

Relationships, Systems, and Complexity

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An examination of complexity in education and social contexts begins with two ideas that at first glance may not seem to be very closely connected. These two ideas are relationship and system. “Relationship” and “system” describe the same basic situation. Typically, when we think of relationship, we think of some connection between two or more people, objects, or ideas. We do not generally see that the moment we have a relationship between two or more “things,” we have set up a system between these “things.” It’s like the standard story of getting a new pet dog in your house where you already have a cat. In order for the two pets to get along with each other or to form a relationship, you put both of them together in a room. In most cases, both survive with minimal bloodshed and emerge having established ground rules for relating to one another. Of course this “relationship” expands to you and others in your family as the cat, dog, you, and your family all negotiate the terms of this more complex set or system of relationships.

From the previous example, a single “thing,” such as the cat or dog, is a system in itself. But, what are the relationships? In such a “cat system” there are probably billions of relationships making up the cat. Each whisker is in relationship with the other whiskers, as well as with the nerve endings around the base of each whisker. These nerve fibers are in relationship with neurons in the brain, which in turn are in relationship with motor neurons and other neurons involved in cat cognition. Each cell in each tissue in each organ is related to other cells, and these cells as tissues are in relationships with other tissues. Each organ has relationships with other tissues and parts of its own organ system; and all organ systems are in relationships with each other. The interesting attribute of both the cat—dog system and the system of cat or system of dog is that relationships of

relationships across levels of scale establish systems that are larger than the sum of their parts. This classic principle of the complexity sciences (that the whole is larger than the sum of its parts) is due in part to this notion of relationships. While the reductionist view (that the whole can be understood as the sum of its parts) sees relationships between the parts, such a view does not really take into account the relationships of relationships. This iterative scaling of relationships (relationships of relationship and so on) allows us to develop understandings of wholes that are larger than the sum of their parts and that are dynamic and complex systems. The cat—dog relationship is something more than both the cat plus the dog. If you have a cat or a dog, you know there is more to your cat or dog than all of its biological parts and systems put together. The same holds true for each of us. All of us are more than the sum of our biological parts.

In classrooms, relationships occur across scales of multiple individuals, events, and contexts, which are the relationships that affect each individual in the classroom. There also are the relationships that are embedded in the classroom itself, including the manifestations of the teacher's philosophy of teaching and the original design of the classroom. These relationships are embedded within those of the school, including those in the design, those that reflect the philosophy of the principal, and those of other teachers. In turn the school is embedded in the social and cultural relationships of the community and the politics of the school district. As we increase levels of scale, the students—classroom—school—community—district are embedded in the national political and societal relationships of schooling and education. The complexity of these intertwining relationships interact in varying ways that affect the systems of relationships across the entire scale.

What is Relationship?

The word “relationship” is so ubiquitous that we use it without really thinking about what it means. At a basic level, any relationship involves some connection between two or more “things.” In fact, as Kelso and Engstøm (2006) suggest, “it is clear that very little happens in mind, life, and matter... unless two or more separate things come together” (p. 140). These relationships or things coming together vary in the degree to which they involve some dynamic interchange or interaction. It seems that a “static” relationship is impossible, since the whole notion of relationship is based on some kind of interaction. A characteristic of complex systems is that they operate out of equilibrium. Typically, if a system has entered into a state of equilibrium it has stopped functioning (Capra, 1996). However, we may have “stagnant” relationships, where the interactions have become predictable and solidified. Gregory Bateson (1979/2002) stated that a “...relationship is always the product of double description” (p. 124). We can extend this idea to multiple description, as well. Bateson’s idea of double or multiple description is that a relationship is described or defined by each “thing” in the relationship (Hui, Cashman, & Deacon, 2008). People in a relationship define or compose that relationship through the dynamics of their interactions. The same sort of double or multiple description holds true for other relationships, such as the relationship among the Sun, Earth, and Moon or the relationship between a driver and her car. Each component of the relationship affects both the other component(s) and the relationship.

What we’ve seen thus far are interactions among “things” as relationships, relationships of relationships across scales and contexts. This complexity of relationships is

a matrix (Bateson, 1991) or network (Barabási, 2010) of relationships. If we look at matrices or networks of relationships, we generally find more significant nodes (Barabási, 2010; Bloom, 1995). These significant nodes tend to have more and stronger connecting relationships than other nodes (or “things”). The most cited author in a particular field, the most popular student in a school, or a key idea of interest to a particular child within a specific topic or theme are all significant nodes or central hubs of relationships within a network or matrix of relationships. Network theory is a subset of complexity theory and extends our knowledge of relationships across scales (Buchanan, 2002). On a popular level, this theory has been used to demonstrate how people are more closely connected to one another than we had thought; as with 6—degrees of separation (Barabási, 2010; Buchanan, 2002). However, the dynamics of networks demonstrate how patterns of individual and group behavior occur, and how even weakly linked relationships provide for incredible extension of connections and for the stability of social “structures.”

The Nature of Relationships

When we work with or observe relationships, we need to focus on the nature of the interactions and how they define the relationship. Gregory Bateson (1972/2000, 1991) described three basic types of relationships: (a) complementary, (b) symmetrical, and (c) reciprocal. Each of these types refers to the patterns of interactions within the relationship.

Complementary relationships are somewhat lopsided, such as dominant—submissive types of relationships. Although these types of relationships often maintain stability in non-human animals, such as among wolves, they often lead to disintegrating relationships among people. The dominant, controlling, and authoritarian teacher may

maintain a semblance of “control” in the classroom, but ultimately the students rebel or disconnect in other ways. Jay Lemke (1990) discussed a variety of techniques that children use to resist or rebel against the power of teachers, as well as the techniques teachers use to assert power and control. As the relationship in the classroom moves from dominant teacher and submissive students to both teacher and students vying for control, the relationship moves from complementary to symmetrical.

Symmetrical relationships are often characterized as competitive. Whether these relationships are competitive or not, they tend to consist of two or more people that exhibit the same relational tendencies. On the competitive side, these relationships have people, such as the teacher and students, as described above, vying for control. In other kinds of symmetrical relationships, the people involved may be of the commiserate type, such as those who sit around and complain. Such symmetrical relationships, whether competitive or commiserate, tend towards instability.

Reciprocal relationships are the only ones among people that tend towards stability. In such relationships, people negotiate and collaborate as a matter of course. There’s a sense of balance or equanimity in such relationships.

Although we may find Bateson’s terms for these types of relationships somewhat confusing, they do provide a useful framework for analyzing and assessing relationships in a variety of social contexts. While it may be easy to place value judgments on these types of relationships, we may find that relational patterns change over time or in different contexts. Certainly, competitors in a particular sport, may be in a symmetrical relationship will playing against one another, but then they may be in a reciprocal relationship during their free time. The symmetrical context may provide the “energy” or motivation to

compete in the sport. Complementary relationships are critical in certain contexts, such as in the military or in some sort of emergency context, such as among firefighters, a surgical team, or rescue operations. If the “dominant” leader does not have control, the whole situation could destabilize or not work effectively. At the same time, reciprocal relationships, which we may think of as being ideal, can be highly problematic as in the competitive, military or emergency situations just mentioned.

As we examine relationships within the context of schooling, analyzing the types of relationship can be useful determining the most appropriate dynamic for different contexts and situations. The teacher who tries to establish a community in the classroom is probably going to try to establish reciprocal relationships with and between the children most of the time. If the teacher arbitrarily changes styles to one that is complementary, this change could undermine the sense of community. However, if the teacher orchestrates the types of relationships for different, but appropriate, situations, then such changes can enhance the sense of community. Such orchestrated changes can allow both the teacher and students to change and exchange roles. At one point, groups of students can be competing (in a symmetrical relationship) within some sort of short or long-term activity. At other times, some students can be controlling the others during some other type of activity. Classroom meetings may be “controlled” by a student who chairs the meeting, but the interactions within this meeting may be reciprocal in nature. In general, the idea here is to look at relationships as dynamic and fluid, rather than as static and predictable.

We also can apply another idea from Gregory Bateson (1979/2002), which has to do with the functioning of a system or relationship. The types of relationships just discussed and other systems may operate to maximize, minimize, or optimize some process. If a

symmetrical relationship is characterized by two people or groups trying to *maximize* control, the relationship is going to change in very different ways from one where the individuals or groups are trying to *optimize* or *minimize* their control. In both the minimizing and maximizing situations, the relationship is likely to be less stable than one that is optimizing. A maximizing symmetrical relationship can lead to outright conflict or warfare, where a minimizing version of this relationship could lead to a halt in communication or to completely unproductive communication. The minimizing symmetrical relationship is one that is based on avoiding conflict at all costs. Table 1 summarizes the functional dimensions of each type of relationship.

Table 1. Bateson’s types of relationships from the perspectives of minimizing, optimizing, and maximizing systems.

FUNCTION TYPE	Minimizing	Optimizing	Maximizing
Symmetrical	Avoidance	Competition	Conflict
Complementary	Lack of Control	Dominant—Submissive	Absolute Control
Reciprocal	Inability to Make Decisions	Negotiable Collaborative	Inability to Make Decisions

From a different perspective, we also have to pay attention to how we describe individual entities (e.g., a person, a component part, an organism) by applying certain attributes or characteristics that are actually descriptions of relationships rather than descriptions of attributes (Bateson, 1979/2002). If we say that a certain person is nasty or aggressive, we are actually describing relationship, not the characteristic of the person. That particular individual is nasty or aggressive in relationship, not as an isolated individual. The same “mistake” occurs in other situations, as well. We often describe sharks

as being aggressive. This label becomes even more problematic. The individual shark may “appear” aggressive in its relationship to its prey, but the added complication is in the “appearance.” Is the shark being aggressive in its relationship to prey, or is it simply doing what it has to do to capture prey and survive. When we observe and analyze relationships, we need to be careful about both what is and is not a part of a relationship and what is a “description” and not an overlay of assumptions, preconceptions, or some sort of belief framework. Of course, this overlay, such as the “aggressive” shark, points to another factor that needs to be addressed – “context.” Although we will discuss context in-depth in another chapter, we need to recognize its importance here. For instance, within the context of a scientific perspective, the relationship between the Earth and the Moon is defined by interactions of their gravitational fields and by the cycle of the Moon’s orbit along with the variations in phases. Throughout the history of humankind within the context of culture, our relationship with the Moon involved the development of a variety of myths, as well as calendars. In still other contexts of human relationships, the Moon may be a third component of a romantic relationship, where the Moonlight adds to the romantic atmosphere. The point here is that context may change or define relationships. What may not be a relationship in one context may be a relationship in another context. If we return to the shark example, within a science context, the shark would not be “aggressive” in its relationships to prey. However, within the context of some creative fiction, such as the book or movie *Jaws*, the shark takes on all kinds of relational characteristics that are not valid within the scientific context, but which make for a thrilling story.

Relationship Dynamics

The dynamics that are involved in establishing and maintaining relationships have been the subject of research in *coordination dynamics*. Kelso and Engstrøm (2006) have been investigating the coordination dynamics of what they call “complementary pairs,” which are ubiquitous across contexts and scales of living systems. From cells to organ systems up to individual organisms and groups of organisms to even larger systems, coordinated relationships between pairings of “things” drive functions and behavior. This notion of *coordination dynamics* is of central importance to functions across all scales of phenomena. In living systems, three basic aspects of such coordination involve: (a) heterogeneity among pairings, (b) non-linear coupling between pairings, and (c) oscillations or rhythms of information or materials exchange between the elements of pairings (see Figure 1).

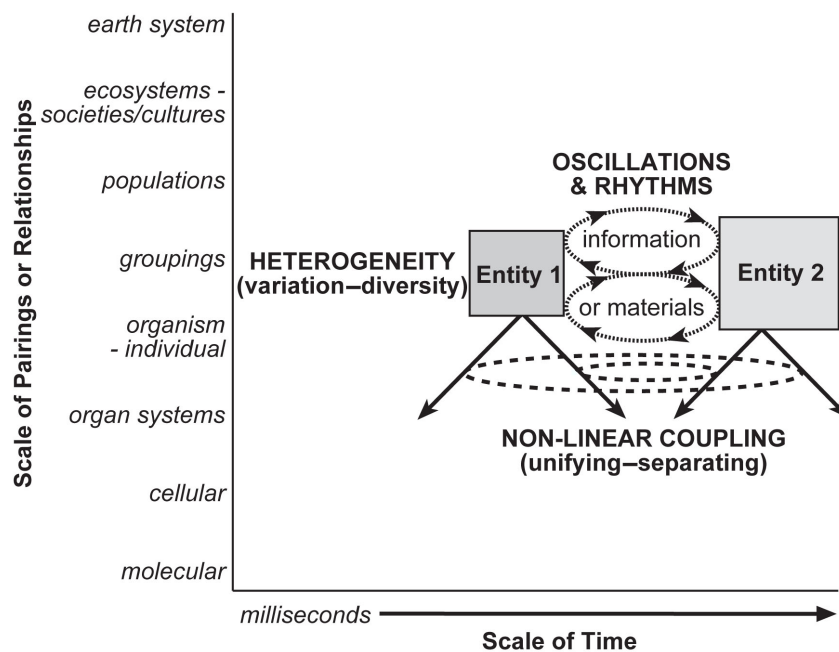


Figure 1. The three fundamental aspects of relational pairings in spatial and temporal scales from the perspective of coordination dynamics.

The notion of heterogeneity is similar to Bateson's (1972/2000; 1979/2002) notion of difference particularly in the domain of creatura (life) vs. pleroma (non-living, physical world). In fact, Kelso and Engstrøm make a point of the importance of difference among living things, whereas in the physical world, homogeneity is common (e.g., atoms). Bateson, Kelso, and Engstrøm would agree that living things are dependent upon and cannot exist without the homogeneity of the physical world. We are made of homogenous relationships among atoms, but beyond that level of relationship we are made of a vast array of variations. Even at the core of life we are made of the relationships between two pairs of heterogeneous elements of the DNA molecule. Various arrangements of this pair of pairs account for the incredible variety of life at all scales and in all dimensions. Differences account for the functioning of each cellular structure, of tissues, of organs and organ systems, of each individual of a species, of the interactions of individuals within a species, of interactions between species, of ecosystems, and of the entire biosphere.

Non-linear coupling involves feedback loops or even more complex cyclical patterns of information flow between the elements in relationship. Again, Bateson's (1979/2002) cybernetic view of relationships involves complex, circular patterns of interconnections. Although we may think that two people in some sort of relationship as engaging in two-way communication, this appearance of bi-directionality is actually much more complex. Within each individual are complex interactions of emotions, values, beliefs, and experiences of all kinds that affect communication and are, in fact, communicated both implicitly and explicitly. At the explicit level, any kind of seemingly back and forth interaction is actually cyclical as each iteration builds upon previous interactions over time. From a different and more contextual perspective, we need to include the information flow from the context to

each individual and then the flow of the effects of contexts in the communication between individuals (Bateson, 1972/2000). These contexts can be cultural, social, physical (e.g., the physical setting), and cognitive—emotional. Some contexts may be more involved in the background of the individual, while other contexts may involve the immediate context in which both individuals are interacting.

These cycles of interactions over time are one part of the oscillations or rhythms of relationships. Cycles are by definition involved in sustaining any kind of system (Volk, 1995). These cyclical oscillations, rhythms, and loops of information and material flow provide for the continuity and stability of systems over time. Communication as one part of social relationships is deeply intertwined in various types of rhythmic and cyclical information flow, which may or may not be verbal. Glances, body language, body movement, eye contact, facial expressions, and emotional states are all part of the communicative complex.

At the scale of social relationships, two people interact in a variety of ways that involve inherent differences, cycles of information flow, and various non-linear ways of coupling or of coming together and separating. These three aspects of relationship do not operate in isolation from one another. Rather, they are dynamically interrelated. The differences between two people or two other elements affect the ways in which they join and separate and the ways in which the oscillations and rhythms occur. As Catherine Bateson (2000) describes, “differences of age and sex crosscut all human lives with experience of Otherness, that which is different, alien, mysterious” (p. 5). We have experienced how our relationships with others vary with both transient and more deeply embedded patterns of difference. We may be very attracted by certain combinations of

differences with some individuals. With others, we may feel aggression or a sense of avoidance. Such feelings oscillate in intensity and affect the ways in which we interact or couple. However, *difference* seems to be the key to relational dynamics, and a necessity to the continuity of interconnections of all kinds. Just as genetic variation is essential to the continuity of ecosystems and species, variation among people is necessary for the continuity of culture, society, and relationships at all scales.

As we have seen, relationships occur at very small scales and extend upwards. When we discuss relationships between people, the scale is usually at a level of two or more individuals within the same context, such as a family or classroom. However, intriguing research at the larger scale of webs or networks of relationships has been going on for several decades. This work has been examining how seemingly unrelated people are somehow connected through their relationships with others, who are connected to still others. This work has been known popularly as “six-degrees of separation,” which originated with the work of Stanley Milgram in the 1960’s (Milgram is the researcher whose work stimulated human subjects regulations, because of his study of obedience and authority while one person was order to induce “shocks” to another person) (Buchanan, 2002). At the beginning of this research, the relational connections were merely that of being acquainted with another person. As time proceeded, the work has looked at how differences in the nature of relationships affects such networks (Buchanan, 2002). James Burke (1999) created a web of relationships in following the development of innovations of various kinds in his book, *The Knowledge Web*. He not only provided insights into how certain people were influenced by others, but also provided additional page and paragraph

links in the margins of the book to allow the reader to follow additional connections in a web-like pattern.

From the perspective of six-degrees of separation, people are connected to each other without necessarily following any thematic or conceptual relationship. This simple network of connections is humbling in many ways. We are much more connected to everyone else around the world, than we may think. When flicking the “finger” at someone while you are driving, we are likely being rude to someone with whom we may only be separated by a degree or two. From Burke’s perspective, we see a network of conceptual and thematic connections, which may not be as numerically robust, but is more robust conceptually and thematically. From such a perspective, it is interesting to follow our own intellectual or conceptual history. What people have influenced our ideas and who influenced those people and so forth. We can develop an intellectual genealogy that could even connect “sideways” when we find others influenced by some of the same people. As teachers and researchers, we may want to pay attention to the ideas and people whose work we use in classes and in our research. Such an approach may be eye-opening when we attempt to uncover the assumptions behind the actions we take and the ideas we promote.

Conceptually-based networks may develop in different ways than networks of simple connections, yet they may end up becoming simple networks. For instance, the “scientific revolution” stimulated by René Descartes in the 17th Century began as a conceptual network that incorporated a wide-range of people during that time period. Two of the major assumptions of this “revolution” were *reductionism* (i.e., if we study the parts of something, we can understand the whole) and *mechanism* (i.e., the living world is like a

machine and can be understood as such). These ideas were further entrenched in society by Isaac Newton during the century that followed. As these ideas of reductionism and mechanism took hold in society they spread throughout a simple network of connections that permeated European and North American societies, then rapidly moved throughout the entire world leaving only a few tribal societies unaffected for a period of time before most of them succumbed to the influence of these assumptions. The insidious nature of such transmission of assumptions across vast networks of connections is that we lose our connection to the intellectual genealogy. The assumptions seem to be self-evident truths. Johann Herbart probably was influenced explicitly by Descartes, as he developed his philosophical and psychological science of pedagogy. His pedagogical work was characteristically mechanistic and included the introduction of *lesson plans* (Lawton & Gordon, 2002). This notion of “lesson plan” became another assumption of teaching practice that permeated a conceptual network, then on into a simple network of connections. The mechanistic practice of lesson plans has lost its intellectual foundations. As a result, it is difficult for teachers to create more intellectually cohesive practices. If a teacher considers herself or himself to be a social constructivist and complexivist in orientation, she or he will attempt to develop practices that are consistent with such an orientation. In the process, this teacher will try to discard mechanistic and other positivistic approaches. However, these simple networks of connections can be insidious. Certain ideas and assumptions, such as those within mechanistic and positivistic frameworks, can permeate all aspects of our personal and professional lives to the point where we may have difficulty tracing the connections to any kind of intellectual history and the theoretical and belief frameworks they represent.

Networks of relationships are powerful. They not only permeate specific cultures and societies, but also cross borders between cultures and societies. They can create cohesive cultural contexts, as well as undermine and distort such contexts. In many tribal cultures, the networks of genealogy and the networks of cultural knowledge are valued and become guiding frameworks for everyday life (Maybury—Lewis, 1992). In our current technological societies, we have lost most of these networks of cultural cohesiveness. How much of our societies are based on ideas and assumptions that have lost their conceptual and relational histories? In education, how many of the subject matter content standards are richly interrelated in ways that the underlying assumptions and concepts are explicit? How much of teaching focuses on seeing and understanding relationships? Where is the cohesiveness that is provided by relationship?

Relationships in Learning, Teaching, and Schooling

Relationships in the contexts of teaching and schooling should be both the central focus of the classroom as a community and the conceptual focus of subject matter learning. However, all too often social and conceptual relationships are not the focus of the day—to—day occurrences in schools and classrooms. Certainly, teachers cannot avoid relationships with students, but do teachers actually work at developing healthy relationships to and among students? At the same time, teachers do make conceptual connections or relationships, but where on scales of importance, relevance, intricacy, and depth do such relationships fall? How much of student learning is about relationships? And, do teachers help students examine the relationships of relationships?

The exploration and study of relationships and networks of relationships should be the emphasis of schooling. Eisner (1998) has promoted the idea of providing opportunities for students to explore the intellectual tapestry that consists of ideas and patterns in context, which are in turn connected to networks of other ideas. He contends that not teaching in this way leads to fragmentation of knowledge and to what Whitehead described as inert knowledge. Eisner also points out that we need to realize that this “tapestry” of knowledge is not static and continues to change. Our institutions of schooling tend not only to promote teaching in ways that fragment knowledge, but also to depict knowledge as static and absolute.

Social relationships in learning contexts have been of critical importance for millennia. The father—son and mother—daughter relationships have been of central importance in learning, but even these relationships seem to have been eroded dramatically over the past century. Of course, apprenticeship models based on relationships for learning beyond just content have been important in a large number of fields (Lave & Wenger, 1991). Recent research on apprenticeship models has been translated into educational practice and theorizing (Bloom, 2002, 2003, 2006; Lave, 1988; Lave & Wenger, 1991; Rogoff, 1990; Rogoff, Goodman Turkkanis, & Bartlett, 2001; Wenger, 1998). Much of this work takes the perspective of classrooms as apprenticeship communities, where the teacher is the mentor and students are apprentices working towards full participation in the community. Such an approach has been more directly addressed in elementary schools, with less emphasis at the middle and high school levels and with even less emphasis at post-secondary levels. At one point, mechanics and other trades people learned from a mentor. Now, for-profit technical schools train people and

often with no direct, personal contact with the instructor (i.e., through web-based instruction). Learning how to think, problem-solve, and work as a trades-person has been severely limited with the demise of the mentor. The same situation occurs at universities and colleges. Of course, large classes in lecture halls presents learning in various subject matter disciplines as only content. The situation is even more disconnected from a potential mentor—apprenticeship relationship in on-line courses. In some programs, students pursuing a degree and certification in teaching may never have a personal relationship with an instructor. Even doctoral programs, which were focused more on a mentor—apprenticeship relationship, have succumbed to mechanistic and jumping—through—the—hoops approaches. Learning how to “be,” how to talk, how think, and how to be a master at one’s discipline is rapidly disappearing as higher level university programs are increasingly based on procedures, policies, and “measureable” content-only achievement.

In classrooms, we need to begin developing relationships with children. As Jayne Fleener (2002) describes, we often view students as objects. In fact, children as quantified objects have been the emphasis of research on children (Graue & Walsh, 1998). However, Fleener suggests that we need to view students as bundles of relationships. We need to *see* relationships rather than see separate objects or things. Seeing others as sets of relationships is more difficult than it may appear. Seeing others as separate objects is a fundamental pattern of dualism and positivism, in general. In order to see relationships, we need to see children and adults in context (Graue & Walsh, 1998). On a more immediate level, we also need to connect and empathize with others. What would it feel like to *be* that other person? What experiences (e.g., happiness, sadness, fear, frustration, et al.) do we

share? Such questions allow us to make an initial connection and develop not only a sense of connection with others, but also a real sense of shared experience or shared humanity. We can extend this “seeing relationships” to the specific students by finding out more about whom they are and even imagining the kinds of relationships that have contributed to whom they are now. In addition to the relationships that have contributed to the complex make-up of each individual, we also need to see each individual within the immediate context. The class clown, the driven high achiever, the tough kid, and the shy student are who they are in the context of the classroom and community relationships. As mentioned, we may categorize, objectify, and place value judgments on each of these students. However, if we see the “tough” kid or class clown in terms of the relationships within the classroom, we can begin to understand more about the dynamics and strengths of each student’s relational make-up and shared humanity.

The problem is not to project one’s own assumptions onto students. At the extreme, Alan Block (1997) describes how adults tend to expect children to be like adults. In fact, we tend to have expectations of children that even adults can rarely meet. We expect children to “be on task” all of the time and not talk to others or doodle or daydream. How many adults can do that? If we actually see children as bundles of relationships, we find that they think and act in very sophisticated ways, while going in and out of fantasy worlds, where imagination and creativity are nourished (Bloom, 1990; Gallas, 1994; Paley, 1990). By expecting something different of children, we undermine relationship, just as expecting an intimate partner to be different. Student teachers are often told to be strict at first then loosen. The assumption in such a recommendation is that teachers are authorities, that

they should be dominant and students submissive, which is Bateson's (1972/2000) classic complementary relationship. Such relationships tend to disconnect rather than connect.

Authoritarian interactions with students are quite common. The underlying assumptions of control, separation or distancing, and objectivity negatively affect the development of relationships, which in turn hinders the development of classrooms as learning communities. Problems arise when teachers act in the ways just described, then ask students to trust, respect, and connect with the teacher and other students and to share in the control of the classroom. In such cases, the teacher implicitly or explicitly distrusts and disrespects students and does not relinquish control to any extent. These conflicting messages from talk and actions set the *context for double binds* (Bateson, 1972/2002, 1991; Doni & Marabello, 2009; Gibney, 2006). When the teacher suggests that students take control over learning and students do so by connecting to relevant and meaningful situations, the teacher ignores or admonishes the students for being off-topic, disruptive, etc. At this point, the double bind is established.

In symmetrical and complementary relationships, as well as in other relationships embedded in double binds, the coordination dynamics that maintain the continuity of relationships are affected. Certainly, all relationships go through rhythms of in the degree of connectedness. However, the stresses of symmetrical and complementary interactions and of double binds can push relationships toward separation and disconnection. In classrooms, other stresses may hinder the development and enhancement of relationships. These stresses may involve the school policies that affect the atmosphere and interactions among students and teachers. A principal, who bans all water bottles in reaction to a single student drinking alcohol out of a water bottle and who creates other equally strict policies,

creates an authoritarian atmosphere of distrust that serves only to disconnect students from the school, teachers, and one another. The stresses of high stakes testing, lack of respect for teachers, school and/or community violence, teaching to the test, and many other situations and actions negatively affect the coordination dynamics of relationships. Such contextual stresses on relationships are often directed at achieving some sort of conformity, which acts to subvert the variation that is an essential part of coordination dynamics. These stresses also throw off the rhythms and disrupt the non-linear coupling processes that serve to coordinate and maintain relationships.

In order to create schools and classrooms where positive relationships are fostered, we need to consider how to support the coordination dynamics. Of course, the dominant characteristic of school relationships should be reciprocal. Even though relationships may become symmetrical and complementary from time to time, the fundamental pattern of relationships should be one of shared respect, equal status, and negotiation of terms and constraints (i.e., reciprocal). In terms of the everyday activities within the school or classroom, students need to value diversity, variation, and other differences. The rhythms and processes of non-linear coupling between students and between students and teachers need to focus on connecting across such differences, looking for shared human experiences, and negotiating how they will cooperate and work towards a community with shared governance.

The question remains as to how we can work effectively with children or adult students in ways that build and not undermine relationship? A major part of the answer to this question lies within what Dobson (2008) refers to as “authentic presence.”

Fundamentally, such authenticity involves openness and a willingness to be vulnerable. In

classrooms where teachers manifest this presence, the effect can be transformative (as shown by Dobson). Within this framework of openness and vulnerability, other aspects of the context and relationships may include trust, respect, being oneself (which also can involve confidence and courage), shared power and control, honesty, directness, and so forth.

Researching Relationships

Research on relationships has not been particularly direct or explicit. Research that has in one way or another involved the relationships of children and teachers has been, for the most part, couched in other terms, such as friendship, interactions, and aggression. In addition, most research has focused on objectifying children, operationalizing behaviors, and quantifying observations (Graue & Walsh, 1998). Each of these actions (of objectifying, operationalizing, and quantifying) ignores the depth, extent, complexity, and contexts of relationships. For example, in a classroom argument about the concept of density, children were shouting at each other, telling each other they were “wrong,” and standing then walking over to other students’ tables (Bloom, 2001). From an objectivist perspective, the behaviors of children are operationalized and described in terms of the researcher’s assumptions about such behaviors, such as standing as an aggressive posturing. However, such an approach ignores the contexts in which these children live and the contexts of their pre-existing and continuing relationships. How does knowing that the primary students involved in the argument were actually good friends who loved to argue with one another change our understandings of the relationship?

For the most part personal and social relationships are studied through the paradigmatic lenses of positivism, objectivism, reductionism, and mechanism (all of which are involved in behaviorism). If we look through such journals as the *Journal of Social and Personal Relationships* and *Personal Relationships* or at research groups, such as the Relationship Research Institute (<http://www.rrinstitute.com/>), the vast majority of research falls within these paradigmatic lenses. In fact, even within fields that are critical of positivism, such as the complexity sciences, positivism and associated paradigms insidiously work their way into the research in such fields. The seduction of positivism is powerful in that it tries to provide a neatly structured and predictable view of our world (Bloom, 2011). However, relationships are particularly messy and unpredictable. Such paradigmatic approaches fall short of capturing the fundamental patterns of relationships and the contexts within which they exist.

From the perspective of the complexity sciences, we need to use different methods to examine relationships, some of which we may need to develop from scratch. In doing so, we need to be especially cautious of the assumptions that may creep into and undermine our work. In planning and conducting research, we also need to keep in mind the following points in order to avoid the traps of conflicting assumptions and paradigms. We need research approaches that:

- value and “see” the non-linear nature of relationships.
- are sensitive to the variation within individuals and the diversity between individuals.
- can monitor the rhythms and oscillations within relationships.

- can describe the multiple contexts, which affect and are affected by relationships.
- can describe how relationships within settings, such as schools and classrooms, become the “fabric” or networks of such contexts.
- can describe additional aspects of the nature and dynamics of relationships and how we can foster authentic relationships in various contexts. Such approaches need to be able to investigate the depths and dynamics of authentic presence as a pre-requisite to authentic relationships (Dobson, 2008).
- in terms of the content of teaching, focus on how teachers teach and students learn about relationships.
- can investigate how the understanding of relationships affects critical thinking, problem-solving, creativity, and transfer of learning.
- can examine teacher thinking as it applies to the dilemmas encountered when teaching relationships (Trumbull, 1999; Windschitl, 2002).

While paying attention to these points, we need to sharpen our awareness and sensitivity to the underlying assumptions of the methods we use. If positivistic assumptions start creeping in, we may find ourselves missing important aspects of relationships or, even worse, misinterpreting our data as something other than what is actually occurring.

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