passes' of talk to examine the transcripts for interaction pattern. These six 'analytic passes' are, namely, (1) turn-taking to talk; (2) building exchanges; (3) parties, alliances and talk; (4) interactional trouble and repair; (5) preferences and accountability, and (6) institutional categories and the question of identity. In this paper, to illustrate the potential of CA in contrasting differences between face-to-face and online environment, we selected three of the six passes, namely, turn-taking, parties, alliances and talk and institutional categories and question of identity.

Turn-taking is not a random or whimsical phenomenon. Rather it has structure and is representative of a system (ten Have, 1999). It is, in fact, the basic form of organization for a conversation. In a conversation, the parties involved in the talk know when their 'turn' to talk is. In a classroom, this 'turn' to talk may need a little co-ordination in order to ensure that the smoothness of the turn-taking system is ensured. We argue here that examining turn taking structures will cast light into the social norms and

acceptable interactions that take place in the two different environments being compared here.

When more than two people are involved in an interaction, as in the context of the classroom, it is noted that interactions are organized in terms of groups (Freebody, 2003). Talk in these settings tend to be organized in terms of what knowledge the various participants have of the topic at hand, and also the institutional roles and categories in what the talk is organized, that is, who the expert is and who the novice is (Schegloff, 1995). It is important to examine how different participants react and form different alliances and parties as it is primarily the determining factor of how interacting parties use the available resources to determine the roles they play as well as their interactional rights and responsibilities.

In educational settings and activities, individuals draw upon their institutional identities to guide their behaviors (Freebody, 2003). Based on the settings, individuals can reconstruct the learning experiences by exerting their 'rights' and 'responsibilities'. These institutional identities which are bestowed upon individuals and groups in an educational setting can result in power interplay between the individuals. In this paper, we aim to see how the different parties draw on their identities, reconstruct new identities and how different powers interact in the two environments to enable learning to take place.

### ***Analysis of Face-to-face Conversation in a Classroom***

#### *Turn taking*

The turn-taking structure in this face-to-face interaction is systematic and usually predictable as in all traditional didactic classrooms. Students and teacher know when they have their speaking rights, leading to a smooth interaction with each speaker knowing when to talk and when not to talk. Excerpt 1 is chosen as it is representative of a typical classroom interaction structure.

Excerpt 1 shows five turns of talk where the teacher initiated a question on the differences between a terminal bud and an auxiliary bud. This was followed by an answer provided by a student. The teacher spoke next in a move which appeared to be evaluative of the student's answer in the previous turn of talk. She did this evaluation by repeating what the student said and then asked another question which appeared to be a clarifying question. The same student answered the teacher's second question and this was followed by the teacher's turn of talk in which she attempted to correct the answer given by the student in the previous turn of talk. The use of the expression 'Huh?' in line 9 by the teacher indicated that she did not understand the student's response in line 8. Her confusion with the student's answer was shown by the next two questions she asked in line 9. Through her questions, she demonstrated where the student was lacking in his answers. The two questions appeared to be rhetorical questions as there was no wait time allowed for the student to respond. The teacher went on to explain the difference between apical/terminal and auxiliary buds. She spoke as the authority in this case. Hence the turn-taking structure as illustrated in excerpt 1 is T(I)-S(R)-T(E/I)-S (R)-T (E) with the teacher initiating the question and giving the evaluation and the students responding specifically to the teacher's questions . (I – initiation, R – Response, E – Evaluation)

### Excerpt 1: *Apical Bud*

- |     |    |   |   |
|-----|----|---|---|
| 1.  | T: | <i>Ah ya, buds, there are two types of buds. Buds</i>   | Teacher asks a question and nominates a student to answer.            |
| 2.  |    | <i>can be terminal bud, ok, and auxiliary bud.</i>      |   |
| 3.  |    | <i>What is the difference. Terminal bud and</i>         |   |
| 4.  |    | <i>auxiliary bud, what is the difference? Song</i>      |   |
| 5.  |    | <i>Hao?</i>   |   |
| 6.  | S: | <i>Auxiliary is at the end.</i>                         | Student answers the question. This is an incorrect answer.            |
| 7.  | T: | <i>Auxiliary is at the end, then apical bud?</i>        | Teacher guides the student to correct answer by questioning.          |
| 8.  | S: | <i>Around the plant.</i>                                | Student answers question.   |
| 9.  | T: | <i>Huh? What does apex mean? (2) Apex is what?</i>      | Teacher acts as authority of knowledge and gives answers to students. |
| 10. |    | <i>Is the top and therefore apical bud is the one</i>   |   |
| 11. |    | <i>right at the end. The terminal bud, you don't</i>    |   |
| 12. |    | <i>call it terminal bud but you call it apical bud,</i> |   |
| 13. |    | <i>ok? Then the other bud, now, apical bud is right</i> |   |
| 14. |    | <i>at the end, right at one end, auxiliary bud are</i>  |   |
| 15. |    | <i>those at the side, ok? Buds.....</i>                 |   |

Turn-taking structure in this case is largely linear, that is, at any one time, only one person can be speaking and the rest of the class is listening. Hence, the students learn by witnessing and observing what is 'said' by others. According to Goodwin and Heritage (1990), hearers are faced with the task of coordinating their behaviors with speakers' so that they can be motivated to make inferences about future action and emerging meaning by analyzing the unfolding structure of the talk in progress.

The students modify what they like to say after listening to what has previously been presented. The teacher also makes use of what is said in the previous turn of talk to determine the next turn of talk and to shape the discussion accordingly – this was evidently seen in how the teacher's evaluation strongly coupled with initiation of the next question. In essence, interaction appears 'fluid' and the shape in which it takes is developed as the interactions take place. Talk shapes the interaction and the interaction in turn will determine the types of talk that will be presented.

Excerpt 2 illustrates yet another example of face-to-face interaction and how the systematic linear form of turn-taking structure looks like. A student initiated the interaction by asking a clarifying question and the teacher answered the student's question with a direct answer in the next turn of talk. The student responded to the teacher's answer in the next turn of talk by paraphrasing what the teacher had said and offered another clarifying example. The teacher's next turn of talk was somewhat complex. She acknowledged that she had heard what the student said by echoing what he

said in lines 4-6. This was followed by a 16 second pause – a rather atypical wait time in the classroom. When there was no further input by the student, the teacher took this as evidence that more explaining was required and hence she addressed the rest of the students in the class.

This illustrates how the teacher makes use of feedback from one student as evidence of the level of understanding for the rest of the class. The teacher has taken her turn of talk between the student and herself to open up the discussion to the class. Here the turn-taking pattern appears as S(I)-T(R)-S(I)-T(R)-Class. This pattern again shows the linearity and systematic nature of face-to-face classroom interaction.

**Excerpt 2: *What’s the difference?***

- |     |   |  |
|-----|---|--|
| 1.  | <i>S12: Then what is the difference between the apical bud and the auxiliary bud?</i> | Student initiates a question.  |
| 3.  | <i>T: Apical is apex, the last one.</i>   | Teacher provides the answer.   |
| 4.  | <i>S12: That means all, is all concentrated here that one.</i>                        | Student clarifies the answer given by the teacher.   |
| 5.  | <i>Concentrated here, apical bud. There is one, one bud.</i>                          |  |
| 6.  |   |  |
| 7.  | <i>T: One, normally one. The rest are all called</i>                                  | Teacher emphasizes answer. A 16 second pause is interpreted by the teacher as lack of understanding. |
| 8.  | <i>auxiliary bud. (16)</i>  |  |
| 9.  | <i>((Addressing the class))</i>   |  |
| 10. | <i>Now, some of you, class, may I have your</i>                                       | Teacher addresses class and used student’s question as a platform for discussion with the class.     |
| 11. | <i>attention? Some of you are not sure what apical</i>                                |  |
| 12. | <i>bud is. Now, if you have a stem and you have</i>                                   |  |
| 13. | <i>leaves coming out. Ok, at the axial of leaf.</i>                                   |  |
| 14. | <i>Alright, so, if you think of your potato as a stem,</i>                            |  |
| 15. | <i>ok? Then, it will also have leaves coming out,</i>                                 |  |
| 16. | <i>isn’t it...</i>  |  |

*Building alliances*

In the face-to-face interaction, alliances appear to be built based on what the teacher says. In a multiple-party interaction between students and teacher, there is little evidence that students are actively trying to convince each other of their stand. Rather, alliances are generally built collectively between the teacher and the students. Although alliances are built collectively, the teacher or students who appear to be most knowledgeable, gain the authority to orchestrate the alliance forming process.

In excerpt 3, the teacher initiated a question and one student offered an answer. The teacher responded by repeating what the student said and asked yet another question, in an effort to refine the answer given by the student. Three other students in the class offered answers to support the teacher’s effort in refining the answers. The teacher, in the next turn of talk, accepted each of the answers and this constituted an alliance that was formed between the teacher and the three students, S1, S2 and S3. The teacher and the

three students jointly constructed the knowledge of what constitutes underground storage organs for the benefit of those witnessing the interaction.

Forming alliances can sometimes be a lonely odyssey for some students. In lines 20 to 33 of excerpt 3, we can see how student S tried to win some support by trying to convince the class that the reason for having perennating organs was to prevent the extinction of the plants. The teacher tried to help him refine his answers but this led him to insist that seeds do not play a part in ensuring the survival of the plant as '*They get eaten by birds*'. This answer resulted in laughter from the class as well as exclamation of wonderment from the students – an indication of an answer or idea that was not acceptable by the class. The students in the class had chosen to form an alliance with the teacher, to perhaps convince student S that the answer he offered was far from acceptable. This social pressure led student S to think through the answer that he had insisted as he tried to defend his answer in line 33 using speech markers like 'but'.

From the excerpt, it is appropriate to conclude that forming alliances is an interactional pattern that allows learning to take place and social factors, social expectations and knowledge which individuals hold are factors which will determine *how* and *what* alliances are formed. However this excerpt also reveals that most of the alliances formed are in support of the teacher, who appears to be the authoritative source of knowledge. One possible explanation for this phenomenon could be because the students do not have time to reflect on what is being discussed in the classroom, hence agreeing with the teacher is the most convenient.

**Excerpt 3: *They get eaten by birds***

1. T: Which part of the parent can become separated and then grow into a
2. new plant? (3)
  
3. S: Underground storage stem.
  
4. T: Underground storage organ, ok, like what?
  
5. S1: Rhizomes.
  
6. S2: Bulbs.
  
7. S3: Runners.
  
8. T: Okay, now these are underground storage organs, usually, ok,
9. rhizomes, corms, bulbs, tubers, runners, stolons and so on. These are
10. also called perennating organs, right because it comes from the word
11. perennial, continues on and on forever. So, these organs that can
12. develop into a new plant parts therefore are called perennating and they
13. also store food. Now, what actually happens to the perennating organs?
14. (10) Okay, perennating organs can be stems, not necessarily, when you
15. say underground plant parts, right, it can be a stem, a root and it not
16. necessary be underground. It can even be a whole shoot, ok? And what
17. happens is, they are storage organs, right and what happens is food

18. *from the current year foliage leaf are then stored in the storage organs,*  
19. *ok? Then, why is it the plants need this perennating organ? (3) What is*  
20. *the reason for requiring perennating organs?*  
21.  
22. S: *So that they will not become extinct.*
23. T: *Ya, why is it they become extinct if they don't have perennating organs?*  
24. *Will they always become extinct if they don't have perennating organs?*  
25.  
26. S: *After they die, then they don't have some others to replace them.*
27. T: *But they can also reproduce actually by seeds, isn't it?*
28. S: *They get eaten by the birds.*
29. T: *Huh?*
30. Ss: *((Laughs))*
31. T: *The seeds are eaten by the birds?*
32. Ss: *Wow!*
33. S: *But the seeds they put under the soil, so birds//*

### *Institution Identity and Power Relations*

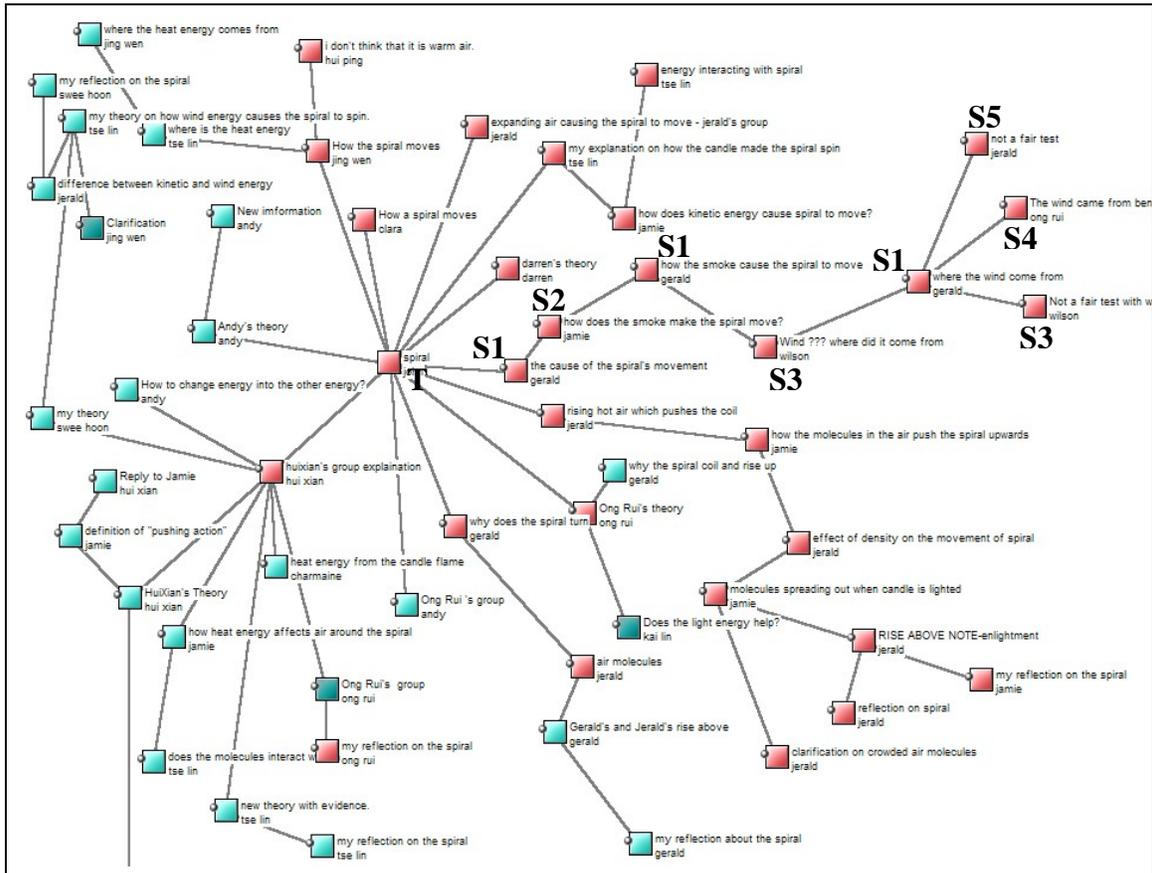
In a classroom context, participants are grouped into different categories and hence different identities surfaced. The interaction in the classroom is largely possible because the participants are accountable for engaging in particular kinds of behavior and sequences of talk. Each category of participants play their roles based on a set of socially acceptable norms and responsibilities.

In excerpts 1 and 3, we see how the teacher played her role as the authoritative source of information by initiating questions and evaluating the answers given by the students. The teacher decided what types of questions were to be asked so that the lesson was framed according to what she intended it to be. Even in excerpt 2, where the student initiated the question, the teacher still held the power to steer the direction of the discussion by the types of answers she gave. In line 3 of excerpt 2, the short answer given by the teacher to the question posed by the student indicated that the teacher was only willing to address the specific phenomenon of the position of the apical bud but was not willing to explain the principles behind the naming of the buds.

The teacher, in the three excerpts, possesses the power to initiate questions, evaluate questions and also to set the direction and pace of the discussion. The teacher has the authority to define what 'correct' knowledge in the classroom was. She views her institutional responsibility and identity as one which requires her to judge and pass verdict to contribution by students. She is the one with the knowledge and the students are viewed as novices. In excerpt 1, we see that the teacher also holds the power to



Figure 1. Complex web-like turn taking in Knowledge Forum, an online forum



**Excerpt 4: Spiral and burning candle**

1. T: Explain how the burning candle caused the spiral to move.
2. S1: <My theory> is that the smoke from the flames causes the spiral to move. the flame's smoke is thick, so when the smoke rises, and the
3. wind blows the smoke, the wind will blow the smoke and push it
4. causing the spiral to move. <I need to understand> if the wind affects
5. the spiral's movement.
- 6.
7. S2: <Opinion> how does the smoke cause the spiral to move?Do you
8. mean the heat and light energy from the flame instead?
9. S1: <My theory> the smoke makes the air expands, then the wind pushes
10. the air upwards causing the spiral to coil and turn up.
11. S3: <I need to understand> wher did the wind come from??? <My
12. theory> is that there is no 'wind' and the heat given out by the spiral
13. causes the spiral to coil and turn up

14. S1: <My theory> is that the air comes from our surrounding.
15. S3: <Opinion> is that if wind is included in the experiment, it would not  
16. be a fair test
17. S4: <My theory> is that the wind did not come from the surrounding but  
18. from beneath. It did not come from the surrounding as when we did  
19. the experiment, we blocked the wind from the surrounding but not  
20. the wind from beneath. <This theory cannot explain> how the wind  
21. move from underneath the spiral
22. S5: <Opinion> Then it was not a fair test. <Reason> The experiment  
23. was conducted to find out how the heat from the candle interacting  
24. with the spiral to make it move not the surrounding air.

\*Words in brackets <> are cues in Knowledge Forum which the students can choose to construct their comments.

#### *Building alliances*

Students seemed to form alliances after careful observations of what others had 'said'. They judged before taking sides. In excerpt 4, although S2, S3 and S4 did not explicitly declare that they agreed with one another, it was clear that they formed an alliance to disagree with what S1 had expressed. They each responded in their own time with their own reasons as to why the claim initiated by S1 could not stand.

S1: ~ The air comes from our surroundings.

S3: ~ If wind is included in the experiment, it **would not be a fair test**.

S4: ~ The wind **did not come** from the surrounding but from beneath. It did not come from the surrounding as **when we did the experiment**, we blocked the wind from the surrounding but not the wind from beneath. How the wind move from underneath the spiral.

S2: ~ Then it **was not a fair test**. The experiment was conducted to find out how the heat from the candle interacting with the spiral to make it move, not the surrounding air.

The interaction above shows that the students were clear about what information they subscribe to and why they did not agree with what S1 has stated. As there was little evidence of teacher's input in this series of exchanges, it is appropriate to conclude that in this case, the power to form alliances and which alliances to join lay with the learner and not the teacher. In the absence of the teacher's input, the factors which affected the alliance formation, although not evidently conclusive, appeared to come largely from the students' prior knowledge and the activities that were carried out in the classroom (S4: *when we did the experiment*). In their responses, the students cited reasons to support their claims and these were usually from the results of experiments they performed or information from books which they have read.

### *Institution Identity and Power Relations*

Examining the interaction that takes place in the online discussion, it appears that the students have been designated power to orchestrate their own social order and discussion. The power to initiate questions lies equally with the teacher as well as the students.

Students initiated many questions on their own, albeit mainly clarifying questions. The students also had the power to evaluate the responses offered by the others in the discussion. Hence, the power to direct the discussion was also distributed to the students although the teacher still held the key to audit the discussion. The discussion that resulted and illustrated in excerpt 4 shows the power students had in directing the discussion. They were free to express the views. There was also little control over the speaking rights of the students. The students decided for themselves when they would like to be ‘heard’.

In this social order, the traditional institution responsibilities and power of a teacher seem to be somewhat modified. The power of the teacher as the significant authority in the field of knowledge appears to be diffused in this mode of learning. His role here appears to be facilitating the discussion rather than to provide instant feedback to what the students have ‘said’. Also, it is the students who have the power to set the pace of discussion. Hence institutional responsibility is re-negotiated. One possible reason for students having greater power in this social order can be because the students are given time for reflection and they are able to converge multiple sources of information to critique knowledge that is presented. They also have the luxury of an online record of what have taken place in discussion to formulate their responses or arguments.

### **Comparison between face-to-face and online interactions**

By performing three passes of CA (turn-taking; parties, alliances and talk; and institutional categories and question of identity), we contrast the differences between face-to-face and online interactions (Table 1). We acknowledge that some of these differences could primarily be due to the teachers’ intervention as the texts were taken from two different contexts. First, as mentioned earlier, we choose two distinct situations and contexts to illustrate the potential of CA as an analytical tool. Second, we argue that some of these differences could be due to the inherent affordances of the environments, as explained in the right most column of Table 1.

Table 1. Comparison between face-to-face and online conversation

<b>Face to face</b>	<b>Online</b>	<b>Affordances of the environment</b>
<u>Turn-taking</u> 1. Linear 2. One at a time 3. Systematic and predictable, one main thread of discussion at one time	1. Web-like 2. Concurrent posting possible 3. Complex, multiple threads possible	Linear turn-taking in classroom because it works best when only one person speaks at a time, therefore only one main thread. Complex, web-like in online environment because it is not possible to know what other participants are going to say and it is possible to post a message at the same time.

<p><u>Building Alliances</u> The teacher, who is the authoritative source of knowledge, attracts social alliances. Difficult to provide counter opinion.</p>	<p>Students form alliances based on agreement with the opinion and ideas presented.</p>	<p>The social presence and authority of teacher, once established, is difficult to remove when the teacher is physically present. In an online environment, the teacher can choose to be absent for students to form alliances.</p>
<p><u>Institution Identity and Power Relations</u> The institutional power, roles and identities of teachers and students are crafted and reinforced through each interaction.</p>	<p>The students assume more power to direct their discussions. The identity of who is the more knowledgeable is formed through discussion.</p>	<p>In an online environment, the teacher can relinquish the power by his/her controlled absence. The students also have more time for reflection and crafting their ideas. The students, however, must possess the knowledge building capacity such that validity of knowledge is respected and meaningful discussion can ensue.</p>

### Conclusions

Taking a socio-cultural perspective of learning, this paper presents CA as an analytical tool to examine texts resulted from interactions in both face-to-face and online environments. Without getting entangled with the psychometric validity issues as in the case of quantitative content analysis, CA allows us to analyze interaction in two different social orders and to surface similarities and differences between the two. Using CA, the actions and knowledge of the participants in the two contexts can be compared to illuminate how the social norms of learning are constructed and understood by the participants in these two learning situations.

Using transcripts from two distinct situations, we can see that in both face-to-face and online discussion, there are some predictable patterns in the turn-taking structure although the actual pattern between the two might look different. Turn-taking in both instances are governed by unwritten and unspoken social norms where the participants seem to know when and what to ‘say’. In both face-to-face and online discussions, alliances are formed between participants. Alliances formed in both forms of social orders are largely based on the belief of who possess the authority source of knowledge.

On the other hand, we observe several differences. For example, turn-taking pattern is linear in a face-to-face environment, with only one person speaking at any one time. In an online environment, the turn-taking adopts a more branching and web-like pattern. More than one person can be expressing their views at the same time, and this is the reason why a web-like pattern is possible. In a face-to-face interaction, the teacher is the one who controls the knowledge constructed through *what he/she* says; *how he/she* says it and the amount of think time and wait time that he/she permits in class. As a result of strong teacher input in face-to-face discussions, the alliances that are formed almost always include the teacher. For an online discussion, where the physical presence of the

teacher is not felt, the teacher can choose to take a “controlled absence” by playing the role of a facilitator. The students can be empowered to steer the discussion provided they possess knowledge building capacity to engage in meaningful and constructive discourse.

Stahl (2005) argued that it is important to make adaptations to methods used to analysis different social order in order to surface the significance difference. Although we agree with this perspective, we argue that that it is also valuable to examine different social orders using the same lens and surface differences in the two social orders. It could help practitioners to draw parallels between the different social orders and to highlight the divergent advantages and disadvantages of each order. Tapping the unique affordances of each environment, practitioners can utilize both environments to bring about a balanced instructional approach. A teacher can utilise the power in a face-to-face environment to steer the learning direction for students in a productive way and yet relinquish this power to the students in an online environments so that the students learn to assume the role of epistemic agents in knowledge construction.

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