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Stepping in the Same Stream Twice: A Dynamic Systems Look at Group Work in the ESL Classroom

The beauty of teaching is that no matter how many times you have taught the same course, you cannot go back and re-teach any class, even if you wish you could. Each class moves along in its own way like a stream, following a fairly predictable path while taking surprising (yet logical) turns and twists over time. Time, as far as we know, is irreversible, but by looking at your classroom as an open, self-organizing system whose flow emerges as it progresses, you can prepare for the next class by making some very effective changes – changes that may seem small but that have a significant impact on the identity of the class and the flow of learning that emerges over time.

Dynamic Systems Theory
Systems theory, also known as complexity theory, has recently been applied by the "soft sciences," much to the dismay of a few hard science academicians. Diane Larsen-Freeman first approached this topic in 1997 with her article *Chaos/Complexity and Second Language Acquisition*. In 2008, she also co-authored a book with Lynne Cameron titled *Complex Systems and Applied Linguistics*. While describing the theory takes a great deal of time, there are a few basic tenets that can be understood and applied easily to any situation where emergence is desired. In this situation, I am interested in applying the theory to group dynamics in the classroom.

In his article, *Classroom Management: Creating 'Just the Right Amount' of Disturbance*, William Doll, author and Professor of Education at Louisiana State University, writes that open systems work best if they have the following components:

   a. a critical, active mass,
   b. only a few operating connections at any given time, and
   c. a simple set of operating rules" (Doll 2000).

This scientific observation can be applied to other dynamic systems, such as students in the classroom, with the expectation that if conditions are favorable, language production will emerge. The key ingredients then would include:

   a. A specific group of active, involved students
   b. who have only a few methods of making connection,
   c. and only a few rules to follow at a time.

Once the initial conditions are established, the instructor acts as a facilitator (steering the boat) while the students provide the energy to move along (rowing). Through the lens of complexity theory, we can see that the facilitator's job is not only to set up the boundaries and be aware of initial conditions, but also to monitor interactions to make sure that the system has just the right amount of input to remain at the "edge of chaos." Too much input, and the system (or classroom) dissolves into chaos. Too little, and entropy ensues. Allowing for mistakes, trial and error, false starts, resistance, and unpredictable variables is what keeps the class moving. Preventing too much of this "noise" is what keeps the project from deteriorating into a situation where the energy falters and participants lose sight of the group identity and begin to take

off on their own. The job of the facilitator then is to create and maintain conditions that are favorable to emergence, knowing that it *will* occur but that it is impossible to predict exactly what course it will take.

Facilitating Group Work
With these concepts in mind, I planned an activity for my level three grammar class. The task required the students to work in small groups in and outside of class to write a story. My goal was to elicit clear verbal and written expression using simple past, past progressive and past modals. I wanted my students to use the forms we had studied in an actual communicative setting where other students could give them immediate feedback with attention to grammatical structures. My secondary (and slightly surreptitious) goal was to expose them to group work in a comfortable multicultural setting before they had to do it on their own. I also wanted to find out the best possible arrangement of students for future group work that will take place outside of class.

The parameters were as follows:

1. Select a small character toy from my collection. (These included Lego people, small plastic animals and toy soldiers.)
2. Use at least five verbs from our weekly irregular verb list. (There were 15 to choose from.)
3. Write a story using simple past, past progressive, the words "there was" or "there were" and one past modal such as "should have." (Thus, one character had to make a mistake.)
4. I also gave each group a vehicle, such as a toy ambulance or helicopter to promote ideas about action.
5. Students were allowed to choose their group members, but they had to have at least 3 people, one of whom spoke a different language.

I gave each student an instruction sheet with blanks for the group members' names, including a place for one person who would write the story down in class and one whose job it would be to type the story and email it to the others. I also set out sample stories that my students had made in the past. At this point, the table was set and I got out of the way.

Returning to the three main ingredients, I now had:

1. A group of active, involved students;
2. Connections that were a bit unwieldy, but were limited to:
    a. Physical interaction between members of the group (talking/moving chairs)
    b. Students looking at the instructions
    c. Students looking at the example stories
    d. Students examining the toys
    e. Students looking through the list of irregular verbs, and
    f. A few students still wandering around trying to find a group
3. Perhaps a few too many rules, but time would tell.

As a facilitator in this learner-centered environment, my job now was to maintain a dynamic balance between order and chaos. In order to maintain overall stability, a system must be kept at the edge of chaos: that moment where everything is flowing and yet there is neither too much nor too little activity. Thus, my first task was to keep the class from becoming too active or chaotic. To do this, I watched to see if my goals were being met. Did they know what to do? Had they selected a scribe? If so, were they using past tense? Were they trying to include the grammar structures I wanted? Were they writing it down? Basically, were they becoming a cohesive group?

Initially, the biggest issue was that the groups were overly active. Each student had to sort out the instructions, get settled physically, and negotiate his or her role in the group. One group had a member who was both creating the story and doing all the writing. As I watched, another student offered to be the scribe while the first student dictated. "So, you'll type it up then," the new scribe said to a third student who agreed. This interaction pleased me immensely for two reasons. First, the student who took on the identity of group scribe had complained when he saw the toys. (He thought it was too childish.) Second, a sign of a healthy system is when participants start to establish personal identity and work out power dynamics between themselves based on their idea of their own ability and what the group identity requires. Thus, this student's power negotiation bonded the group and helped give it form.

For the most part, my job entailed moving from group to group reestablishing the parameters, reminding the students to use the specific grammar structures, and helping them spell vocabulary that emerged from using the toys: ambulance, helicopter, snake, duck, etc… I realized that the inclusion of the irregular verb list was creating confusion, so I revised this requirement and allowed them to use any verbs they wanted, telling them that they "could" use the list if they needed ideas, but that they "had to" include all the grammatical forms in their story. By releasing one requirement and reiterating another, I was able to direct their energy effectively. As the work progressed, language and ideas began to flow, and there were many questions, but at no point did I feel that the activity was so over stimulating as to be detrimental.

My next task was to make sure that the energy didn't die down throughout the remaining 30 minutes of class. The second law of thermodynamics states that dynamic systems naturally tend to move toward stability, so over time I knew that the energy would dissipate. I wanted to make sure that when the whistle blew (signaling that there were 10 minutes remaining) all the groups would be winding down their efforts but still working attentively.

With all the toys and the short time limit, entropy was not a problem, but there was a slight threat when one group member sat back in his chair and asked how long the story had to be. As a facilitator, one of my roles is to provide positive or negative feedback depending on my perceptions of their progress. To answer the student's question, I smiled and said, "Long," and I held up one of the examples from a previous class of a lower level showing 6-8 paragraphs. The student looked at the group's one-paragraph product and realized that there was more work to do. I suggested using more adjectives and descriptive words and phrases to develop the story. This is an example of positive feedback which is discussed below.

I also looked for students who seemed to be uninvolved and encouraged the group to "include everyone." However, one important aspect of systems theory is Richardson's 80/20 principle discussed by McClellan (2010). This posits that in a functional group approximately 20% of the active members will actively contribute to the output while the other 80% follow along. Even allowing for inactive members, this theory shows how leadership can emerge even in a small group. If the leadership rotates from time to time, this is not a threat to stability, so it's perfectly fine if several students just listen rather than talk at once.

As the project progressed, I continued my alternating role as both "noise reducer" and "noise amplifier" (Kennedy, 2010). This job requires the facilitator to employ a type of negative or positive feedback that is defined along the lines of systems dynamics. Negative feedback involves steering the group back to the basic rules and structural limitations in order to stabilize the system. The risk of too much negative feedback is that it can create "a zone of 'flattened-out' conversation that narcotizes the group…and establishes a consensus of indifference, in which no new ideas appear to be available" (Kennedy, 2010, p. 10). Positive feedback includes anything which "brings difference" such as encouraging moving on or moving in a new direction. The risk of too much positive feedback is that the system can become too

dynamic and lose focus. By balancing between these two extremes, I was able to maintain a classroom environment that was conducive to the emergence of the language structures I had selected.

In Retrospect

Looking back through the lens of complexity science, I reevaluated the lesson particularly in regard to the effect of initial conditions and the use of a simple set of operating rules. Initial conditions can be considered through a phenomenon popularly known as The Butterfly Effect. The term was coined by Edward Lorenz to describe his work with weather prediction in the 1960's (Gleick, 1987). He noticed with his computer calculations that a small change in initial conditions can lead to highly disparate results. Thus, while the relationship is not causative or predictable, we can be assured that details are more important in the beginning of a process because they help define the direction that the system will follow. First impressions are indeed lasting.

Conscious of this phenomenon, I had done a bit of groundwork before we engaged in this activity, mostly in regard to having students write creatively using the grammar structures we had been using each week. I also had previously put the students in pairs to work on less demanding activities. I had not done any actual group work with this class yet. Being sensitive to initial conditions in an ESL classroom always requires an awareness of cultural attitudes and expectations. In this classroom, I had four Muslim women, two of whom preferred to work and sit together; neither had interacted with males in the class unless they were required to. I was concerned about the comfort of one in particular who was fully covered. Before class that day, I asked her privately if she was comfortable working with men, and she said that she was a little shy, but that she would try and thanked me for asking. She ended up in a group with three men, but she (being dynamic and smart) jumped in and participated as much as the others. In fact, she seemed to take the lead in a group that included a man from Costa Rica, one from Ethiopia, and one from South Korea. In this case, a small bit of attention to initial conditions may have prevented what could have been a problematic outcome. However, I also noticed that her friend, another Muslim woman, seemed more reticent in her group which included mostly Saudi males who preferred to talk to each other rather than her. I hadn't had a chance to speak with her before the class, and I think that next time, I'll look more closely at how to head off any discomfort in this regard. I will probably assign students to groups rather than letting them decide.

In regard to keeping the operating rules simple, I see now that I could have explained the process better and perhaps introduced the parameters in a different order. I might also minimize the characters that they can use and avoid the irregular verb list, as it just seemed to increase confusion. One point I'm still debating about is the usage of toys. They generate a lot of playful energy, and students will use them as props to show interactions, but there is nearly always one very serious student who recoils at first. Perhaps simply explaining why I'm using toys from the start would head off this issue and elicit more cooperation in general, or I might start using pictures of real people and vehicles rather than toys.

What Emerged?

It is not possible to know every detail of what emerges from the workings of an open system. However, on an intuitive and immediate level, I was content with the lesson. One measure of success for an open system is that the group develops a sense of self-identity over time, and these groups had done just that. I could smell competition in the air when one group and then another started getting out their cameras to photograph the objects so they could illustrate their stories, which was not required.

When I packed up my books, students were still scribbling titles and correcting verb tenses and exchanging email addresses so they could polish and e-mail their stories to me. They had worked hard to use the grammar structures I listed, and they had all actively participated in the process of developing a product that they could take ownership in. They had also pushed themselves to interact socially in a small group and were taking steps to extend that social interaction outside of class in order to complete the

assignment. Clearly, they had given themselves much to consider as they continued their projects outside of class.

As the facilitator, I also had a great deal to think about after this class. I wondered which students had gotten the most out of the verbal part of the class and whether they were inspired or dismayed by the group work. In regard to writing, I wondered how much feedback they would need before their stories were presentable and whether one student would be burdened with proofreading the entire story. As we left the classroom, I was already drafting a questionnaire in my mind to ask them about their feelings regarding this group work, and I had quite a few ideas about how to revise the lesson.

In the short term: the stories required at least one major revision, but they were more extensive and creative than I had anticipated. Some groups had obviously collaborated outside of class and some had not. They all needed to meet once more in class to revise their work. Before we moved on to other group work, I created a survey to find out about their experience which we discussed in class before launching into further and more extensive study groups. On the last day of class, I handed out copies of all the stories combined so each student had one to take home. It was clear by their smiles that they were pleased to see their work in print, and that more had emerged from their interactions than I knew.

I know that when I revisit this lesson, I'll be able to manipulate the initial conditions more effectively. I'll try to minimize the amount of information on the instructions, and I'll spend more time setting up the activity and deciding which students to put in which groups. But even with the most meticulous plans, the beauty of working with an open system assures me that it isn't possible to have complete control over the direction and velocity of what emerges. In fact, attempts at total control run counter to the philosophy behind systems theory. As Heraclitus observed long ago, it isn't possible to step into the same stream twice. It is not the same water, and we will not be exactly the same people.

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